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Sampling and Analysis Data Document for:

Lawrence Livermore National Laboratory
Sandia National Laboratories - Livermore

This document contains uninterpreted sampling and analytical data. The data will be interpreted by the DOE Environmental Survey Team and used to modify, as appropriate, the tentative Survey findings contained in the Environmental Survey Preliminary Report. Final Survey findings will be presented in the Environmental Survey Summary Report.

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Volume II A

June 1989

DEPARTMENT OF ENERGY

ENVIRONMENTAL SURVEY

ORNL/TM-11174

LAWRENCE LIVERMORE NATIONAL LABORATORY AND SANDIA NATIONAL LABORATORIES - LIVERMORE SAMPLING AND ANALYSIS DATA DOCUMENT

(DRAFT)

June 1989

Prepared by:
DOE Environmental Survey and
Oak Ridge National Laboratory

Operated by
Martin Marietta Energy Systems, Inc.

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for the
U.S. Department of Energy

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Appendix A

UPDATED LIST OF SAMPLING AND ANALYTICAL REQUESTS

TABLE A.1
LIVERMORE/SANDIA SITE ENVIRONMENTAL SAMPLES
WITH FIELD QC SAMPLES
SORTED BY ENVIRONMENTAL PROBLEM AND REQUEST NUMBER

REQ NUMB	PROB NUMB	ST	DATE COLL. DD/MM/YY	LOCATION	TYPE LOCATION	MEDIA	NUMB SAMP ACTUAL	NUMB SAMP PLANNED	TYPE	ANIONS ACTUAL	ANIONS PLANNED	METALS ACTUAL	METALS PLANNED	O&G ACTUAL	O&G PLANNED	HE ACTUAL	HE PLANNED	PES/H/PCB ACTUAL	PES/H/PCB PLANNED	SEMIVOLS ACTUAL	SEMIVOLS PLANNED	VOLS ACTUAL	VOLS PLANNED	RADS ACTUAL	RADS PLANNED
LL001	1		04/08/87	ARROYO SECO	ARROYO	SEDIMENT	3	3	BKGRN	0	0	3	3	0	0	0	0	3	3	3	3	3	3	3	3
LL001	1		04/08/87	ARROYO SECO	ARROYO	SUR WATER	1	1	QC RN	0	0	1	1	0	0	0	0	0	1	1	1	1	1	1	1
LL002	1		04/08/87	ARROYO SECO	ARROYO	SEDIMENT	3	3	S COM	0	0	3	3	0	0	0	0	3	3	3	3	3	3	3	3
LL003	1		06/08/87	TRAILER STG	ARROYO	SEDIMENT	3	3	GRAB	0	0	3	3	0	0	0	0	3	3	3	3	3	3	3	3
LL003	1		06/08/87	TRAILER STG	ARROYO	SUR WATER	1	1	QC RN	0	0	1	1	0	0	0	0	0	1	1	1	1	1	1	1
LL004	1		05/08/87	RET. BASIN	ARROYO	SEDIMENT	4	4	GRAB	0	0	3	3	0	0	0	0	0	4	4	4	4	4	3	3
LL005	1		06/08/87	LAS POSITAS	ARROYO	SEDIMENT	3	3	BKGRN	0	0	3	3	0	0	0	0	3	3	3	3	3	3	3	3
LL006	1		06/08/87	LAS POSITAS	ARROYO	SEDIMENT	3	3	GRAB	0	0	3	3	0	0	0	0	3	3	3	3	3	3	3	3
LL006	1		06/08/87	LAS POSITAS	ARROYO	SUR WATER	1	1	QC RN	0	0	1	1	0	0	0	0	0	1	1	1	1	1	1	1
LL007	1		06/08/87	LAS POSITAS	ARROYO	SEDIMENT	3	3	GRAB	0	0	3	3	0	0	0	0	3	3	3	3	3	3	3	3
LL008	1		07/08/87	LAS POSITAS	ARROYO	SEDIMENT	3	3	GRAB	0	0	3	3	0	0	0	0	3	3	3	3	2	3	3	3
LL009	1		07/08/87	LAS POSITAS	ARROYO	SEDIMENT	3	3	GRAB	0	0	3	3	0	0	0	0	3	3	3	3	3	3	3	3
LL010	1	DELETED		SHIELD BLDG	ARROYO	SEDIMENT	0	3	GRAB	0	0	0	3	0	0	0	0	0	3	0	3	0	3	0	3
LL010	1	DELETED		SHIELD BLDG	ARROYO	SUR WATER	0	1	QC RN	0	0	0	1	0	0	0	0	0	1	0	1	0	1	0	1
LL011	1		11/08/87	N OF 4TH ST	ARROYO	SEDIMENT	3	3	GRAB	0	0	3	3	0	0	0	0	3	3	3	3	3	3	3	3
SN001	1		11/08/87	ARROYO SECO	ARROYOS	SEDIMENT	3	3	BKGRN	0	0	3	3	0	0	0	0	3	3	3	3	3	3	3	3
SN001	1		11/08/87	ARROYO SECO	ARROYOS	SUR WATER	1	1	QC RN	0	0	1	1	0	0	0	0	0	1	1	1	1	1	1	1
SN002	1		11/08/87	ARROYO SECO	ARROYOS	SEDIMENT	3	3	GRAB	0	0	3	3	0	0	0	0	0	3	2	3	3	3	3	3
SN003	1		11/08/87	ARROYO SECO	ARROYOS	SEDIMENT	3	3	GRAB	0	0	3	3	0	0	0	0	0	3	3	3	3	3	3	3
SN004	1	DELETED		ARROYO SECO	ARROYOS	SEDIMENT	0	1	GRAB	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1
SN004	1		13/08/87	ARROYO SECO	ARROYOS	SEDIMENT	3	3	GRAB	0	0	3	3	0	0	0	0	3	3	3	3	3	3	3	3
LL012	2	DELETED		BLDG. 131	SEWERS	SUR WATER	0	1	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
LL012	2	DELETED		BLDG. 151	SEWERS	SUR WATER	0	1	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
LL012	2	DELETED		BLDG. 169	SEWERS	SUR WATER	0	1	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
LL012	2	DELETED		BLDG. 175	SEWERS	SUR WATER	0	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
LL012	2	DELETED		BLDG. 175	SEWERS	SUR WATER	0	3	T COM	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	3
LL012	2	DELETED		BLDG. 222	SEWERS	SUR WATER	0	2	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
LL012	2	DELETED		BLDG. 241	SEWERS	SUR WATER	0	1	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
LL012	2	DELETED		BLDG. 298	SEWERS	SUR WATER	0	1	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
LL012	2	DELETED		BLDG. 321	SEWERS	SUR WATER	0	1	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
LL012	2	DELETED		BLDG. 322	SEWERS	SUR WATER	0	1	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
LL012	2	DELETED		BLDG. 331	SEWERS	SUR WATER	0	1	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
LL012	2	DELETED		BLDG. 511	SEWERS	SUR WATER	0	1	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
LL012	2		05/08/87	BLDG. 131	SEWERS	SUR WATER	2	2	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
LL012	2		05/08/87	BLDG. 131	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	0	0	2	2	0	0
LL012	2		05/08/87	BLDG. 169	SEWERS	SUR WATER	2	2	GRAB	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		05/08/87	BLDG. 169	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	0	0	2	2	0	0
LL012	2		05/08/87	BLDG. 298	SEWERS	SUR WATER	2	2	GRAB	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		05/08/87	BLDG. 298	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	0	0	2	2	0	0
LL012	2		05/08/87	BLDG. 321	SEWERS	SUR WATER	2	2	GRAB	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		05/08/87	BLDG. 321	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	0	0	2	2	0	0
LL012	2		05/08/87	BLDG. 322	SEWERS	SUR WATER	2	2	GRAB	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		05/08/87	BLDG. 322	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	0	0	2	2	0	0

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TABLE A.1
LIVERMORE/SANDIA SITE ENVIRONMENTAL SAMPLES
WITH FIELD QC SAMPLES
SORTED BY ENVIRONMENTAL PROBLEM AND REQUEST NUMBER

REQ NUMB	PROB NUMB	ST	DATE COLL. DD/MM/YY	LOCATION	TYPE LOCATION	MEDIA	NUMB SAMP ACTUAL	NUMB SAMP PLANNED	TYPE	ANIONS ACTUAL	ANIONS PLANNED	METALS ACTUAL	METALS PLANNED	O&G ACTUAL	O&G PLANNED	HE ACTUAL	HE PLANNED	PES/H/PCB ACTUAL	PES/H/PCB PLANNED	SEMIVOLS ACTUAL	SEMIVOLS PLANNED	VOLS ACTUAL	VOLS PLANNED	RADS ACTUAL	RADS PLANNED
LL012	2		05/08/87	BLDG. 511	SEWERS	SUR WATER	1	1	QC FL	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		05/08/87	BLDG. 511	SEWERS	SUR WATER	1	1	QC RN	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		06/08/87	BLDG. 131	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		06/08/87	BLDG. 131	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		06/08/87	BLDG. 169	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		06/08/87	BLDG. 169	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		06/08/87	BLDG. 298	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0
LL012	2		06/08/87	BLDG. 298	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		06/08/87	BLDG. 321	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0
LL012	2		06/08/87	BLDG. 321	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		06/08/87	BLDG. 322	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		06/08/87	BLDG. 322	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		06/08/87	BLDG. 511	SEWERS	SUR WATER	1	1	QC FL	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		07/08/87	BLDG. 131	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		07/08/87	BLDG. 131	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		07/08/87	BLDG. 169	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		07/08/87	BLDG. 169	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		07/08/87	BLDG. 298	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		07/08/87	BLDG. 298	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		07/08/87	BLDG. 321	SEWERS	SUR WATER	4	4	GRAB	0	0	1	1	0	0	0	0	0	0	1	1	3	3	1	1
LL012	2		07/08/87	BLDG. 322	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		07/08/87	BLDG. 322	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		10/08/87	BLDG. 151	SEWERS	SUR WATER	2	2	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0
LL012	2		10/08/87	BLDG. 151	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		10/08/87	BLDG. 222	SEWERS	SUR WATER	4	4	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0
LL012	2		10/08/87	BLDG. 222	SEWERS	SUR WATER	2	2	T COM	0	0	2	2	0	0	0	0	0	0	2	2	0	0	2	2
LL012	2		10/08/87	BLDG. 241	SEWERS	SUR WATER	3	3	GRAB	0	0	1	1	0	0	0	0	0	0	1	1	2	2	1	1
LL012	2		10/08/87	BLDG. 331	SEWERS	SUR WATER	2	2	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0
LL012	2		10/08/87	BLDG. 331	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		10/08/87	BLDG. 511	SEWERS	SUR WATER	2	2	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0
LL012	2		10/08/87	BLDG. 511	SEWERS	SUR WATER	1	1	QC RN	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		10/08/87	BLDG. 511	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		11/08/87	BLDG. 151	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		11/08/87	BLDG. 151	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		11/08/87	BLDG. 222	SEWERS	SUR WATER	6	6	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	6	6	0	0
LL012	2		11/08/87	BLDG. 222	SEWERS	SUR WATER	2	2	T COM	0	0	2	2	0	0	0	0	0	0	2	2	0	0	2	2
LL012	2		11/08/87	BLDG. 241	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		11/08/87	BLDG. 241	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		11/08/87	BLDG. 331	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		11/08/87	BLDG. 331	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	0	1	0	0	1	1
LL012	2		11/08/87	BLDG. 511	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		11/08/87	BLDG. 511	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	0	1	0	0	1	1

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TABLE A.1
LIVERMORE/SANDIA SITE ENVIRONMENTAL SAMPLES
WITH FIELD QC SAMPLES
SORTED BY ENVIRONMENTAL PROBLEM AND REQUEST NUMBER

REQ NUMB	PROB NUMB	ST	DATE COLL. DD/MM/YY	LOCATION	TYPE LOCATION	MEDIA	NUMB SAMP ACTUAL	NUMB SAMP PLANNED	TYPE	ANIONS ACTUAL	ANIONS PLANNED	METALS ACTUAL	METALS PLANNED	O&G ACTUAL	O&G PLANNED	HE ACTUAL	HE PLANNED	PES/H/PCB ACTUAL	PES/H/PCB PLANNED	SEMIVOLS ACTUAL	SEMIVOLS PLANNED	VOLS ACTUAL	VOLS PLANNED	RADS ACTUAL	RADS PLANNED
LL012	2		12/08/87	BLDG. 151	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		12/08/87	BLDG. 151	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		12/08/87	BLDG. 222	SEWERS	SUR WATER	6	6	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	6	6	0	0
LL012	2		12/08/87	BLDG. 222	SEWERS	SUR WATER	2	2	T COM	0	0	2	2	0	0	0	0	0	0	2	2	0	0	2	2
LL012	2		12/08/87	BLDG. 241	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		12/08/87	BLDG. 241	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		12/08/87	BLDG. 331	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		12/08/87	BLDG. 331	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
LL012	2		12/08/87	BLDG. 511	SEWERS	SUR WATER	3	3	GRAB	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
LL012	2		12/08/87	BLDG. 511	SEWERS	SUR WATER	1	1	T COM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1
SN005	2	DELETED		BLDG. 913	BLDG 913	UNSEAL CO	0	1	GRAB	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1
SN005	2		10/08/87	BLDG. 913	BLDG 913	UNSEAL CO	1	1	GRAB	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1
SN005	2		11/08/87	BLDG. 913	BLDG 913	SUR WATER	1	1	QC RN	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1
SN005	2		11/08/87	BLDG. 913	BLDG 913	UNSEAL CO	1	1	GRAB	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1
SN005	2		12/08/87	BLDG. 913	BLDG 913	UNSEAL CO	1	1	GRAB	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1
LL013	3	DELETED		BLDG. 612	DITCH	SEDIMENT	0	1	GRAB	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1
LL013	3		11/08/87	BLDG. 612	DITCH	SEDIMENT	3	3	GRAB	0	0	3	3	0	0	0	0	0	0	3	3	3	3	3	3
SN006	3		10/08/87	SPRAY BOOTH	SPRAY BOOTH	SUR WATER	1	1	QC FL	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1
SN006	3		10/08/87	SPRAY BOOTH	SPRAY BOOTH	SUR WATER	3	3	GRAB	0	0	3	3	0	0	0	0	0	0	3	3	3	3	3	3
LL014	4		04/08/87	BLDG. 131	TANK	SEALED CO	1	1	GRAB	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	1
LL015	4		04/08/87	BLDG. 141	SUMP	SUR WATER	1	1	QC RN	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1
LL015	4		04/08/87	BLDG. 141	SUMP	UNSEAL CO	1	1	GRAB	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1
LL016	4		13/08/87	BLDG. 141	SUMP	UNSEAL CO	1	1	GRAB	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1
LL017	4		13/08/87	BLDG. 141	SUMP	UNSEAL CO	1	1	GRAB	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1
LL018	4		13/08/87	BLDG. 151	TANK	UNSEAL CO	1	1	GRAB	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1
LL019	4		13/08/87	BLDG. 151	TANK	UNSEAL CO	1	1	GRAB	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1
LL020	4		11/08/87	BLDG. 222	TANK	UNSEAL CO	1	1	GRAB	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1
LL021	4		11/08/87	BLDG. 222	TANK	UNSEAL CO	1	1	GRAB	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1
LL022	4		04/08/87	BLDG. 231	SUMP	SUR WATER	1	1	QC RN	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1
LL022	4		04/08/87	BLDG. 231	SUMP	SEALED CO	1	1	GRAB	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1
LL023	4	DELETED		BLDG. 231	SUMP	SUR WATER	0	1	QC FL	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1
LL023	4	DELETED		BLDG. 231	SUMP	UNSEAL CO	0	1	GRAB	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1
LL024	4		11/08/87	BLDG. 298	TANK	UNSEAL CO	1	1	GRAB	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1
LL025	4		11/08/87	BLDG. 321	SUMP	SUR WATER	1	1	QC FL	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0
LL025	4		12/08/87	BLDG. 321	SUMP	UNSEAL CO	1	1	GRAB	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1
LL026	4		12/08/87	BLDG. 492	SUMP	UNSEAL CO	1	1	GRAB	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1
SN007	4		13/08/87	NAVY LANDFIL	INACTIVE SI	SEDIMENT	6	6	GRAB	0	0	6	6	0	0	0	0	0	0	6	6	6	6	6	6
SN008	4		13/08/87	EXP BURN PIT	INACTIVE SI	SOIL	3	3	GRAB	0	0	3	3	0	0	0	0	0	0	3	3	3	3	3	3
SN008	4		13/08/87	EXP BURN PIT	INACTIVE SI	SUR WATER	1	1	QC RN	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1
SN009	4		12/08/87	OLD FIRE TRA	INACTIVE SI	SOIL	1	1	GRAB	0	0	1	1	0	0	0	0	0	0	1	1	1	1	0	0
SN009	4		13/08/87	OLD FIRE TRA	INACTIVE SI	SOIL	3	3	GRAB	0	0	3	3	0	0	0	0	0	0	3	3	3	3	0	0
SN010	4	DELETED		SANDIA CROSS	INACTIVE SI	SOIL	0	1	GRAB	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0

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TABLE A.1
LIVERMORE/SANDIA SITE ENVIRONMENTAL SAMPLES
WITH FIELD QC SAMPLES
SORTED BY ENVIRONMENTAL PROBLEM AND REQUEST NUMBER

REQ NUMB	PROB NUMB	ST	DATE COLL. DD/MM/YY	LOCATION	TYPE LOCATION	MEDIA	NUMB SAMP ACTUAL	NUMB SAMP PLANNED	TYPE	ANIONS ACTUAL	ANIONS PLANNED	METALS ACTUAL	METALS PLANNED	O&G ACTUAL	O&G PLANNED	HE ACTUAL	HE PLANNED	PES/H/PCB ACTUAL	PES/H/PCB PLANNED	SEMIVOLS ACTUAL	SEMIVOLS PLANNED	VOLS ACTUAL	VOLS PLANNED	RADS ACTUAL	RADS PLANNED
SN010	4		12/08/87	SANDIA CROSS	INACTIVE	SISOIL	5	5	GRAB	0	0	5	5	0	0	0	0	0	0	5	5	5	5	0	0
SN011	4		DELETED	OLD PAINT ST	INACTIVE	SISOIL	0	3	GRAB	0	0	0	3	0	0	0	0	0	0	0	3	0	3	0	3
SN011	4		13/08/87	OLD PAINT ST	INACTIVE	SISOIL	3	3	GRAB	0	0	3	3	0	0	0	0	0	0	3	3	3	3	3	3
LL027	* 5		12/08/87	BLDG. 514	WASTE	SEDIMENT	9	9	GRAB	0	0	0	9	0	0	0	0	0	0	0	9	0	0	0	0
LL027	5		12/08/87	BLDG. 514	WASTE	SUR WATER	1	1	QC RN	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0
LL028	6		12/08/87	BLDG. 321	DRUMRACKS	SOIL	4	4	GRAB	0	0	4	4	0	0	0	0	0	0	4	4	4	4	0	0
LL029	6		07/08/87	875/878	CULVERT	SEDIMENT	3	3	GRAB	0	0	3	3	3	3	0	0	0	0	3	3	3	3	3	3
LL030	6		07/08/87	N OF 875	CULVERT	SOIL	4	4	GRAB	0	0	4	4	4	4	0	0	0	0	4	4	4	4	4	4
LL031	6		DELETED	GSA AREA	GSA AREA	SOIL	0	1	GRAB	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	1
LL031	6		DELETED	GSA AREA	GSA AREA	SUR WATER	0	1	QC RN	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	1
LL031	6		10/08/87	GSA AREA	GSA AREA	SOIL	15	15	GRAB	0	0	15	15	15	15	0	0	0	0	15	15	15	15	15	15
LL032	6		DELETED	DRUM RACK	SUMP	SOIL	0	3	GRAB	0	0	0	0	0	3	0	0	0	0	0	3	0	3	0	0
LL032	6		DELETED	DRUM RACK	SUMP	SEDIMENT	0	9	S COM	0	0	0	0	0	9	0	0	0	0	0	9	0	9	0	0
LL032	6		10/08/87	DRUM RACK	SUMP	SOIL	3	3	GRAB	0	0	0	0	3	3	0	0	0	0	3	3	3	3	0	0
LL032	6		10/08/87	DRUM RACK	SUMP	SOIL	6	6	S COM	0	0	0	0	6	6	0	0	0	0	6	6	6	6	0	0
LL032	6		10/08/87	DRUM RACK	SUMP	SEDIMENT	3	3	S COM	0	0	0	0	3	3	0	0	0	0	3	3	3	3	0	0
LL032	6		10/08/87	DRUM RACK	SUMP	SUR WATER	1	1	QC RN	0	0	0	0	1	1	0	0	0	0	1	1	1	1	0	0
LL033	6		05/08/87	BLDG. 805	DRAINS	SEDIMENT	3	3	GRAB	0	0	3	3	0	0	0	0	0	0	3	3	3	3	3	3
LL034	7		10/08/87	BURN PIT	PITS	SOIL	12	12	GRAB	0	0	12	12	0	0	12	12	0	0	12	12	12	12	12	12
LL034	7		10/08/87	BURN PIT	PITS	SUR WATER	1	1	QC RN	0	0	1	1	0	0	1	1	0	0	1	1	1	1	1	1
LL035	8		06/08/87	DIESEL TANKR	TANKS	UNSEAL CO	3	3	S COM	0	0	3	3	0	0	0	0	3	3	0	0	0	0	0	0
LL035	8		07/08/87	DIESEL TANKR	TANKS	UNSEAL CO	3	3	S COM	0	0	3	3	0	0	0	0	3	3	0	0	0	0	0	0
LL036	9		04/08/87	GSA AREA	WELLS	SOIL	1	1	GRAB	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1
LL036	9		05/08/87	GSA AREA	WELLS	SOIL	2	2	GRAB	0	0	2	2	0	0	0	0	0	0	0	2	1	2	2	2
LL036	9		06/08/87	GSA AREA	WELLS	SOIL	1	1	GRAB	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1
LL036	9		07/08/87	GSA AREA	WELLS	SOIL	3	3	GRAB	0	0	3	3	0	0	0	0	1	0	3	3	3	3	3	3
LL036	9		07/08/87	GSA AREA	WELLS	SUR WATER	1	1	QC RN	0	0	1	1	0	0	0	0	0	0	1	1	0	1	1	1
LL036	9		10/08/87	GSA AREA	WELLS	SOIL	3	3	GRAB	0	0	3	3	0	0	0	0	0	0	3	3	3	3	3	3
LL036	9		11/08/87	GSA AREA	WELLS	SOIL	3	12	GRAB	0	0	3	12	0	0	0	0	0	0	3	12	3	12	3	12
LL037	10		DELETED	STP OVERFLOW	POND	SUR WATER	0	1	QC RN	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	1
LL037	10		06/08/87	STP OVERFLOW	POND	SEDIMENT	3	3	GRAB	0	0	3	3	3	3	0	0	0	0	3	3	3	3	3	3
LL038	10		DELETED	STP MAIN	POND	SEDIMENT	0	1	GRAB	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1
LL038	10		07/08/87	STP MAIN	POND	SEDIMENT	4	4	GRAB	0	0	4	4	0	0	0	0	1	0	4	4	4	4	4	4
LL039	11		05/08/87	865 AREA	DITCH	SEDIMENT	4	4	GRAB	0	0	4	4	0	0	0	0	0	0	4	4	4	4	4	4
LL040	12		10/08/87	CORRAL H CRK	ARROYO	SEDIMENT	3	3	BKGRN	0	0	3	3	0	0	0	0	0	0	0	0	0	0	3	3
LL041	12		10/08/87	CORRAL H CRK	DITCH	SEDIMENT	3	3	GRAB	0	0	3	3	0	0	0	0	0	0	0	0	0	0	3	3
LL042	12		10/08/87	CORRAL H CRK	CREEK	SEDIMENT	3	3	GRAB	0	0	3	3	0	0	0	0	0	0	0	0	0	0	3	3
LL043	12		DELETED	CORRAL H CRK	DITCH	SEDIMENT	0	3	GRAB	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3
LL044	13		05/08/87	FIRING TABLE	DITCHES	SEDIMENT	9	9	GRAB	0	0	9	9	0	0	0	0	0	0	0	0	0	0	9	9
LL044	13		05/08/87	FIRING TABLE	DITCHES	SUR WATER	1	1	QC RN	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
LLN02	99		05/08/87	TRIP BLANK	TRIP BLANK	WATER	1	1	QC BL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
LLN05	99		06/08/87	TRIP BLANK	TRIP BLANK	WATER	1	1	QC BL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0

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TABLE A.1
LIVERMORE/SANDIA SITE ENVIRONMENTAL SAMPLES
WITH FIELD QC SAMPLES
SORTED BY ENVIRONMENTAL PROBLEM AND REQUEST NUMBER

REQ NUMB	PROB NUMB	ST	DATE COLL. DD/MM/YY	LOCATION	TYPE LOCATION	MEDIA	NUMB SAMP ACTUAL	NUMB SAMP PLANNED	TYPE	ANIONS ACTUAL	ANIONS PLANNED	METALS ACTUAL	METALS PLANNED	O&G ACTUAL	O&G PLANNED	HE ACTUAL	HE PLANNED	PES/H/PCB ACTUAL	PES/H/PCB PLANNED	SEMIVOLS ACTUAL	SEMIVOLS PLANNED	VOLS ACTUAL	VOLS PLANNED	RADS ACTUAL	RADS PLANNED
LLN07	99		06/08/87	TRIP BLANK	TRIP BLANK	WATER	1	1	QC BL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
LLN09	99		07/08/87	TRIP BLANK	TRIP BLANK	WATER	1	1	QC BL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
LLN12	99		10/08/87	TRIP BLANK	TRIP BLANK	WATER	1	1	QC BL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
LLN14	99		11/08/87	TRIP BLANK	TRIP BLANK	WATER	1	1	QC BL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
LLN14	99		11/08/87	TRIP BLANK	TRIP BLANK	WATER	1	1	QC BL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
LLN15	99		11/08/87	TRIP BLANK	TRIP BLANK	WATER	1	1	QC BL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
LLN19	99		11/08/87	TRIP BLANK	TRIP BLANK	WATER	1	1	QC BL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
LLN23	99		12/08/87	TRIP BLANK	TRIP BLANK	WATER	1	1	QC BL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
LLN27	99		13/08/87	TRIP BLANK	TRIP BLANK	WATER	1	1	QC BL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
LLN29	99		13/08/87	TRIP BLANK	TRIP BLANK	WATER	1	1	QC BL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
LLN31	99		13/08/87	TRIP BLANK	TRIP BLANK	WATER	1	1	QC BL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
LLN33	99		14/08/87	TRIP BLANK	TRIP BLANK	WATER	1	1	QC BL	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
						TOTAL	349	407		10	10	224	265	39	54	13	13	41	57	198	254	272	329	203	234

* DATA ANALYSES WILL NOT BE PRESENTED WITHIN THIS DATA DOCUMENT, BUT WILL BE PRESENTED UNDER SEPARATE COVER.

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Appendix B

BACKGROUND CONCENTRATION LEVELS OF ANALYTES

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APPENDIX B
BACKGROUND CONCENTRATION LEVELS OF ANALYTES

The purpose of Appendix B is to provide data on the level of contaminants in environmental samples that are expected from sources other than site operations. The data provided in Tables B.1 and B.2 are from previously published sources and were not obtained as part of the Survey.

A limited amount of background data are available for metals, anions, organics, and radionuclides in ground and surface water. The data in Table B.1 are from off-site monitoring in the vicinity of Site 300. Unfortunately, no explanation of the coding was provided in the report; therefore, ground and surface water samples could not be reported separately. If tritium values are used for surface and well water from on-site of Site 300, a value of 1.16×10^{-7} uCi/L is obtained as compared with 1.45×10^{-7} uCi/L for the off-site samples.

In Table B.2, radionuclides in soils in the Livermore Valley and Site 300 are provided. It must be noted that the results for Site 300 were obtained from sampling sites near high explosive testing. In particular, the explosives in some cases contained uranium-238; thus, the uranium values may have been suspect. However, only one out of 15 samples contained uranium at about 150 times higher than the mean calculated without the single outlier.

Table B.1. WATER-QUALITY PARAMETERS IN GROUND AND SURFACE WATERS IN THE VICINITY OF SITE 300.[a]

Nonradiological Analyte In mg/L[b] ($\pm$26)[c]

Arsenic	0.0037	(0.0097)
Barium	0.052	(0.033)
Lead	0.013	(0.050)
Selenium	0.0014	(0.0023)
Fluoride	0.576	(0.459)
Nitrate (as N)	22.14	(62.23)

Radiological Analyte In 10^{-9} uCi/mL ($\pm$26)[c]

Gross alpha	2.41	(3.11)
Gross beta	12.64	(27.82)
Tritium	145.82	(113.82)

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a. Holland, R. C. and D. D. Brekke 1988. Environmental monitoring at the Lawrence Livermore National Laboratory - 1987. UCRL-50027-87.

b. Concentrations of cadmium, chromium, mercury, silver, beryllium, and organic primary drinking water standard analytes were below the analytical quantitation limits.

c. Mean and standard deviations were calculated using half-value for results reported as less than (<).

Table B.2. VARIOUS RADIONUCLIDES IN SOILS FROM LIVERMORE VALLEY AND SITE 300.[a] (Sampling depth = 0 to 5 cm)

	^{239}Pu	^{40}K	^{137}Cs	^{232}Th	^{238}U
Units	10^{-9}uCi/dry g	10^{-6}uCi/dry g	10^{-6}uCi/dry g	ug/dry g	ug/dry g
		Livermore Valley			
Mean	3.4 (30.7)[b]	13.1	0.19	0.8	0.8
2 SD[c]	0.18 (6.45)[b]	2.75	0.18	0.13	0.25
		Site 300			
Mean	3.1	13.1	0.15	1.1 (59)[b]	1.0
2 SD[c]	2.1	2.1	0.10	0.66 (173)[b]	0.39

a. Holland, R. C. and D. D. Brekke 1988. Environmental Monitoring at the Lawrence Livermore National Laboratory-1987. UCRL-50027-87.

b. Outlier. Values with outliers included are in parenthesis.

c. Two sigma standard deviation.

Appendix C

AUDITS

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- NEIC Laboratory Evidence Audit Report - August 25, 1987.	C-5
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- Attachment to EMSL-LV fourth quarter Organic Performance Evaluation Study (QB4, FY88). C-295
- Corrective actions letter for QB4, FY88. C-299
- Letter (with attachments) dated August 8, 1988, from Harold A. Vincent to William R. Laing. Subject: Results of ORNL participation in the EMSL-LV third quarter Organic Performance Evaluation Study (QB3, FY88). C-303
- EMSL-LV third quarter Organic Performance Evaluation Study (QB3, FY88). C-305
- Corrective actions letter for QB3, FY88. C-315
- Letter (with attachments) dated May 16, 1988, from Larry C. Butler to John E. Caton. Subject: Results of ORNL participation in the EMSL-LV second quarter Organic Performance Evaluation Study (QB2, FY88, Organic). C-317
- EMSL-LV second quarter Organic Performance Evaluation Study (QB2, FY88). C-323
- Corrective actions letter for QB2, FY88. C-325
- Results of the analyses for Water Pollution Sample WP-019. C-327
- Results of the analyses for Water Pollution Sample WP-020. C-341
- Results of the analyses for Water Pollution Sample WP-021. C-345

BCD Results of Organic Performance Evaluation Studies C-351

- Performance Evaluation Scores for BCD. C-353

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- Letter (without attachments) dated August 8, 1988, from Harold A. Vincent to J. E. Gebhart. Subject: Results of BCD participation in the EMSL-LV third quarter Organic Performance Evaluation Study (QB3, FY88, Organic). C-355
- Note stating QB3, FY88, Organic evaluation has been requested. C-356
- Letter (with attachments) dated April 29, 1988, from Larry C. Butler to Gregory A. DusSault. Subject: Results of BCD participation in the EMSL-LV second quarter Organic Performance Evaluation Study (QB2, FY88, Organic). C-357
- Organic Performance Evaluation Data Scoring Form (QB2, FY88, Organic). C-363
- Corrective actions letter for QB2, FY88, Case No. 8783. C-365
- Organic Performance Evaluation Data Scoring Form (QB1, FY88, Organic). C-371
- Corrective actions letter for QB1, FY88, Case No. 8124. C-375

ORGDP Results of Organic Performance Evaluation Studies C-379

- Performance Evaluation Scores for ORGDP. C-381
- EMSL-LV first quarter Inorganic Performance Evaluation Study (QB1, FY88). C-383
- EMSL-LV fourth quarter Inorganic Performance Evaluation Study (QB4, FY87). C-385
- MSL-LV second quarter Organic Performance Evaluation Study (QB2, FY88). C-387

ANL Results of Inorganic and Organic Performance Evaluation Studies C-389

- Performance Evaluation Scores for ANL. C-391

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- Letter dated April 6, 1989, from Fredric J. Martino to Renee Tucker stating QB2, FY89 organic sample sets have not yet been scored and corrective actions for QB2,FY89 inorganics and organics (if necessary) will be forthcoming. C-393

- Letter (with attachments) dated March 28, 1989, from Harold A. Vincent to Peter C. Lindahl. Subject: Results of ANL participation in the EMSL-LV second quarter Inorganic Performance Evaluation Study (QB2,FY89, Inorganic). C-395

- EMSL-LV second quarter Inorganic Performance Evaluation Study (QB2,FY89). C-397

- Letter (with attachments) dated February 7, 1989, from Harold A. Vincent to Peter C. Lindahl. Subject: Results of ANL participation in the EMSL-LV first quarter Inorganic Performance Evaluation Study (QB1, FY89, Inorganic). C-399

- EMSL-LV first quarter Inorganic Performance Evaluation Study (QB1, FY89). C-401

- Corrective actions letter for QB1, FY89, Inorganic. C-405

- Letter dated February 7, 1989, from Harold A. Vincent to Peter C. Lindahl. Subject: Results of ANL participation in the EMSL-LV first quarter Organic Performance Evaluation Study (QB1, FY89, Organic). C-407

- EMSL-LV first quarter Organic Performance Evaluation Study (QB1, FY89). C-409

- Corrective actions letter for QB1, FY89, Organic. C-411

ORNL EPA Technical and Laboratory Evidence Audit Reports

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
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FEB 19 1988

FEB 22 1988

D. Karen Knight
DOE Environmental Survey Sampling
and Analysis Manager
U.S. Department of Energy
Forrestal Bldg., EH-24
1000 Independence Avenue
Washington, DC 20585

Dear Ms. Knight:

Enclosed is the final report by Jesse Gerard of LEMSCo for an on-site radiation measurement evaluation and the final report by Cynthia Miller, Jeffrey Worthington, and Betty Malone of Techlaw for an on-site evidentiary audit carried out at the Oak Ridge National Laboratory on August 25, 1987.

J. Gerard's report includes a completed copy of the new checklist for radiation measurement quality assurance support patterned after those established for the inorganic and organic technical areas under the Contract Laboratory Program (CLP) of the EPA. He outlined during the visit and the debriefing the data items required for a full data package for the sample designated group(s) that will get the full audit. ORNL will cooperate in furnishing this material.

The evidentiary audit covered all areas of the laboratory involved with the DOE environmental survey even though no technical evaluation was made during this visit for the organic and inorganic laboratory areas.

Of the four items noted in the Techlaw report as being repeated from the previous audit of June 10, 1987, the one of rewriting SOPs to may be the most extensive in effort but once done, will be the easiest to maintain or adapt in the future. The most difficult item of the four to keep from reappearing is the one involved with accounting for errors and error correction in the data documents. Training is important and supervisors have to vigilantly watch that proper correction is applied when bad data is to be identified as such. The other recommendations, both previous and from this audit can easily be addressed by following the procedures in the SOPs when they have been revised.

Sincerely,

Harold A. Vincent

Harold A. Vincent
Chemist
Quality Assurance Research Branch
Quality Assurance and Methods Development Division

Enclosures

cc:
William Laing, ORNL
Pamela Howell, ORNL
Jeff Wade, ORNL

NEIC Audit

LABORATORY EVIDENCE AUDIT REPORT FEB 22 1988

OAK RIDGE NATIONAL LABORATORY
ANALYTICAL CHEMISTRY DIVISION
MARTIN MARIETTA ENERGY SYSTEMS, INC.

OAK RIDGE, TENNESSEE

AUGUST 25, 1987

Martin Marietta Energy Systems, Inc. (MMES)
Analytical Chemistry Division
Oak Ridge National Laboratory
Oak Ridge, TN 37830
(615) 574-4898

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Julian Hackney	- Analyst[2]
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Wayne Greist	- Group Leader, Separations and Synthesis[2]
Amelia Herndon	- Analyst[2]
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Jeff Wade	- Group Leader, Low-Level Radiochemical Analysis[1,2,3]
Robert Holmes	- Analyst[2]
K. Webb	- Analyst[2]
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[3]Present during post-audit briefing.

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This work was conducted on behalf of the Environmental Protection Agency's (EPA) National Enforcement Investigations Center (NEIC) under EPA Contract #68-01-7369.

INTRODUCTION

The National Enforcement Investigations Center (NEIC) assigned the Contract Evidence Audit Team (CEAT) to perform an evidence audit on Martin Marietta Energy Systems (MMES) Analytical Chemistry Division Laboratory located at Oak Ridge National Laboratory in Oak Ridge, Tennessee. The laboratory is receiving, preparing, and analyzing samples using USEPA Contract Laboratory Program (CLP) protocols for the Department of Energy's (DOE) Environmental Survey.

The purpose of this audit was to determine if laboratory policies and procedures are in place to satisfy evidence handling requirements. The report specifies the corrective action needed to meet EPA Evidence Audit Requirements.

The audit was conducted on August 25, 1987 in conjunction with a technical audit performed by representatives from the USEPA Environmental Monitoring Systems Laboratory (EMSL) at Las Vegas, Nevada.

The following operations, accompanying documentation, and written standard operating procedures (SOPs) were reviewed: sample receiving, sample storage, sample tracking (from receipt to completion of analysis), and analytical project file organization and assembly.

EXECUTIVE SUMMARY

This was the third audit of MMES conducted by USEPA representatives in support of the DOE Environmental Survey Program. The previous audit was conducted on June 8-9, 1987 and resulted in nine recommendations. Four of the nine recommendations have not been addressed or corrected. The recommendations from the previous audit still requiring corrective action are:

1. The laboratory's written SOPs should be revised to include accurate descriptions of the actual laboratory procedures in the following areas:

   a. Sample Receiving
   b. Sample Storage
   c. Sample Identification
   d. Sample Security
   e. Sample Tracking
   f. Analytical Project File Organization and Assembly

2. Corrections to documents should be made by drawing a single line through the error and initialing and dating the correction. Correction fluid should not be used on Environmental Survey project-related documents.

3. Laboratory personnel should record the appropriate information on the Organic Sample Control and Chain-of-Custody Sheet or indicate that the activity was not performed.

4. Airbills should be routinely placed in the receiving document files.

The following six findings (non-conformances to Evidence Audit Requirements) were identified during the present audit and are discussed in this report:

Findings

1. Written SOPs did not contain accurate descriptions of the actual laboratory procedures used for the following:

   a. Sample Receiving
   b. Sample Storage
   c. Sample Identification
   d. Sample Security
   e. Sample Tracking

2. Information was obliterated or rendered unreadable.

3. Error corrections were not consistently signed and dated by the analysts.

4. Entries in the explosives laboratory logbook are not consistently signed and dated.

5. Sample receiving information on the Organic Sample Control and Chain-of-Custody Sheet is not recorded in the space provided.

6. Airbills are not always placed in the receiving document file.

As a result of these findings, the following recommendations were made:

Recommendations

1. The laboratory's written SOPs should be revised to include accurate descriptions of the actual laboratory procedures in the following areas:

a. Sample Receiving
b. Sample Storage
c. Sample Identification
d. Sample Security
e. Sample Tracking

2. Corrections to supporting documents and raw data should be made by drawing a single line through the error and entering the correct information.

3. Corrections and additions to supporting documents and raw data should be dated and initialed.

4. Logbook entries should be dated and signed by the analyst or individual performing the activity at the time the activity was performed.

5. Laboratory personnel should record the appropriate information on the Organic Sample Control and Chain-of-Custody Sheet or indicate that the activity was not performed.

6. Airbills should be routinely placed in the receiving document files.

The audit was concluded August 25, 1987. Audit participants are listed on the cover page of this report.

PROCEDURAL AUDIT

The procedural audit consisted of review and examination of actual and written SOPs and accompanying documentation for the following laboratory operations: sample receiving, sample storage, sample identification, sample security, sample tracking (from receipt to completion of analysis), and analytical project file organization and assembly.

Sample Receiving

Samples are received at the shipping/receiving area of the laboratory which is located approximately one mile from the laboratory building. A receiving clerk signs the airbills, and the sample containers are delivered to Building 4500S by the facility's delivery service. The Federal Express couriers may deliver the sample containers directly to Building 4500S on Saturdays.

Barry Grant, the designated sample custodian, takes possession of the containers. B. Grant inspects the custody seals and open the containers in the sample receiving area of Building 4500S. The custodian signs and dates the chain-of-custody records, checks for the presence/absence of receiving documents, and verifies the agreement/non-agreement among information recorded on the sample shipping documents. The sample custodian records the receiving information on the Shipping Container Sample Log-In Form.

According to Bruce Clark, problems associated with sample condition or documentation and their resolution are noted in the "Comments" column of the Shipping Container Sample Log-In Form and the "Remarks" column of the Field Chain-of-Custody Record. Also, according to Bruce Clark, tag numbers not referenced on shipping documents are recorded on the Field Chain-of-Custody Record.

A Request for Analytical Services Form is also received with the samples. This form contains information regarding sample identification and requested analyses.

An internal chain-of-custody receipt record is completed for each batch of samples received at the facility. This document is sent with the sample when delivered to the analyst. A unique laboratory identification number is assigned to each sample when the sample arrives at the laboratory where the analysis is to be performed. Each laboratory (inorganic, organic, radiochemistry) has the same method for assigning identification numbers. The

year is the first two (2) digits, the month is the second two (2) digits, the day is the third two (2) digits, and the sequence order representing the order in which the sample was checked in for that day is the last two (2) digits.

Inorganic Sample Receiving

The sample custodian makes a copy of the Request for Analytical Services Form and writes a request number on the original form. A sample identification number is then assigned to each inorganic sample, and the numbers are recorded on the original request and on the Sample Log-In Sheet.

Copies of the Request for Analytical Services Form are sent to each inorganic laboratory to serve as notification of sample arrival. The samples are placed in a storage area located adjacent to the sample receiving area.

Organic Sample Receiving

The sample custodian sends a Request for Analytical Services form to the organic analysis department to inform the department of the arrival of samples. The organic laboratory assigns identification numbers to each sample and places them in storage.

Radiochemistry Sample Receiving

A copy of the Request for Analytical Services Form is also sent to the radiochemistry laboratory. The radiochemistry laboratory assigns identification numbers to each sample and places them in storage.

Written SOPs for sample receiving have been developed and implemented. The auditor read these SOPs, and they did not accurately describe the procedures in use for sample receiving. These SOPs are documented in Quality Assurance/Quality Control Standard Operating Procedure and Sample Receipt and Handling.

Sample Storage, Identification, and Security

Storage, identification, and security procedures are described in the four sections below.

Inorganic Sample Storage and Identification

Inorganic samples are stored in the Building 4500S storage room located immediately adjacent to the sample receiving room. Samples designated for Inductively Coupled Plasma (ICP) analysis may also be stored in the same storage room. If samples are delivered on Saturday, all samples could be stored here.

Inorganic samples are identified with the field identification number and the assigned laboratory number. Sample preparation containers are identified with the laboratory number, percent acid, and sample weight or volume.

In Building 1505, samples are stored in a locked three-door refrigerator located in the hallway near the entrance to the atomic absorption (AA) laboratory. Prepared AA metals samples are stored in locked cabinets in the AA laboratory. Samples and digestates for AA and mercury analysis are also stored in locked cabinets in Building 2026 Annex.

Samples prepared for AA and mercury analysis (digestates) are identified with the field identification number and the laboratory number. Sample preparation containers are identified with the laboratory number.

Organic Sample Storage and Identification

Organic samples are stored in the sample preparation laboratory located in Building 4500S. Extracts are stored in a refrigerator located adjacent to the analysis area.

Organic samples are identified with the field number and the assigned laboratory number. Sample extract vials are marked with a marking pen or sticker indicating the assigned laboratory number.

Radiochemistry Sample Storage and Identification

Samples requiring radiochemistry analysis are stored in the locked custody room located in the radiochemistry department in Building 4500S. These samples are identified with the field identification number and the assigned laboratory number.

Security

The refrigerators and sample storage areas are locked at night. The facility is surrounded by a fence. Visitors must enter through a visitor screening center, obtain an identification tag, and sign in before they are allowed to enter the facility. The visitors are not escorted when entering the facility. This was discussed during the post-audit debriefing. The AA preparation and analysis laboratories in Building 1505 are locked at night.

Written SOPs for sample storage, identification, and sample security have been developed and implemented. The auditors read these SOPs, and they described the procedures in the laboratory; however, they did not accurately describe the storage areas in

the laboratory that will be used for Environmental Survey samples. The SOPs are documented in the laboratory SOPs Quality Assurance/Quality Control Standard Operating Procedures and Sample Receipt and Handling.

Sample Tracking

All samples are currently received at the "inorganic receiving area" of Building 4500S. Metals samples requiring ICP analysis are also prepared and analyzed in Building 4500S.

Cyanide, oil and grease, ion chromatography, and radio-chemistry tests are performed in Building 4500S. Asbestos analyses are performed in Building 4500N.

Metal samples for AA analysis are delivered to Building 1505. These samples are then taken to the Building 2026 Annex where they are prepared (digested). The mercury fraction is analyzed by cold vapor AA in Building 2026 Annex. The AA metals digestates are returned to Building 1505 where they are analyzed by Furnace AA.

The preparation and analysis of "explosives" samples are performed in Building 2026 Annex.

Samples may be tracked through the laboratory from receipt to completion of analysis by using the following documents:

1. Shipping Container Sample Log-In Forms
2. Request for Analytical Services (Several Copies)
3. Receipt Record/Chain-of-Custody Forms
4. ICP Preparation Logs
5. ICP Preparation Control Worksheets
6. ICP Analysis Logbooks (ICP EPA/CLP Program Log)
7. Log-In Books (AA and Hg Samples)
8. Contract Laboratory Samples - Flame AA and Furnace AA Analyses Building 1505 Logbook
9. Contract Laboratory Samples Preparation and Mercury Analysis Building 2026 Annex Log (AA and Hg Preparation, Hg Analysis)
10. AA Analysis Control Worksheets
11. CLP Logbooks (Cyanide Preparation and Analyses)
12. Phenol Analysis Logbooks
13. Ion Chromatography Analysis Control Worksheets
14. Asbestos Samples Pantex (Asbestos Determinations)
15. CLP Logbooks (Oil and Grease Determinations)
16. Oil and Grease Analysis Control Worksheets
17. Uranium Analysis Control Worksheets

18. CLP Logbooks (Explosives Weight and Identification Number)
19. HPLC Sample Logbooks (Explosive Analyses)
20. Sample Preparation Logsheets (Organic Preparation)
21. GC/MS Instrument Operations Logsheets
22. GC Instrument Operations Logsheets
23. Chain-of-Custody Record Low-Level Radiochemical Analysis Group
24. Alpha/Beta Worksheets
25. Gamma Scan Worksheets

The procedures and documentation used to track inorganic and organic samples and radiochemistry samples are described in the following three sections.

Inorganic Sample Tracking

Copies of the Request for Analytical Services Forms (with the assigned inorganic batch number) are sent to the appropriate inorganic laboratories by B. Grant to serve as notification of the arrival of samples. Preparation of samples for ICP analysis are documented in the ICP preparation logbook entitled Logbook for P.E. and EPA Sample J. H. Hackney, 4500 SR-147. ICP preparation information is also recorded on an ICP Preparation Control Worksheet. The ICP analyses are recorded in the logbook entitled ICP EPA/CLP Program Log.

Metals samples for AA analysis are brought to Building 1505 after the laboratory personnel signs the Receipt Record/Chain-of-Custody Record.

The samples are then delivered to Building 2026 where mercury and inorganic sample digestions are recorded in a logbook entitled Contract Laboratory Samples Preparation and Mercury Analysis Building 2026 Annex Log. The mercury analyses are performed in Building 2026 and recorded in the same logbook as well as a Mercury Control Worksheet. The transfer of samples to Building 2026 and back to Building 1505 is recorded in the Log-In Book.

The prepared metal digestates are returned to Building 1505 for analysis and are accompanied by the logbook (Contract Laboratory Samples - Flame AA and Furnace AA Analyses Building 1505 Logbook). The AA analyses are recorded in the previously described logbook and on AA Control Worksheets.

Cyanide analyses are performed in Building 4500S and are recorded in a logbook entitled CLP. Ion chromatography analysis is performed in Building 4500S. The analyses are recorded on Ion Chromatography Control Worksheets. The instrument produces a strip chart.

Asbestos determinations are performed in Building 4500N. This analysis is recorded in a logbook entitled Asbestos Samples Pantex. The laboratory has not analyzed any samples for phenols. According to J. Stewart, a logbook for phenols analysis will be initiated when samples arrive with a request for phenols analysis. Oil and grease determinations are recorded in a logbook entitled CLP and the Oil and Grease Analysis Control Worksheets.

Organic Sample Tracking

Organic samples are brought to the organic sample preparation area with a Request for Analytical Services Form and an Analytical Chain-of-Custody Form/Receipt Record that had been initiated by the sample receiving department. This record was previously described in the inorganic sample tracking section.

The preparation chemist signs the custody form and initiates the Record Receipt/Chain-of-Custody. The auditors observed that the receiving information was not consistently recorded on this form.

The preparation chemist assigns a batch number to the Request for Analytical Services Form, copies the request form, and then tapes the copy into a logbook entitled No. 4 Sample Log.

Extraction data is recorded on the Sample Preparation Logsheet. Copies of this logsheet are also taped into the No. 4 Sample Log.

The analysis of the volatile fraction is recorded on the GC/MS Instrument Operations Logsheet (GC/MS Logbook). The analysis of the base/neutral/acid fraction is recorded in a separate GC/MS logbook.

The pesticides analysis is recorded on the GC Instrument Operations Logsheet (Logbook).

The explosive analysis is recorded in the HPLC Sample Log. The weight of each sample is recorded in a CLP logbook. The auditors observed that the information in both logbooks were not consistently dated and signed.

Radiochemistry Sample Tracking

The transfer of samples to the radiochemistry laboratory is recorded on the Chain-of-Custody Record Low-Level Radiochemical Analysis Group (LLRAG) Form in addition to the previously mentioned Receipt Record/Chain-of-Custody. This form is also used to track the sample through the radiochemistry laboratory.

Summaries of preparation and analyses radiochemistry are recorded in the untitled radiochemistry logbook. Alpha and beta counts are recorded on the Alpha/Beta Worksheet. Gamma scans are recorded on the Gamma Scan Worksheet.

The uranium analysis is recorded on the Uranium Analysis Control Worksheet.

Written SOPs for sample tracking have been developed and implemented. The auditor read these SOPs, and they did not accurately describe the documents used to track samples and the analytical paths of the various sample fractions. The written SOPs are documented in Quality Assurance/Quality Control Standard Operating Procedures and Sample Receipt and Handling.

Analytical Project File Organization and Assembly

Receiving documents are currently filed in the laboratory receiving room. Preparation logbooks remain in the possession of the analysts. Analysis logbooks are kept in the analytical area of the laboratory. The Organic Chain-of-Custody Forms are kept in files in the organics laboratory office. Airbills are retained by the receiving clerk.

The laboratory has not developed actual or written procedures for the organization and assembly of laboratory documents related to the receipt, storage transfer, preparation, and analysis of Environmental Survey samples. (Technical direction has not been received from DOE in this area.)

EVIDENCE AUDIT

The evidence audit consisted of review and examination of analytical project file documentation. Completed analytical project files have not been assembled, numbered, or inventoried. Thus, the auditors could make no observations concerning the completeness and consistency of analytical project files.

AUDIT FINDINGS

The following six findings (non-conformances to Evidence Audit Requirements) are based on the results of the procedural and evidence audits.

Findings

1. Written SOPs did not contain accurate descriptions of the actual laboratory procedures used for the following:

a. Sample Receiving
b. Sample Storage
c. Sample Identification
d. Sample Security
e. Sample Tracking

2. Information was obliterated or rendered unreadable.

3. Error corrections were not consistently signed and dated by the analysts.

4. Entries in the explosives laboratory logbook are not consistently signed and dated.

5. Sample receiving information on the Organic Sample Control and Chain-of-Custody Sheet is not recorded in the space provided.

6. Airbills are not always placed in the receiving document file.

SUMMARY

A debriefing session was held on August 25, 1987 with MMES personnel. During this debriefing, the evidence auditors made the following recommendations based on the findings discussed in this report:

1. The laboratory's written SOPs should be revised to include accurate descriptions of the actual laboratory procedures in the following areas:

   a. Sample Receiving
   b. Sample Storage
   c. Sample Identification
   d. Sample Security
   e. Sample Tracking

2. Corrections to supporting documents and raw data should be made by drawing a single line through the error and entering the correct information.

3. Corrections and additions to supporting documents and raw data should be dated and initialed.

4. Logbook entries should be dated and signed by the analyst or individual performing the activity at the time the activity was performed.

5. Laboratory personnel should record the appropriate information on the Organic Sample Control and Chain-of-Custody Sheet or indicate that the activity was not performed.

6. Airbills should be routinely placed in the receiving document files.

Lockheed

Environmental Programs Office
1050 E. Flamingo Road, Suite 120, Las Vegas, Nevada 89119

FEB 22 1988

January 28, 1988

United States Environmental
Protection Agency
P.O. Box 93478
Las Vegas, Nevada 89193-3478

ATTENTION: DR. HAROLD VINCENT, QAD

VIA: 2/4/88 M. T. HOMSHER

SUBJECT: ON-SITE RAD PREASSESSMENT EVALUATION OF OAK RIDGE NATIONAL LABORATORY (ORNL/X-10).

Dear Dr. Vincent:

This is the detailed RAD Preassessment Evaluation Report for ORNL/X-10. A preliminary report was sent to you on September 2, 1987. Due to a lack of funds, this report is about four months beyond its due date.

Very truly yours,

Jesse T. Gerard

Jesse T. Gerard
Staff Scientist
QA Department

JTG/ahh

cc: M. T. Homsher
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J. D. Petty
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ATTACHMENT

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Lockheed

Environmental Programs Office
1050 E. Flamingo Road, Suite 120, Las Vegas, Nevada 89119

January 19, 1988

United States Environmental
Protection Agency
P.O. Box 93478
Las Vegas, Nevada 89193-3478

ATTENTION: DR. HAROLD C. VINCENT

SUBJECT: RAD PREASSESSMENT ON-SITE EVALUATION OF OAK RIDGE NATIONAL LABORATORY (ORNL/X-10) ON AUGUST 25, 1987

Dear Dr. Vincent:

The subject RAD preassessment on-site evaluation has been completed and the following items must be given attention in order to improve data integrity.

1. Logbooks and laboratory notebooks were not signed and dated by personnel or verified by signing and dating by the supervisor. This was the case across the board for all techniques. Additionally, notebook/logbook changes were not crossed out and initialed by personnel making the changes.

2. It is recommended that an instrument logbook be maintained for the γ-ray spectroscopy area with instrument settings etc., entered.

3. It is recommended that manual validation checks of computer generated data/results be performed randomly at a fixed frequency. For example, rather than blindly accepting computer data reduction results of γ-ray spectra it is recommended that manual checks be made (printing out digital channel data and hand calculation/calculator computation of peak areas) to ensure that something has not gone wrong and that the method of computer integration is appropriate for the situation. Results of the computer versus hand calculated final results should be documented in a logbook/notebook in a continuing fashion easy to follow with time. Retain calculations and data for archival purposes.

4. At present, ORNL is not storing raw data for archival purposes. Raw data being data directly output from the equipment (instrument settings, etc., for runs would be available in logbooks), onto disks or tapes, etc. Raw data is data on which a decision has not been irreversibly made so that at a future date, one can return to the original data/instrument output (in the case of γ-spectroscopy all 2000/4000 channels) as versus data reduced in a fashion so that original instrument output data cannot be regenerated. It is recommended that all data output directly from equipment be stored on disk, or tape, etc., for future retrieval. The capability already exists to do this at ORNL but it is not being done.

5. Written SOPs were not available for the overall program sample receipt and storage area - nor were appropriate portions available to the sample custodian.

6. As a general recommendation, it is suggested that survey program wide Gross α and Gross β procedures for soils, sludges etc., be used that can provide comparable data such as consistent comparably low detection limits as well as good precision and accuracy. The variation of capabilities of procedures among different laboratories is wide and since the site survey plans are beginning to depend more heavily on survey/screening techniques such as Gross α, Gross β and γ-scan it is very important that comparable data be generated across all sites especially since these results will be used to prioritize sites for further work. These procedures for water and air filters seem to be quite acceptable and comparable and seem to be well documented.

7. While analyses are being performed (or planned) for Gross α, Gross β, γ-Scan, ^3H, Tot.U etc., in soils and sludges, validated "Survey Analysis and Sampling Manual Appendix 4: Radiochemical Analyses" procedures for ORNL (X-10) could not be found.

8. Based on conversations on July 27, 1987 at a meeting in Las Vegas, K. Knight expressed support for all DOE Laboratories participating in the Environmental Program to also participate in the EML PE program and EPA drinking water PE/IC samples. It is recommended that ORNL participate on a full regular basis in those programs for those radionuclides/parameters associated with the DOE Environmental Survey Program for matrices involved in site analyses requested of them. Past participation generally is good and quite comprehensive but ORNL participation does not cover all parameters required for the DOE Environmental Survey Program even though available in the PE samples.

9. Data audit sample reporting requirements for reporting of data/results on samples to be audited were discussed and it was generally felt and agreed that lab personnel understood what was required.

Details of some of the above items may be found in the text of this report. An evidentiary audit was conducted simultaneously. Their findings will be provided in a separate report.

Laboratory:	Oak Ridge National Laboratory (X-10)
Date:	August 25, 1987
Type of Evaluation:	RAD Preassessment On-Site Evaluation

Personnel Contacted:

NAME	TITLE
Bruce R. Clark	Coordinator, DOE Environmental Survey Program
Pamala Howell	QA Specialist
Jeff W. Wade	Supervisor of RAD Analytical Area
Bill Laing	Section Head QA Office
Joe Stewart	Fluorimetry Expert

Laboratory Evaluation Team:

Jesse T. Gerard	RAD QA Evaluator
Earl Whittaker	RAD QA Evaluator
Harold Vincent	Task Monitor DOE Site Survey Program
Cinthia L. Miller	Techlaw (CEAT) Auditor
Betty C. Malone	Techlaw (CEAT) Auditor
Jeff Worthington	Techlaw (CEAT) Auditor

A. Procedural Changes the Laboratory Agreed to Implement

The following comments refer to deficiencies noted in the Laboratory Evaluation Checklist (Attachment 1).

For comments see page 1, 2, and 3 above and also page 6, item D.

B. Review of Environmental Measurements Laboratory and EPA Drinking Water Performance Evaluation Samples

The results of both were discussed with the laboratory personnel:

For comments see page 2, item 8 above.

C. Review of Data Audit

The following comments refer to the Summary/Conclusions of the data audit for Problem No _____, Request No. _____ (Attachment 2.)

Report Item #	Comments	Action*
	Information on samples for data audits has not been received yet-as this stage is just beginning to evolve. See page 3, item 9 above for comment.	

D. Issues to be Resolved by DOE Headquarters

As is required for items page 1, 2 and 3 since this is a preassessment evaluation.

Attachment 1

Laboratory Evaluation Checklist

I. Organization and Personnel (Page 1 of 2)

ITEM	YES	NO	COMMENT
Laboratory or Project Manager (individual responsible for overall technical effort) Name: Bruce R. Clark	x		615-574-6896
Name: Jeff W. Wade Job Title: Supervisor RAD Anal. Chem.	x		615-574-4528
Name: Bill Laing Job Title: Section Head, QA Office	x		
Name: Joe Stewart Job Title: Fluorimetry Expert	x		615-574-4895
Name: Job Title:			
Name: Job Title:			
Name: Job Title:			
Do personnel assigned to this project have the appropriate background to successfully accomplish the objectives of the program?	x		

I. Organization and Personnel (Page 2 of 2)

ITEM	YES	NO	COMMENT
Quality Assurance Supervisor Name: Pamala Howell	x		
Support-Electronic Technician Name: _____			
Is the organization adequately staffed to meet project commitments in a timely manner?	x		
Were all personnel involved with the analysis available during the evaluation? (List those not present.)	x		

Additional Comments

II. Sample Receipt and Storage Area (Page 1 of 1)

ITEM	YES	NO	COMMENT
Are written Standard Operating Procedures (SOPs) developed for receipt and storage of samples?		x	For RAD area, yes.
Is the appropriate portion of the SOP available to the sample custodian at the sample receipt/ storage area?		x	For RAD area, yes.
Are adequate facilities provided for storage of samples.	x		
Are the sample receipt/storage and records maintained in a manner consistent with program needs?	x		
Are standards stored separately from sample digestates?	x		
Has the supervisor of the individual maintaining the notebook/bench sheet/logbook personally examined and reviewed the notebook/bench sheet/ logbook periodically, and signed his/her name therein, together with the date and appropriate comments as to whether or not the document is being maintained in an appropriate manner?		x	

Additional Comments

Main DOE Environmental Survey Receipt and Storage SOPS were not completed at this point in time.

III. Sample Preparation Area (Page 1 of 2)

When touring the facilities, give special attention to: (a) the overall appearance of organization and neatness, (b) the proper maintenance of facilities and instrumentation, (c) the general adequacy of the facilities to accomplish the required work.

ITEM	YES	NO	COMMENT
Is the laboratory maintained in a clean and organized manner?	x		
Does the laboratory appear to have adequate workspace (120 sq. feet, 6 linear feet of unencumbered bench space per analyst)?	x		
Are contamination-free areas provided for trace level analytical work? (Low level and high activity areas separated.)	x		
Are the hoods in good condition and functional?	x		
Are chemical waste disposal policies/procedures well defined and followed by the laboratory?	x		
Does the laboratory have a source of distilled/demineralized water?	x		
Is the conductivity of distilled/demineralized water routinely checked and recorded?		x	Not needed?
Is the analytical balance located away from draft and areas subject to rapid temperature changes?	x		
Has the balance been calibrated within one year by a certified technician?	x		Quarterly.
Is the balance routinely checked with the appropriate range of class S weights daily before use and are the results recorded in a logbook?	x		Contracted.
Is the sample preparation portion of the SOP available to the analyst at the sample preparation area?	x		
Are unexpired standards used to prepare instrument calibration standards?	x		
Are fresh analytical standards prepared at a frequency consistent with good QA?	x		
Are chemicals and standards dated upon receipt?	x		
Are reference materials properly labeled with concentrations, date of preparation, and the identity of the person preparing the sample?	x		
Is a spiking/calibration standards preparation and tracking logbook(s) maintained?	x		
Are the primary standards traceable to NBS standards where possible?	x		
Do the analysts record bench data in a neat and accurate manner?	x		

III. Sample Preparation Area (Page 2 of 2)

ITEM	YES	NO	COMMENT
Are digestion logbooks/bench sheets maintained in a neat and organized manner?	x		
Is an adequate drying oven available with a temperature measurement device?	x		
Has the supervisor of the individual maintaining the notebook/bench sheet personally examined and reviewed the notebook/bench sheet periodically, and signed his/her name therein, together with the date and appropriate comments as to whether or not the notebook/bench sheet is being maintained in an appropriate manner?		x	

Additional Comments

IV. Sample Analysis Instrumentation (Page 1 of 11)

A. Gamma-Ray Spectrometer

	Manufacturer	Model	Automated Sample Exchanger Used	Installation Date
1. Spectrometer ID# 1		Geli- (1)LGC2250LATT		
2	Two PyT's	(2)LGC2250LATT	Manual	5 years old
Data System	ND-9900			
2. Spectrometer ID# 3		Ge- (3)2020		
4	Two Canberra's	(4)2001	Manual	6 years old
Data System	ND-9900			
3. Spectrometer ID# 5		Ge- (5)OTZDS30-25185		
6	Two Tennelec's	(6)CPZDS30-25185	Manual	< 1 year old
Data System	ND-9900			
4. Spectrometer ID#				
Data System				
5. Spectrometer ID#				
Data System				
6. Spectrometer ID#				
Data System				

Spectrometers 1, 2, 3, 4 are approx. 20% effic., 5 is 25% and 6 is 30% - 3 inch lead chambers used. ND-9900 controls all 6 detectors.

IV. Sample Analysis Instrumentation (Page 2 of 11)

A. Gamma-Ray Spectrometer

ITEM	YES	NO	COMMENT
Are operating manuals readily available to the operator?	x		
Are calibration protocols available to the operator?	x		
Are energy, efficiency, FWHM values, gains and check standard results kept in a permanent record so that instrument performance can be measured over time?		x	Yes, except for Inst., logbook settings i.e., gains etc.
Is there a methods manual (SOP) available to the operator?	x		
Are NBS traceable standards used for calibration?	x		
Duplicate samples analyzed? (Frequency)	x		1/10, 1 per batch
Spike/standard samples and blanks? (Frequency)	x		1/20, 1/10, 1 per batch.
Is a permanent service record maintained in a logbook?	x		
How is the data reduced-off line computer, dedicated system or other?	x		Dedicated.
Are radioisotopic or interelement correction factors updated every six months or more frequently?		x	Avoided.
Is service maintenance by contract?	x		
Is preventative maintenance applied?	x		

Additional Comments

Blindly takes computer output without performing manual validation checks (see item 3, page 1).

Does not store raw data for archival purposes even though capability exists to do so (see item 4, page 2).

Calibrates efficiency, resolution etc., each day and maintains reults in logbook with printout.

IV. Sample Analysis Instrumentation (Page 3 of 11)

B. Alpha Spectrometer

	Manufacturer	Model	Automated Sample Exchanger Used	Installation Date
1. Spectrometer ID# 1, 2, 3, 4	Tennelec	Si(Li) TC-256	Manual	2 years old
Data System	ND-9900			
2. Spectrometer ID# 5, 6, 7, 8	Tennelec	Si(Li) TC-256	Manual	2 years old
Data System	ND-9900			
3. Spectrometer ID# 9, 10, 11, 12	Tennelec	Si(Li) TC-256	Manual	2 years old
Data System	ND-9900			
4. Spectrometer ID#				
Data System				
5. Spectrometer ID#				
Data System				
6. Spectrometer ID#				
Data System				

3-Four simultaneously operated α-spectrometers for a total of 12 available. 1024 channels used for spectra. ND-9900 controls all detectors. All are part of the same system so there is only one model number TC-256.

IV. Sample Analysis Instrumentation (Page 4 of 11)

B. Alpha Spectrometer

ITEM	YES	NO	COMMENT
Are operating manuals readily available to the operator?	x		
Are calibration protocols available to the operator?	x		
Are energy, efficiency, FWHM values, gains and check standard results kept in a permanent record so that instrument performance can be measured over time?	x		
Is there a methods manual (SOP) available to the operator?	x		
Are NBS traceable standards used for calibration?	x		
Duplicate samples analyzed? (Frequency)	x		1/10, 1 per batch
Spike/standard samples and blanks? (Frequency)	x		1/10, 1/20, 1 per batch.
Is a permanent service record maintained in a logbook?	x		
How is the data reduced-off line computer, dedicated system or other?	x		Dedicatd.
Are radioisotopic or interelement correction factors updated every six months or more frequently?		x	Avoided- not applicable.
Is service maintenance by contract?	x		
Is preventative maintenance applied?	x		

Additional Comments

Calibrates efficiency and resolution etc., each day and maintains results in logbook with printouts.

IV. Sample Analysis Instrumentation (Page 5 of 11)

C. Low Background Gas Flow Proportional Counting System (Gross Alpha and Gross Beta)

	Manufacturer	Model	Sample Capacity	Installation Date
1. Instrument ID# Grossα/βCtr	Tennelec	LB5100	Multiple	3 years old.
Window Density or Thickness	260 ug/cm^2	Voltage Plateau Span and Slope	Not available Not available	Operating Voltage α=750 β=1470 Gas p-10(Ar,Me)
			(Rack of 4) x 3 = 12 at a time	
2. Instrument ID# ^{90}Sr Ctr	Tennelec	LB4000	Manual	Not Available
Window Density or Thickness	260 ug/cm^2	Voltage Plateau Span and Slope	Not available Not available	Operating Voltage α=1200 β=1913 Gas p-10, (Ar Me)
3. Instrument ID#				
Window Density or Thickness		Voltage Plateau Span and Slope		Operating Voltage Gas
4. Instrument ID#				
Window Density or Thickness		Voltage Plateau Span and Slope		Operating Voltage Gas
5. Instrument ID#				
Window Density or Thickness		Voltage Plateau Span and Slope		Operating Voltage Gas

1 system of each type. The second one is the older of the two.

IV. Sample Analysis Instrumentation (Page 6 of 11)

C. Low Background Gas Flow Proportional Counting System (Gross Alpha and Gross Beta)

ITEM	YES	NO	COMMENT
Are operating manuals readily available to the operator?	x		
Are calibration protocols available to the operator?	x		
Are calibration results kept in a permanent record so that instrument performance can be measured over time?	x		
Is there a methods manual (SOP) available to the operator?	x		
Are NBS traceable standards used for calibration?	x		
Is a permanent service record maintained in a logbook?	x		
How is the data reduced-off line computer, dedicated system or other?	x		Each has its own microprocessor-HP
Is calibration done at least daily or batch frequency?	x		
Duplicate samples analyzed? (Frequency)	x		1/10, 1 per batch
Spike/standard samples and blanks? (Frequency)	x		1/10 stds, 1/20 spikes, 1/batch.
Are self-absorption curves readily available to analyst (curves reestablished last 3 months)?	x		Daily checked.
Is service maintenance by contract?	x		
Is preventative maintenance applied?	x		

Additional Comments

Calibrates efficiency, etc., each day and maintains results in logbook with printouts.

IV. Sample Analysis Instrumentation (Page 7 of 11)

D. Liquid Scintillation (LS) Spectrometer

	Manufacturer	Model	Sample Capacity	Installation Date
1. LS Spectrometer ID# 1	Packard	460C	Multiple	5-6 years old
Data System	Data output by system is manually feed into area computer			
2. LS Spectrometer ID#				
Data System				
3. LS Spectrometer ID#				
Data System				
4. LS Spectrometer ID#				
Data System				
5. LS Spectrometer ID#				
Data System				
6. LS Spectrometer ID#				
Data System				

1 liquid scintillation system only.

IV. Sample Analysis Instrumentation (Page 8 of 11)

D. Liquid Scintillation (LS) Spectrometer

ITEM	YES	NO	COMMENT
Are operating manuals readily available to the operator?	x		
Are calibration protocols available to the operator?	x		
Are calibration results (i.e., sensitivity) kept in a permanent record so that instrument performance can be measured over time?	x		
Is there a methods manual (SOP) available to the operator?	x		
Are NBS traceable standards used for calibration?	x		
Is a permanent service record maintained in a logbook?	x		
How is the data reduced-off line computer, dedicated system or other?	x		Raw data input into area computer manually.
Duplicate samples analyzed? (Frequency)	x		1/10, 1 per batch
Spike/standard samples and blanks? (Frequency)	x		Stds 1/10, spikes 1/20, 1 per batch
Is calibration done at least daily or batch frequency?	x		Per setup or each day.
Are multiple discriminator channels available? (List how many.)	x		3.
Refrigeration?			
External Standard?		x	
Is service maintenance by contract?	x		
Is preventative maintenance applied?	x		

Additional Comments

IV. Sample Analysis Instrumentation (Page 9 of 11)

E. Fluorometer/Spectrophotometer

	Manufacturer	Model	Type: Fluorometer or Spectrophotometer	Installation Date
1. Instrument ID# 1	ORNL In-House	Q1165 Fluorophotometer Serial #12	Fluorometer	Not Available
2. Instrument ID#				
3. Instrument ID#				
4. Instrument ID#				
5. Instrument ID#				
6. Instrument ID#				
7. Instrument ID#				
8. Instrument ID#				
9. Instrument ID#				
10. Instrument ID#				
11. Instrument ID#				

Tot.U-Induction Furnace Method. One system only.

IV. Sample Analysis Instrumentation (Page 10 of 11)

E. Fluorometer/Spectrophotometer

ITEM	YES	NO	COMMENT
Are operating manuals readily available to the operator?	x		
Are calibration protocols available the the operator?	x		
Are calibration results (i.e., sensitivity) kept in a permanent record so that instrument performance can be measured over time?	x		
Is there a methods manual (SOP) available to the operator?	x		
Are NBS traceable standards used for calibration?	x		
Is a permanent service record maintained in a logbook?	x		
How is the data reduced-off line computer, dedicated system or other?	x		Output from INST. Manual Calc.- Calib Curves.
Is calibration redone at least every 3 months?	x		Daily Check.
Duplicate samples analyzed? (Frequency)	x		1/10, 1 per batch
Spike/standard samples and blanks? (Frequency)	x		Stds 1/10, Spikes 1/20, 1 per batch
Is service maintenance by contract?	x		
Is preventative maintenance applied?	x		

Additional Comments

Fluorometer (Tot.U) is not located in the RAD area. Uranium in RAD area is usually by α-spectrometry. There is only one unit. It is part of Inorg. Section Eval. also.

IV. Sample Analysis Instrumentation (Page 11 of 11)

F. Thermal Ionization Mass Spectrometer (TIMS)

	Manufacturer	Model	Installation Date
1. Instrument ID#			
2. Instrument ID#			
3. Instrument ID#			

ITEM	YES	NO	COMMENT
Are operating manuals readily available to the operator?			
Are calibration protocols available to the operator?			
Are calibration results kept in a permanent record so that instrument performance can be measured over time?			
Is there a methods manual (SOP) available to the operator?			
Are NBS traceable standards used for calibration?			
Is a permanent service record maintained in a logbook?			
How is the data reduced-off line computer, dedicated system or other?			
Is calibration/recalibration done at least with batch frequency?			
Duplicate samples analyzed? (Frequency)			
Spikes/standard samples and blanks? (Frequency)			
Is service maintenance by contract?			
Is preventative maintenance applied?			

Additional Comments

ORNL (X-10) - does not have a TIMS Unit.

V. Data Handling and Review (Page 1 of 1)

ITEM	YES	NO	COMMENT
Are manual data calculations spot-checked by a second person? Are computer results checked?		x	
Do records indicate that appropriate corrective action has been taken when analytical results fail to meet QC criteria?	x		
Is a Laboratory Information Management System (LIMS) used? Manufacturer/Model:	x		
Is the operation of the LIMS validated with a test set of data and is the data maintained for on-site inspection?			

Additional Comments

VI. Quality Control Manual and SOP's (Page 1 of 1)

ITEM	YES	NO	COMMENT
Does the laboratory maintain a Quality Control Manual?		x	See below.
Does the manual address the important elements of a QC program, including the following:		x	See below.
a. Personnel?		x	See below.
b. Facilities and equipment?		x	See below.
c. Operation of instruments?		x	See below.
d. Documentation of procedures?		x	See below.
e. Preventative maintenance?		x	See below.
f. Reliability of data?		x	See below.
g. Data validation?		x	See below.
h. Feedback and corrective action?		x	See below.
Are files of outdated SOP's stored for reference		x	See below.

Additional Comments

QA/QC Division (Pam. Howell) - contents of manual in preparation at this point in time - so these questions can't be answered yet.

VII. Summary Checksheet (Page 1 of 1)

ITEM	YES	NO	COMMENT
Do responses to the evaluation indicate that project and supervisory personnel are aware of QA/QC and its application to the project?	x		
Have responses with respect to QA/QC aspects of the project been open and direct?	x		
Has a cooperative attitude been displayed by all project and supervisory personnel?	x		
Have any QA/QC deficiencies been discussed before leaving?	x		
Is the overall quality assurance adequate to accomplish the objectives of the project?	x		Or soon will be.
Have corrective actions recommended during previous evaluations been implemented? If not, provide details in Section VII.B.	--	--	This is a preassessment.

Additional Comments

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MARTIN MARIETTA ENERGY SYSTEMS, INC.

November 3, 1987

Robert B. Fitts

Response to the On-Site Evaluation and Evidentiary Audit Carried out at the Oak Ridge National Laboratory on 8/25/87

Item #1 - Notebooks are now reviewed once a week by the laboratory supervisor, notebook/logbook changes are made by drawing a line through the entry and then initialed by the technician making the change.

Item #2 - We have been keeping a logbook (containing QA/QC data) for each instrument, we are now keeping a logbook that contains instrument settings, etc.

Item #3 - We process a standard or standard spike and a duplicate with every tenth sample. The computer generated data/results are checked by such QA/QC measures. All instruments are monitored on a daily basis by counting known standards before the day's counting begins. The recommendation that we perform manual data reduction on gamma spectra is unfounded.

Item #4 - We are now storing all gamma spectra for the survey indefinitely on floppy disks. Previously, the data was held for thirty days.

Item #5 - We have a written SOP for sample receiving, login, and chain-of-custody. The SOP is and has been available to everyone.

Item #6 - This recommendation should be addressed by the RAD Committee, not our laboratory.

Item #7 - All of our procedures should be in the survey manual, they were submitted months ago.

Item #8 - We are heavily involved in the EPA-Las Vegas PE/IC samples. The data from past work is available from me or from EPA-LV.

We measure radionuclides in water and air filters and these analyses cover all parameters required in a water matrix for the survey. As of 11/1/87, soil samples were not available from EPA-LV.

Sincerely,

J. W. Wade

J. W. Wade
Analytical Chemistry Division

JWW:sdc

cc: B. R. Clark
D. L. Dihel
P. L. Howell
W. R. Laing
J. R. Stokely

Internal Quality Assurance Reviews

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MARTIN MARIETTA ENERGY SYSTEMS, INC

March 23, 1988

R. B. Fitts

DOE Environmental Survey Program - Review of SAIC Involvement

On March 9, 1988, the review team visited SAIC and discussed at length their involvement with the DOE Environmental Survey Program. We met with John Goyert, Kevin Newman, Phil Bridges, and Karen Van Hoosen, SAIC employees, who were responsible to provide whatever software development assistance that MM-ES needed for the program. This broad statement translates into the following verbal requests;

1. Provide final documents from data generated by the ORNL Field Sampling Team.

2. Develop data management techniques for the Environmental Survey Program.

3. Compile an electronic deliverable of K-25 data for delivery to Battelle.

4. Assist ORNL Analytical Chemistry Division in the production of CLP documentation.

Phil Bridges as the author of the software programs, is in charge of all electronic transfer of data. Kevin Newman, has the responsibility for meeting the software needs of Inorganic and Exotic analysis, John Goyert has the same responsibility to meet the needs (software-wise) of the Organic and PCB/Pesticides analysis, and Karen Van Hoosen is assigned to work specifically with the K-25 data to supply the necessary assistance to the Environmental Survey Program. SAIC has met their verbal commitment to provide the requested deliverables for item #4. Item #3 is still in progress and Items #1 and #2 were not discussed.

During the ensuing discussion, the review team which consisted of A. H. Halouma, P. L. Howell, L. W. McMahon and D. W. Frazier, endeavored to understand how they assured that the requests were handled. Since the discussion, we now have a much better understanding of what SAIC's function is, and what they are trying to do.

General Comments

1. List of deliverables furnished by SAIC to date:

a. They have developed the program logo,

b. Developed data management tools to help with electronic transfer of data - forms generation, a QC summary report (not in CLP format) can be generated that enables the labs to obtain QC data, on a daily basis from the PC which is used for checking sample runs, this gave the labs the ability to do their own

electronic edit checks, and a program was interfaced to allow Pesticides/PCB GC program to work with AnaLis (Analytical Chemistry Division (ACD) data management system).

c. Developed software to produce final hardcopy reports.

d. Adapted software to ACD's mode of operation to receive and review data instead of causing a force fit of ACD data to SAIC's methods of operation.

e. Established "archive" and "clean" data files which provides an audit trail of changes.

2. Although data from VOA, SVO, PCB/Pesticide, Inorganic, Radiochemical, ICP, and "Exotics" analyses were obtained by SAIC via different pathways, all were handled in the same manner after formation of "archive" files, which appeared to be effective.

Areas of Concern

1. Requirements documentation for the program to SAIC was non-existent.

2. Need data document chain-of-custody when hardcopies or floppy disks are transferred from one location to another.

3. No formal QA Plan or Standard Operating Procedure exists for closing the link between the time the labs release data, when SAIC receives the data, and when DEM receives the necessary data from SAIC. How can correct data transmission and receipt be assured ?

4. No formal plan exists for distinguishing between which set of Pesticides/PCB data to use, since ACD sends all of this data in each transfer. This data is sent to SAIC in a form that is not easily used. Due to this problem SAIC does data comparisons to CRDL's, etc. SAIC and ACD should work together to reach a mutually agreeable working plan in this area, to attain a more efficient operation.

5. There appears to be no central point of contact in ACD for SAIC and no defined (documented) responsibilities. The working system for laboratory contacts seems to work, but there's no assurance that some things will not "fall between the cracks", and there appears to be no one to mediate conflicts.

6. There appears to be good interaction between SAIC and ACD Inorganics, Radionuclides, and "Exotics" Organics labs. Better communication needs to be established with personnel in the Organics lab.

7. SAIC felt that time delays in completing Pantex data was not caused by SAIC; they bring in extra people, as required by the task for efficient and timely completion of data handling tasks.

8. SAIC is concerned about discrepancies in the Pesticides/PCB GC computer code.

9. SAIC has not received final SVO data from ACD; ACD Organic lab management would not release data until RTA is running. ACD is working out the problem with getting their data uploaded from the Chem Station to the RTA for final processing prior to release to SAIC.

10. VOA data is at ORNL for third review by ACD; this should be the last review required for VOA. SVO data first returned to ORNL ACD for review in early January, for a second review in late January, a QC summary report was generated March 2, SAIC is still waiting for data. Pesticides/PCB archive file was created and given to ACD for review in early February, the data was returned to SAIC. The first clean file was generated and returned to ACD for a second review in February, when a review and changes were made. The third set of data was sent to ACD for review on March 7, 1988.

11. The ACD labs and SAIC need to understand and agree upon the use of data qualifiers, example, "J", "B", and "U", for each analysis (VOA, SVO, & PCB/Pest).

12. In the PCB/Pesticide area, there needs to be an understanding of what the final report should be when the CLP forms are produced, or allow SAIC to participate in the programming to produce the forms. Do whichever is best for the program!

Recommendations

1. The review team recommends that the program managers representing the participating labs seriously consider the applicable area(s) of concern as discussed herein for overall improvement in the DOE Environmental Survey Program/SAIC working relationship, thus enhancing the data handling/management aspect of the entire survey in Oak Ridge.

2. In all future communications where deliverables are due, it is recommended that requirements of outside contractors be documented.

If you have questions or concerns, please call me.

D. W. Frazier

D. W. Frazier, 1000, MS-335, ORNL (6-0347)

DWF:cet(QA 88-25)

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MARTIN MARIETTA

nternal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

April 5, 1988

83 10: 11

Distribution

Final Oak Ridge Environmental Survey Program Quality Assurance (QA) Review

During the week of April 11-15, 1988, the final activities of the QA review of the Organic, Inorganic and Radiochemistry labs at both ORNL and ORGDP, as well as the field sampling activities performed by the ORNL Environmental Compliance Department have been scheduled. All of the activities will begin at 8:30 a.m. each day. If necessary, special case re-visits vital to the resolution of any discrepancies will take place during April 27-29, prior to the issuance of the final report. Please refer to the attachment, Activities Schedule, for the specific day that we will come to your location.

The procedure to be used during this informal review is the Energy Systems Quality Procedure ESP.18.1, "Audits," with the exception of necessary modifications to accommodate the nature and purpose of this review. Please find attached also a copy of the checklists to be used for the labs and the field sampling activity, and note that action items from the previous DOE/EPA audit (1/88) and QA reviews (ORNL February and March activities) will be looked at closely. (Reference Draft Copy of ORNL USEPA CONTRACT LABORATORY PROGRAM (CLP) STATEMENT OF WORK for ORGANIC AND INORGANIC ANALYSIS multi-media, multi-concentration SOW NO. 787, EXHIBIT E, SECTION V, PART 1 & 2.) The agenda can be set when we arrive. You may want to make a limited number of brief presentations (to cover information which would help to expedite time for all concerned for no longer than one hour at the most). You could also cover for our information who your contacts are, where we will be located, etc. We will cover each area on the checklist as thoroughly as necessary to assure that we understand the status at this time.

The purpose of this review is to determine the status of the field sampling activities, organic, inorganic, and radiochemistry laboratories relative to the Environmental Survey CLP protocol in the aforementioned statement of work. Our interests and attention will be focused on this. We would very much like to go about the review with the least amount of impact on your organization. If you'll make available a place to accommodate a team of 4-6 people, we could do most of the review with little impact. However, we will need to talk to some of the analysts who perform the analyses at some time during the day. Please arrange your schedule to allow us to begin the review process no later than 9:30 a.m.

We will schedule a de-briefing meeting to discuss the results of all the reviews on April 18, at 1:30 p.m., at ORNL, Building 1000, conference room 208A. Our plan is to provide a draft copy of our report on the results of each review at this meeting. If no changes to the drafts are needed after the de-briefing, the drafts will stand as written, otherwise agreed upon changes will be incorporated into the final report. Please have your area represented at this meeting if you cannot attend so that your comments can be included in the final report.

D. W. Frazier

D. W. Frazier, 1000, MS 335, ORNL (6-0347)

DWF:cet (QA 88-28)

Attachments

Distribution:
J. R. Caffrey
J. E. Caton
M. R. Guerin
W. R. Laing
R. W. Morrow
J. B. Murphy
R. K. Owenby
D. C. Parzyck
S. R. Rizk
P. S. Rohwer
W. D. Shults

cc: E. L. Allred
M. S. Dill
J. N. Dumont
R. B. Fitts
S. W. Goza
A. A. Halouma
P. B. Hoke
S. R. Holladay
P. L. Howell
R. A. Jacobus
R. J. McElhaney
L. W. McMahon
P. E. Melroy
R. F. Swiger
A. N. Weisbin
R. M. Wright

ACTIVITIES SCHEDULE

Schedule of Quality Assurance Reviews of the DOE Site Survey Sampling and Analysis Activities

D. W. Frazier and P. L. Howell will participate on each review team.

April 11	2nd ORNL Organic Lab Review	McMahon, Weisbin
April 12	ORNL Inorganic Lab Review	Halouma, Weisbin
April 13	ORNL Site Survey Sampling Review	Halouma, McMahon
April 14	ORGDP Organic Lab Review	Holladay, McElhaney
April 15	ORGDP Inorganic Lab Review	Holladay, McElhaney
April 27-29	Re-visit to Labs, if necessary and report preparation	
May 2	Final Report to Fitts	

Checklist for the Quality Assurance Review of the ORNL Field Sampling Activities

1. Organization, personnel qualifications and training to perform assigned tasks?

2. Adequate facilities and equipment available?

3. Complete documentation, including chain-of-custody of samples implemented, document control, field logbooks, instrument calibration log, sample labels, tags, field observations, sample shipment, sample preparation field procedures, and discussion of on-site performance.

4. Proper sampling methodology used?

5. Adequate analytical Quality Control samples provided?

6. Acceptable documentation techniques used?

7. Corrective action status from previous audits or reviews.

8. Were waste disposal procedures followed? Explain.

9. What was security process for the entire sampling activity?

10. Were deviations from the Sampling Plan documented?

11. Discuss on-site sampling performance at Pantex site.

Checklist for the Quality Assurance Review of the ORNL and ORGDP Organic, Inorganic and Radiochemistry Laboratories Involved in the Oak Ridge Environmental Survey Program

1. Organization, personnel qualifications and training to perform assigned tasks?

2. Adequate facilities and equipment available?

3. Complete documentation, including chain-of-custody of samples being implemented?

4. Proper analytical methodology being used?

5. Adequate analytical Quality Control, including reference samples, control charts, and documented corrective action measures, being provided?

6. Acceptable data handling and documentation techniques being used?

7. Performance evaluation sample, and inorganic CLP data review.

8. Corrective action status from previous audits or reviews.

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April 18, 1988

R. B. Fitts

DOE Environmental Survey Program - Final Quality Assurance (QA) Review of the ORNL Analytical Chemistry Division's Organic, Inorganic, Radiochemical, and High Explosives Analysis Laboratories

Please find attached the report from the above activities. In order to understand the final report, please reference the cover letter for the Review of the Pantex Site Organic Data Generated by the ORNL Analytical Chemistry Division (ACD), dated March 23, 1988. This cover letter is included with this report as Attachment 6.

Due to the urgency of this situation we have distributed draft reports to the labs. Further distribution should be made by your office. Please request corrective actions and allow P. L. Howell to track, review and verify adequacy of the completed action items as per the Charter, dated February 25, 1988.

All of the requested QA reviews of the ORNL ACD's Organic, Inorganic, Radiochemical and High Explosives analysis labs are now complete. Any additional information concerning the reviews (review notes, evidentiary information) is available to you upon request.

Should you have further concerns or questions about anything in the reports or QA concerns in your program, please call me or P. E. Melroy, ORNL's Quality Manager.

D. W. Frazier

D. W. Frazier, 1000, MS-335, ORNL (6-0347)

DWF:cet (QA-88-30)

Attachments:

1. Copy of Sample control and Chain-of-Custody Sheet with suggested additions
2. Letter - Oak Ridge Environmental Survey Program Review - Final Review and Recommendations - To Frazier, From McMahon
3. Lists of the revised Organic and InorganicStandard Operating Procedures reviewed
4. Total list of organic SOP's to be revised
5. Total list of inorganic SOP's to be revised
6. Cover letter and Review Report (from L. W. McMahon) from the Pantex site data review

Final Report of the Second Quality Assurance (QA) Review of the ORNL Analytical Chemistry Division's Organic, Inorganic, Radiochemistry, and High Explosives Analysis Laboratory Participating in the DOE Environmental Survey Program

Issued to:

R. B. Fitts

April 18, 1988

Issued By:

D. W. Frazier, Review Team Leader

S. K. Holladay

P. L. Howell

L. W. McMahon

A. N. Weisbin

A. A. Halouma

INTRODUCTION

On April 11-12, 1988, the QA review team consisting of A. A. Halouma, S. K. Holladay, P. L. Howell, L. W. McMahon, A. N. Weisbin and D. W. Frazier met with ORNL personnel W. R. Laing, J. E. Caton Jr., W. H. Griest, J. C. Price, J. W. Wade, C. A. Treese, J. A. Hayden, and S. J. Bobrowski, prior to beginning the review of the subject laboratories. A checklist including the areas of concern for the review had been provided prior to the activity. The status of the corrective action items from the EPA audits of the program conducted in June 1987 and January 1988 and from the first QA review were also addressed. This report will reflect, as best could be determined, the status of subject labs readiness to be audited by the EPA in connection with the requirements of the statement of work. Since this is the final report, items from the first report are included to provide a comprehensive overall summary of this status.

SCOPE

This QA review was requested by R. B. Fitts, Program Manager of the Oak Ridge Environmental Survey Program (ORESP) and ORNL Analytical Chemistry Division (ACD) Director W. D. Shults, to obtain an independent evaluation of participant's compliance to established guidelines to the Contract Laboratory Program protocol. The Draft of ORNL USEPA Contract Laboratory Program (CLP) Statement of Work for Organic and Inorganic Analysis Multi-Media, Multi-Concentration SOW No. 787, and good lab practices were used as the basis for the review. The team began in the Sample Receiving Laboratory and proceeded to review the Organic, Inorganic, Radiochemistry, and High Explosives analysis laboratories.

COMMENDABLE EFFORTS NOTED

ORGANICS LABORATORY

1. Volatile organic matrix spikes, tune criteria, and surrogate recoveries are being reviewed on a batch-to-batch basis - relates a good effort to comply with protocol in spite of man-power needs.

2. Instrument run log notebooks were well thought-out and designed.

3. There was an excellent effort to develop software to produce the required PCB\Pesticide CLP forms. Further efforts to include additional useful information to the Form 1D was made prior to the second QA review.

4. Review of the linearity of standards, surrogate recoveries, matrix spikes and matrix spike duplicates is now evident in the Organic labs prior to sample reporting.

5. There has been a commendable effort put forth to address the corrective action items from the EPA audits and the first QA review.

6. The semivolatile data evaluation, although not complete at the time of this second review, is moving toward completion since additional instrumentation has been ordered and further training in the use of the software is scheduled with Hewlett Packard Company representatives.

7. The final report of Pantex VOA data has been generated to correctly state quantitative values, positive contaminate identifications, documentation of deviations from the protocol, and documentation of corrective actions taken for out-of-control conditions.

INORGANICS LABORATORY

8. Applicable inorganic technical and CLP procedures were made accessible in notebooks for use by each analyst - very good practice.

9. Exemplary documentation of notebooks in compliance to the CLP protocol in the ICP and Atomic Absorption labs.

10. Revised standard operating procedures, and implementation thereof has begun.

11. All biographical data on personnel was well documented.

12. Certification records were available on all personnel including the EPA procedures that they were certified to perform - excellent.

13. CAPA Sample Prep lab notebooks and records were exemplary.

14. A holding time traceability system has been established in this section, and is being tested in the organic section. By request number the sample is compared to the holding time date and to the program due date, whichever date is earlier is printed as the deadline.

Status: Incomplete

ATOMIC ABSORPTION LAB

14. Training records to CLP procedure are complete.

15. Procedures in use were on hand for analysts use.

MERCURY LAB

16. The sample prep and mercury labs were very well organized.

RADIOCHEMISTRY

17. Chain-of-custody system for paperflow and sample management appeared to be an effective system for the present set-up.

18. Documentation of instrument maintenance, specific weekly counting activities, instrument setting log, and QC were found to be exemplary.

HIGH EXPLOSIVES LABORATORY

19. Even though this lab is not under the CLP protocol, several SOP's were written to cover the involvement in the program.

20. Data transfer and CLP form generation are being patterned after the PCB/PEST Form I and are quite comprehensive - excellent effort.

ASBESTOS LAB

21. Involvement for the Environmental Survey in the Asbestos lab was found to be very well organized, instrument and standard operating procedures were in place, training - past and future plans were excellent, master log book is noteworthy, lab security is well thought out and implemented, and waste management was handled by sending all of the sample (including the portion analyzed) back to the customer, just an exemplary effort.

DEFICIENCIES/RECOMMENDATIONS

GENERAL:

This review included a more thorough study of the standard operating procedures (SOP) throughout the labs. A. N. Weisbin, spent a considerable amount of time reviewing newly written SOP's against the CLP requirements. The list of Organic and Inorganic SOP's reviewed and conclusions drawn can be found in Attachment_3 to this report. Consider that the recommendations and comments in the attachment are the team's recommendations to be incorporated into the SOP.

1. There were too many different forms requiring varying information, and inconsistently used for the same purpose in use throughout the laboratories, which made sample tracking very difficult. Although the number of forms has not decreased, the Organic lab has re-designed their chain-of-custody form to reflect only the needed information.

Recommendation: This applies specifically to work under the CLP protocol; Use a centralized receiving record, or a log to record the incoming samples.

Comment:

A. The Organic Lab Chain-of-Custody form has been revised to reflect their informational needs. Three suggested additions are included for your consideration as a result of previous audits (1) the number of containers received, (2) the site name, and (3) state whether the container holds a sample or an extract. (See Attachment 1, copy of the form.)

B. In order for sample tracking to be more efficient, consider numbering the forms to cross-reference Request for Analytical Services form with the Chain-of-Custody form.

C. There is now a central sample tracking system in place.

Status: Complete

2. There is no consistent documentation to the customer concerning as-received sample nonconformances.

Recommendation: Written documentation of sample nonconformances should accompany phone calls to notify the customer. An entry can be made directly on the Request for Analytical Services form. This could be called out in the Sample Receiving and Inspection for the DOE Environmental Survey Program Standard Operating Procedure.

Comment: This item is covered in Draft SOP-002, Sample Receiving and Inspection for the DOE Environmental Survey Program.

Status: Complete

3. The lack of man-power which was evident in the sample receiving area during the first review is being handled.

Recommendation: During the interim, it will be necessary to properly train temporary personnel. The use of a simple stepwise checklist made up from the SOP to assure that everything gets done can be used, or simply train some relief personnel to the SOP for back-up (especially in the sample receiving areas.)

Comment: This item is also covered by Draft SOP-002, as in item #4.

Status: Complete

4. Different AnaLis sample identification numbers were assigned to the same sample for multi-analysis (VOA, SVO, ICP, Hg, etc.) was found to be inefficient and time consuming when compiling data reports for a sample.

Recommendation: Consider centralization of the sample log-in function. Man-power and terminals for this function could yield a more efficient sample tracking system with several avenues to data retrieval at one source. Consideration of this for the CLP program is strongly advised by the QA review team.

Comment: Lab personnel have developed a sample tracking system which allows samples to be located via request numbers or assigned lab numbers. Therefore a central login would not be necessary.

Status: Complete

5. A lack of awareness of the Analytical Chemistry Division's general policy for sample disposal was Train employees in the use of applicable SOPs.

Comment: Draft SOP-013 will be issued by June 1, 1988. Training of the sample receiving personnel to the SOP has already taken place.

Status: Incomplete

6. Printed forms were completely filled in. This was much improved over the situation observed during the last review.

Comment: This area should be monitored on an unscheduled basis to assure that it is continuously being done.

Status: Complete

7. Personnel should be made aware of the data validation process. A documented data validation process is scheduled to be written to cover this issue.

Comment: Standard operating procedures to be revised or written should have targeted completion dates.

Status: Incomplete

8. Date of receipt on chemicals were inconsistently applied.

Recommendation: Management must assure that policy regarding age of chemicals used for any aspect of analysis is set up and implemented. This allows chemicals to be used on a first-in first-out basis.

Status: Incomplete

9. Non-target parameter laboratories have very little familiarity with QA/QC and evidentiary requirements.

Recommendation: Strongly consider conducting documented QA/QC discussions at regular intervals during general meetings or separately, whichever meets the need. Regular meetings should document attendance if safety or QA/QC is discussed and kept in training file.

Status: Incomplete

10. Non-target parameter labs were found to be weak in the implementation of standard operating procedures (SOPs).

Recommendation: Train employees in the use of applicable SOPs.

Status: Incomplete

11. Glassware Cleaning procedures, posted above sinks for easy reference by user, were not signed and dated by management.

Recommendation: All Technical and Standard Operating Procedures should be signed and dated by applicable management to show that the procedure is an official document.

Status: Incomplete

12. Notebook reviews were being performed, but repeated obliterations without initials or dates of the action were found.

Recommendations: Instructions for how to fill out a notebook are available in the Martin Marietta Energy System's laboratory notebooks and handling of errors is a part of the instructions. Training to these instructions should be a part of the regular group meetings for old and new hires. An error should have a single line drawn through it, initialed, and dated.

Comment: Draft SOP-003, Requirements for Recording and Correcting Lab Entries for the Environmental Survey Program has been written to address this deficiency. Training of all ACD employees to the SOP has been planned and will be complete by June 1, 1988.

Status: Incomplete

13. The mechanism for handling future CLP work has changed. Future work will incorporate analyst review and interpretation of all data prior to reporting quantitative values, and to assure that the required QC criteria are met before proceeding with the analysis.

Status: To be monitored during analysis of next CLP samples.

ORGANIC LABORATORIES

14. Although writing and revision of SOP's are in progress, it is doubtful that all of the SOP's called out on the list supplied to the team will be completed prior to another EPA audit.

Recommendation: Prepare an action plan for completing the writing and revision of SOP's, with specifics, such as SOP name, completion date, review and comment due date, issue date, training to SOP completion date, and show evidence that the plan is being followed. Be reasonable in this activity, set dates that can be achieved, but dates that reflect urgency to have this activity completed.

Status: Incomplete

15. While tracking an Argonne CLP sample, it was noted that there was no Chain-of-Custody form, nor original request for services resulting in an incomplete paperflow.

Recommendation: Prepare a receiving and completed data package checklist to be reviewed for essential paperwork in a CLP package for each file.

Comment: This type problem will be handled with the implementation of the appropriate SOP's. However, this is still a concern until the SOP's are implemented. A copy of this checklist was supplied to the lab by L. W. McMahon.

Status: Incomplete

16. Training to the CLP protocol is being planned for the Organic labs staff. Arrangements are being made to obtain the services of EPA personnel to conduct the training in mid-May.

Status: Incomplete

17. There was insufficient data handling software/hardware during the first review. Presently, arrangements have been made with Hewlett-Packard Company representative to further train staff to use the new RTA System, and two additional Scan Boxes have been ordered to make the system efficient which will increase data evaluation productivity.

Status: Incomplete

18. There is now documentation of corrective actions in the GC-MS and PCB/PEST labs.

Status: Complete

19. The daily check on the refrigerator temperature is now being performed and recorded. Temperature excursions are handled by adjusting the controls until the event is under control. The Temperature Controlled Sample Storage Areas: Records and Maintenance SOP, is to be written and implemented. The Organic Analysis lab supervisor has committed to supply the team with a schedule for the completion of the organic SOP's.

Status: Incomplete

20. Sample concentration data is now being flagged to show the appropriate blanks concentrations.

Status: Incomplete

21. Data validation will be performed by two people in the GC-MS lab, as well as by the Group Supervisor, when possible, in a manner that will expedite sample analysis and data handling.

Comment: Unscheduled monitoring should confirm continued practice.

Status: Complete

22. There was evidence that only three performance evaluation samples out of five quarters were completed and reported.

Recommendation: In order to access the labs ability and capability to operate under the CLP protocol, the performance evaluation samples must be completed and reported to show good faith that the samples can be analyzed as necessary.

Status: Incomplete

PESTICIDE/PCB LABORATORY

During this QA review, L. W. McMahon reviewed in detail the PCB/PEST data as it is now being evaluated and the semivolatile data as it is presently generated using the Aquarius software. Please find a draft version of his report to me in Attachment 2, dated April 15, 1988 entitled Oak Ridge Environmental Survey Program Review - Final Review and Recommendations. The recommendations stated in his report are official recommendations of the QA review team and will be considered as such.

22. Lack of sufficient number of Gas Chromatographs (GC) and personnel for project workload was noted during the first review. At present, another GC has been borrowed for CLP work until a recently ordered system is in-house and set up. Management is actively interviewing to add personnel to the workforce. There can be no date set for personnel addition, this activity will have to be monitored closely to expedite the process.

Status: Incomplete

23. A better understanding of the CLP protocol is now evident, such as personnel now are aware that the Form VIII Evaluation Standards must be within specification prior to sample analyses; that the raw data reported on Form I is the laboratory validated results, and that tentatively identified compounds must be referenced on Form X. However, the following recommendations must be made in an effort to strengthen this area.

Recommendation:

- Give SAIC hardcopy of data to use to verify the final electronic CLP form generation.
- Continue to put the PCB/PEST data together in the CLP package.
- Report all quantitation data as estimated flagged with a "J".
- If matrix spike recovery = 0, the data associated with it should be flagged as not useful.
- Alter computer program on sample calculation for the following; discontinue averaging the response factors, and quantitate on the nearest appropriate Individual A or B standard.
- All organic staff need additional training to the CLP protocols.

24. SAIC should take out the packed and capillary column data that they now have and replace it with the data on the present Form I.

Status: Incomplete

25. Case narrative should explain the rationale for altering Forms II and VIII and should also address Form III.

Status: Incomplete

26. Confirm via comparison the information on the forms vs the information in the AnaLis database.

Status: Incomplete

VOLATILE ORGANICS

The status of the VOA data was reported in a letter to D. W. Frazier, from L. W. McMahon entitled Review of Pantex Data at ORNL 2/23/88 - 2/26/88, dated March 2, 1988. (See Attachment 7.)

SEMI-VOLATILE ORGANICS

29. The evaluation of the raw data generated on the GC-MS Chem stations is now taking place through the use of the RTA to produce the CLP forms. The information is being assembled into CLP data packages.

Status: Incomplete

30. The review team has similar concerns with the semi-volatile organic data as with the volatile organic data, such as matrix spike results being outside the QC window, detection limits and results needing to be corrected for moisture content, and positive hits reported as estimated values. The number of CLP non-conformances is probably not so extensive that the data should all be declared as Level III quality. This conclusion was based on the evaluation of limited data available at the time of the review. The semi-volatile organic data evaluation by the labs' staff was not complete. It has been predicted that this data evaluation will not be complete for several weeks.

Status: Incomplete

HIGH EXPLOSIVES LAB

31. Sample receipt is inadequate. Chain-of-custody is not carried through to receiving personnel at Bldg. 2026 from ORNL Receiving personnel.

Recommendation: Some type of arrangements will be made and documented with ORNL Receiving such that someone in the Lab must sign for the incoming samples. They are presently left at the front door of the High Explosives lab Bldg. 2026 until the cooler is found.

Status: Incomplete

INORGANIC LABS

GENERAL:

32. Control work sheets containing the results of analysis are now being put into laboratory notebooks in the % solid and fluorometric Uranium analysis lab.

Status: Complete

33. Notebook entries are being made in black ink.

Status: Complete

34. Violations of error correction protocol (single line through error, initials, and date) were observed in notebooks throughout the lab.

Recommendation: See recommendation under Deficiency #12.

Status: Incomplete

35. The review of the notebooks by supervision or designee obliterated actual data in several notebooks.

Recommendation: An area on the data page should be allotted for witnesses signatures and/or stamps.

Status: Unscheduled monitoring to confirm continued action.

ICP LAB

36. Lack of back-up instrumentation presently on line in the ICP laboratory.

Recommendation: Provide documented policy or agreements for back-up in case the present ICP instrument fails.

Comment: To date the team has not received any assurances that this concern has been handled.

Status: Incomplete

CYANIDE LAB

37. There is a need for awareness of the methods used in the lab (SW-846, EPA-600, and CLP method EPA-335.2) for different types of samples.

Recommendation: Train employees so that they will be aware of such information.

Comment: This can be handled in regular group discussion meetings.

Status: Incomplete

38. There was no awareness that there are specified concentrations with which the instrument should be calibrated.

    a. This was reflected in the lack of frequent instrument standardizations.

    b. General lab QA/QC not strictly followed;
       - Conductivity of water is not recorded.
       - Balance is not regularly calibrated.

Recommendation: Implement SOP's to alleviate this situation.

Comment: Assure that employees in this lab are following the QA/QC procedures for the ACD as well as for the Environmental Survey Program.

Status: Incomplete

39. There was no SOP for washing glassware at the sink.

Recommendation: Post SOP at sink in the Cyanide analysis lab.

Status: Incomplete

40. Reagents should be dated upon receipt before storage in the refrigerator.

Recommendation: Initial and date all incoming reagents, standards, etc. for use in sample analysis to allow first-in first-out usage of supplies.

Status: Requires unscheduled monitoring for continuous action.

RADIOCHEMISTRY LAB

41. Procedures are still in the old format, but updating to conform to the NQA-1 format is in progress.

Recommendation: Document expected completion of this activity.

Status: Incomplete

42. The Environmental Survey Manual is in the process of assigning ESM numbers for the Radiochemical procedures.

Status: Complete

43. The Sample Receiving, Logging and Distribution procedure was found to be inadequate. There is no QA input and it is not written in procedural format.

Recommendation: This procedure is a strawman and is in need of being completed, "adding the meat of how to do the receiving, logging and distribution." The SOP is a part of the QA process and was written so that when it is implemented will assure that these processes don't fall through a crack.

Status: Incomplete

ASBESTOS LAB

44. Standard operating procedures for this lab are not written, but a system is definitely in place.

Recommendation: Inorganic lab SOP's should include the Asbestos lab in all areas.

Status: Incomplete

ATTACHMENT 1

MARTIN-MARIETTA ENERGY SYSTEMS, INC.
OAK RIDGE NATIONAL LABORATORY

SAMPLE CONTROL AND CHAIN-OF-CUSTODY SHEET

REQUEST NO.: ________ SAMPLE NUMBERS: ________

MATRIX: ________ REMARKS: ________

CIRCLE THE APPROPRIATE ANALYSIS: VOA SVO PEST/PCB OTHERS: ________

CONTAINER DESCRIPTIONS: ________

NAME ________ PHONE ________ ADDRESS ________

SHOULD THE REMAINING SAMPLE BE RETURNED TO THE CUSTOMER? YES NO

NUMBER OF CONTAINERS RECEIVED ________ SAMPLE or EXTRACT (CIRCLE ONE)

SITE NAME ________

CHAIN-OF-CUSTODY

DATE RECEIVED	TIME RECEIVED	TRANSFERRED FROM	TRANSFERRED TO	ACD SAMPLE NUMBERS	PURPOSE	STORAGE LOCATION

LAB MANAGER OR DESIGNEE: ________ ________

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ATTACHMENT 2
Detailed Review of PCB/PEST Data Evaluations

April 15, 1988

D. W. Frazier

Oak Ridge Environmental Survey Program Review - Final Review and Recommendations

During the second review on April 11, Mike Guerin's and John Hayden's comments and questions expressed previously (Pantex PCB/Pesticide Data Review, Guerin to Frazier, March 25, 1988) regarding the pesticide/PCB data were addressed. I will note how these issues were resolved and then offer some conclusions from the review.

Issues Noted in Guerin's Memo

1. The data packages reviewed on February 23-26 did not reflect extensive data evaluation and checks. Contradictory results were reported within the data set (duplicate Form I's with different results), within AnaLIS, and within the SAIC database. Two causes for this were identified; misunderstanding by the laboratory about how to present CLP data and transfer of raw data to SAIC. As of the second review on April 11 the lab is reprocessing the CLP packages to reflect the necessary data checks and evaluation.

2. The calibrations did not meet the CLP linearity requirement. Specific instruction is found on pages D-32 through D-35 and E-52 of the 10/86 SOW. The additional 5 point standards used by the lab to demonstrate linearity were at a higher concentration range than required. In addition the response factors used for calculations were a averaged. This process was reviewed with John Hayden on 4/11 and his questions regarding the linearity and continuing calibration requirements were resolved.

3. To insure SAIC database is correct, hard copies of the lab evaluated data will to be given to SAIC.

4. Abnormalities previously noted in computer generated forms have been corrected.

5. After re-evaluating the blank data and correcting the Form I data, the concern about blank contamination has been resolved. The single positive hit must be addressed in the case narrative.

6. Over the past year to 18 months, EPA-EMSL has been quite nebulous regarding the use of an appropriate surrogate as well as the value of Dibuty/Chlorandate (DBC) recovery data. The lab was operating under the assumption that mirex was an acceptable alternative to DBC. In terms of the SOW used for the DOE Survey work it was not. However, while no criteria is available to evaluate mirex recovery, it can be used to make some technical judgement as to how well the overall extraction and analysis process is working. This issue must also be addressed in a case narrative. (Analysis data to evaluate mirex is provided as Attachment 6.)

7. The questions posed by the Guerin memo were addressed on 4/11 with John Hayden as follows:

   (a) A single Form I is used to report quantitative, confirmed data. Raw data from both columns is to be included in the package. The data reported on Form I is the laboratory validated results.

   (b) If the lineartiy check from EVAL A, B, and C exceeds 10% for aldrin, endrin, or DBC discontinue the analysis, troubleshoot the equipment/ technique, and meet this requirement before continuing analysis. If DDT exceeds the 10% requirement see paragraph 4.5.4.4, page E-59 of the 10/86 SOW. The footnote on Form VIII PEST-1 refers to DDT only.

   (c) There is no reference to tentatively identified compounds on Form X.

OVERALL ASSESSMENT OF PANTEX PESTICIDE/PCB DATA

While appropriate to make professional judgments and express concerns on the validity of data, the additive nature of QC factors out of specification is difficult to express. The reviewer as well as the laboratory has a responsibility to inform users of the data of all concerns in order to assist that user in avoiding inappropriate use of the data while at the same time not precluding data necessary to facilitate the progress of projects requiring the availability of the data. While data which does not meet specified requirements is never fully acceptable, this line-of-thought is consistent with EPA guidance on laboratory data evaluation (Technical Directive Document No. HQ-8410-01, Laboratory Data Validation, Functional Guidelines For Evaluating Pesticide/PCB's Analysis, May 28, 1985). Using guidance from this document, I suggest reporting the data annotated as outlined below while fully explaining any non-conformance in the case narratives. I suggest this for the following reasons:

1. Factors beyond the control of the laboratory were a cause of many QC non-conformances.

   (a) There was miscommunication between management and the lab concerning project requirements, capabilities available at the time of Pantex sampling, and capacity to handle the workload within the time frame allotted.

   (b) There were continuing changes in program requirements, by DOE-HQ, concerning the CLP reporting requirements and documentation, and

   (c) Continuing changes to the Sampling and Analysis Plan even during sampling.

2. Making data available in this manner will facilitate the progress of the Pantex project.

I. Suggested procedure to annotate Pantex Pesticide/PCB data

Sample Holding Times - If 40 CFR 136 holding times are exceeded, flag all positive results as estimated (J) and sample quantitation limits as estimated (UJ) and annotate data to the effect that holding times were exceeded.

II. Pesticides Instrument Performance -

1. DDT Retention Time - If the retention time of DDT is less than 12 minutes, a close examination of the chromatography is necessary to assure that adequate separation of individual components is achieved. If adequate separation is not achieved, all affected compound data are unusable and must be flagged with (R).

2. Retention Time Windows - Retention time windows are used in qualitative identification. When these retention time windows have not been met, positive results should be considered tentative (N).

3. DDT/Endrin Degradation Check

   a. DDT breakdown is greater than 20%;

      (1) All quantitative results for DDT should be considered estimated and flagged with (J).

      (2) Qualitative and quantitative results for DDD and DDE should be considered estimated and tentatively identified and flagged with (JN).

      (3) All other pesticide PCB results should be inspected very closely to determine their validity.

   b. If Endrin breakdown is greater than 20%;

      (1) All quantitative results for endrin should be considered estimated and flagged with (J).

      (2) Qualitative and quantitative results for Endrin ketone should be considered as tentative and flagged with (NJ).

      (3) All other results should be inspected very closely to determine their validity.

4. Retention Time Check

   a. If the retention time shift for DBC is greater that 2.0% for packed column or greater than 0.3% for capillary column, the analysis should be

considered unusable for that sample(s) with discernable chromatographic peaks and results flagged with an (R).

b. The absence of a DBC peak does not constitute a violation of the above condition since DBC may be absent due to low recovery of dilution.

III. Calibration

1. Initial Calibration - If criteria for linearity are not met, all associated quantitative results should be considered estimated and flagged with (J).

2. Continuing Calibration

a. If the % Difference between calibration factors during the 12 hour period is greater than 15% for the compound(s) being quantitated, flag all associated positive quantitative results as estimated and flagged with (J).

b. If the % difference is > 20% than the CRLOD is estimated and flagged with (UJ).

IV. Matrix Spike/Matrix Spike Duplicate

1. No action is taken on Matrix Spike/Matrix Spike Duplicate (MS/MSD) Data alone to qualify an entire Case.

2. The results of the matrix spike and matrix spike duplicate can be used in conjunction with other QC criteria to aid the user in applying more informed professional judgement when necessary.

3. On a sample-by-sample basis, the following suggestion on using MS/MSD results is provided for the specific sample spiked. If the results are positive (above detection limit) and the percent recovery is zero, the results of the unspiked sample for which (MS/MSD were performed are flagged with a (J) as estimated. If the results are less than the detection limit and spike recovery is zero, the results for the spiked compound(s) with zero recovery for the unspiked MS/MSD sample should be flagged as unusable with an (R). Multiple zero recoveries for compounds may suggest more general application of qualifiers.

VII. Compound Identification - Compound results reported without meeting qualitative criteria for two column confirmation should be flagged as not detected with a (U), using professional judgement to assign appropriate Sample Detection Limit.

Status of Laboratory Operations for Future Work

The laboratory personnel have a better understanding of CLP QA/QC requirements and are working within their means to insure capabilities are in place to handle future work. The Hewlett Packard (HP) RTA system is operational. On-site training by HP personnel, well versed in the use of Aquarius software is scheduled for mid-May. Two scan boxes previously recommended to increase productivity for semivolatile data processing has been ordered.

Communication between the sampling team and analytical team has improved and the sampling schedule at INEL has been lengthened in an attempt to resolve capacity issues in light of holding time concerns. Since 300 volatile organics will exceed the labs capacity, the aide of one or more other laboratories should be arranged as soon as possible.

Review of Sampling and Data Management Activities in Support of DOE Survey

On the morning of April 13, a short time was spent with Donna Pickel, John Murphy, and Karen Daniels reviewing the ORNL field participation in the Pantex project. Murphy reiterated the evolution of program requirements regarding field QC activities and their subsequent implementation by the ORNL team. At Murphy's initiative he has updated his on-site NPDES sampling program to include many of the DOE Environmental Survey program field QC protocols and intends further QC improvements to the RCRA sampling as well. From this discussion it appears the participation of the ORNL sampling team in the DOE Environmental Survey has resulted in improvements to the on-site monitoring programs at ORNL. Murphy provided the review team a written response to the review team checklist which addressed the documentation techniques, disposal procedures, sampling plan deviations, and training and personnel qualifications.

I would offer a single suggestion as to how this work effort has been documented in that the field log sheets should be bound by 19-hole punch spiral binder prior to archival in the case file. This should serve as better binding for storage than the staples and loose-leaf binders used during assimilation.

Karen Daniels is responsible for the data management activities. Much of this work has been contracted to SAIC. A review of SAIC work was reported earlier (McMahon to Frazier, March 18, 1988). Again, I would reiterate the recommendation that the data management teams review hard copy, lab generated CLP forms against the electronic database to insure that lab evaluated data is the data represented in the

database. Furthermore, a meeting between lab personnel and the data management team will likely be needed to insure the annotated lab data is properly interpreted. Dealing with CLP QA/QC requirements is equally new to the data management team. I believe a training program, by lab personnel experienced in the generation of CLP data, would be beneficial for the data management team and strengthen the communication skills needed to deal with the CLP lab.

Please call me if I can provide further information.

L. W. McMahon, 9704-1, MS-001, Y-12 (4-7535)

cc: T. R. Butz/C.C. Hill
L. L. McCauley/C.W. Kimbrough

ATTACHMENT 3

Organic Lab - List of New Standard Operating Procedures (SOP) Reviewed

A. N. Weisbin
4-11-88

Recommendations and Comments:

SOP #1 — Sample Login and Identification for the DOE Environmental Survey Program (Draft dated 3-12-88 - not approved)

- 7.2.10 - "Arrange for the proper and secure storage of all samples" - too general.

- Delete "...QA/QC section, if not applicable", statement.

SOP #6 — Personnel Signature and Initial Record

SOP #4 — Sample Storage for the DOE Environmental Survey Program (Refrigerators)

SOP #2 — Duties and Responsibilities of Sample Custodian

SOP #3 — Sample Chain of Custody

- Procedure should address answers to questions of "Who signs what?" (signature and date) "Who has ultimate responsibility?"

SOP #5 — Sample Storage Area Security

SOP #8 — Sample Tracking

- How are corrections made? Signed for? Attachments?

SOP #9 — Sample Preparation Bench Sheet

- Sect. 6.2. - How will the sample be identified?

- Sect. 6.3. - Incomplete

SOP #17 — Document Flow

- Incomplete

- Need responsible person also for each document.

Inorganic - List of Standard Operating Procedures (SOP) Reviewed

A. N. Weisbin
4-12-88

Recommendations and Comments:(Applies to all SOP's)

1. Recommend that the Scope and Purpose be separated.
2. Recommend that the QA/QC applicability statement be deleted.
3. Suggest that the summary should be "requirements".
4. Suggest that the list of forms be an attachment in the procedure.

SOP # 001	Duties and Responsibilities of Sample Custodian for the DOE Environmental Survey Program
SOP # 002	Sample Receiving and Inspection
Suggestion:	- 7.4.11 Reference secure storage and login procedures... Be specific, reference which secure storage and which login procedure will be used.
SOP # 003	Requirements for Recording and Correcting Laboratory Entries for the Environmental Survey Program
SOP # 004	Sample Login and Identification
SOP # 005	Personnel Signature and Initial Record
SOP # 006	Monitoring Analytical Balance Performance
SOP # 007	Sample Storage
SOP # 008	Sample Security
SOP # 009	Monitoring Cold Storage Temperatures
SOP # 011	Sample Chain-of-Custody
SOP # 013	Sample disposal

See comprehensive listing of all SOP's in Attachment 5 to this report.

ATTACHMENT 4

STANDARD OPERATING PROCEDURES

ORGANIZATIONAL

1. SAMPLE LOGIN AND IDENTIFICATION ✓
2. DUTIES AND RESPONSIBILITIES OF SAMPLE CUSTODIAN ✓
3. SAMPLE CHAIN-OF-CUSTODY ✓
4. SAMPLE STORAGE ✓
5. SAMPLE STORAGE AREA SECURITY ✓
6. PERSONNEL SIGNATURE AND INITIAL RECORD ✓
7. SAMPLE IDENTIFICATION
8. TRACKING SAMPLE ANALYSES ✓
9. SAMPLE REQUEST LOG NOTEBOOK
10. SAMPLE PREPARATION LOG
11. SAMPLE PREPARATION BENCH SHEET ✓
12. VOLATILES ANALYSIS INJECTION LOG
13. SEMIVOLATILES ANALYSIS INJECTION LOG
14. GCMS BACKLOG SHEET
15. PESTICIDES/PCBS ANALYSIS INJECTION LOG
16. PROGRESS REPORT
17. DOCUMENT FLOW ✓
18. DOCUMENT CONTROL
19. ORGANIC GCMS DATA REVIEW
20. REVIEW OF SAI-TREATED VOLATILES DATA
21. ORGANIC PESTICIDES DATA REVIEW
22. ORGANIZATION AND ASSEMBLY OF CASE FILE
23. ORGANIZATION AND ASSEMBLY OF EPA ORGANIC DATA PACKAGE
24. DOCUMENT/DATA PACKAGE SHIPPING
25. TRACEABILITY OF STANDARDS
26. ORGANIC STANDARDS STORAGE AND CUSTODY
27. ORGANIC REAGENT TRACEABILITY
28. TRACEABILITY OF MATRIX AND SURROGATE SPIKING SOLUTIONS
29. STORAGE OF MATRIX AND SURROGATE SPIKING SOLUTIONS
30. REQUIREMENTS FOR RECORDING, VALIDATING, AND CORRECTING ENTRIES
31. TEMPERATURE CONTROLLED SAMPLE STORAGE AREAS: RECORDS AND MAINTENANCE
32. CLEANING OF GLASSWARE
33. BALANCE OPERATION CHECK
34. DISPOSAL OF ENVIRONMENTAL SAMPLES
35. LABORATORY SAFETY

DRAFT

[illegible] (4-11-'90)

ATTACHMENT 5

STANDARD OPERATING PROCEDURES FOR THE DOE ENVIRONMENTAL SURVEY PROGRAM

X • DUTIES AND RESPONSIBILITIES OF SAMPLE CUSTODIAN
X • SAMPLE RECEIVING AND INSPECTION
X • REQUIREMENTS FOR REPORTING AND CORRECTING LABORATORY ENTRIES
X • SAMPLE LOGIN AND IDENTIFICATION
X • SAMPLE STORAGE
X • SAMPLE SECURITY
X • SAMPLE CHAIN-OF-CUSTODY
X • SAMPLE TRACKING
X • PERSONNEL SIGNATURE AND INITIAL RECORD
X • MONITORING COLD STORAGE TEMPERATURES
X • SAMPLE DISPOSAL
X • MONITORING ANALYTICAL BALANCE PERFORMANCE
• DOCUMENT CONTROL
• ANALYTICAL PROJECT FILE ORGANIZATION
• CASE FILE ASSEMBLY
• DATA MANAGEMENT AND SECURITY
• MONITORING WATER QUALITY
• CLEANING GLASSWARE

X = DRAFT COMPLETED

Sophie Bobrowski
Analytical Chemistry Division
April 11, 1988

Attachment 6

Oak Ridge Environmental Survey Program - Review of the Pantex Site Organic Data Generated by the ORNL Analytical Chemistry Division (ACD)

Issued to:

R. B. Fitts

March 23, 1988

Issued by:

D. W. Frazier, Review Team Leader

A. H. Halouma

P. L. Howell

L. W. McMahon

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Internal Correspondence

MARTIN MARIETTA

MARTIN MARIETTA ENERGY SYSTEMS, INC.

March 23, 1988

R. B. Fitts

DOE Environmental Survey Program - Review of the Pantex Site Organic Data Generated by the ORNL Analytical Chemistry Division (ACD).

In January 1988, EPA representatives reviewed the Pantex Site data generated by the ORNL ACD Organic labs. As a result of that audit, the data was declared suspect. A quality assurance review team was chosen at MM-ES to conduct an independent review of the data. On February 23, 24, & 26, 1988, this activity took place to assess the status or usefulness of the data in light of the comments made, and to document an independent evaluation of the participant's compliance to established guidelines as stated in the CLP statement of work.

Selected organic data, generated by ORNL, on environmental samples collected at Pantex as part of the DOE Environmental Survey were reviewed by the team. The following summary will discuss our conclusions based on compliance to requirements of the CLP protocol or from a view of the data being legally defensible versus actual usefulness from a technical point of view. However, prior to stating the conclusions drawn from the review, the team requests that the following issues/comments be recognized and considered.

1. Recognize:

   a. That the Organic Lab employees were directed to analyze the sample set from Pantex within the holding times and produce data. The lab received 195 volatile organic analyses (VOA), 203 semivolatile organic (SVO), and 154 PCB/Pesticides to be analyzed by two employees for ~75% of the project, (~25% of the samples were analyzed by one person) on 4 GC/MS instruments equipped with auto-samplers, two gas chromatographs with auto-samplers (which were not operational 100% of the project) operated by one or two employees;

   b. That these samples came in one delivery;

   c. That laboratory capacity was estimated to be 40 samples per week for the three parameters including sample preparation.

2. Recognize:

   a. That long hours and diligent efforts were expended by all concerned to produce the data within the specified holding times.

b. It was readily apparent that sufficient staff and instrumentation were not available to handle the workload from the Pantex Site.

c. Furthermore, it is suspected that sufficient laboratory capacity does not exist in any single DOE laboratory to handle this project given the short holding times associated with the organic samples.

d. At the time of the Pantex sample analyses, only 10% of the data was to be reported as full CLP data packages.

3. Recognize:

a. That the ORNL Organic lab, like the other DOE laboratories, was unaccustomed to providing the level of documentation required by CLP.

b. There is a definite learning curve which all laboratories, including ORNL, must undergo before producing CLP level data efficiently and in quantity.

4. Consider:

a. The results in light of the CLP statement of work which when adhered to, should produce data that is legally defensible in a court of law.

b. That technically, in a broad sense, most of the data is useful for the volatile organics (both soil and water samples).

It is with these issues in mind that the review is summarized below. Specific comments and notes from the review can be supplied upon request.

The VOA data, although not documented to the degree that a third party could recreate the analysis, were retrievable. The level of CLP non-compliances was not unreasonable for the two soil data sets reviewed considering the time frame available for the analyses to be completed. On the other hand, the VOA data reviewed for two water data sets had numerous errors which caused serious concerns. The chief cause of non-compliances appeared to have been a lack of communication or interpretation of CLP requirements, insufficient software to allow timely data interpretation by the analysts, and insufficient time and resources to properly document required information to the level required by the CLP.

1. Recommendation: The final report of Pantex VOA data should be regenerated to correctly state quantitative values, positive contaminate identifications, documentation of deviations from the protocol, and documentation of corrective actions taken for out-of-control conditions.

The most serious concerns were with the Pesticide/PCB data. There was an excellent effort to produce the forms electronically, however, the evaluation of the required QC samples was less than adequate. According to the data reviewed, quantitative values

appeared to be reported based on raw electronic data, rather than analyst review and interpretation which is essential.

The linearity evaluation check did not meet CLP requirements on any of the analysis batches. In conclusion, there were enough errors found in the documentation to cause the team to doubt the validity of the results to be reported. Considering that the Gas Chromatograph Electron Capture detector data is more difficult to reconstruct, and that all linearity checks were outside the QC window, it is doubtful that useful data can be regenerated from the raw electronic data, as with the VOA's.

2. **Recommendation:** Future CLP work should incorporate analyst review and interpretation of all data prior to reporting quantitative values, assure that the required QC criteria are met before proceeding with the analysis.

The laboratory evaluation and interpretation of the Semivolatile data had not been completed at the time of the review. There was insufficient data to evaluate the usefulness of the Pantex semivolatiles analysis.

3. **Recommendation:** Due to the length of time since the analysis were performed and the target completion date, the evaluation of this data should be given top priority in order to ultimately generate the necessary CLP forms to complete the data package.

A major concern of the team was the data that SAIC and DEM have in the Pantex data base. None of the data in the SAIC database should be considered as laboratory evaluated and approved. SAIC has provided a useful service which aided the laboratory process raw data, and generate CLP forms. However, it appeared that SAIC and DEM had misinterpreted raw data as final analysis results. The data required processing and laboratory evaluation prior to being put onto the final CLP forms. To reiterate, a considerable amount of data review and evaluation is required on the part of the laboratory before any of the Organic analytical results from the Pantex site can be considered final.

4. **Recommendation:** All of the data in the SAIC data bases should be discarded, and only the final results, validated by laboratory staff should be included in the data. The team understands that the release of the data prior to validation was to aide in the development of the required software. However, there was insufficient resources for the amount of review that this entailed.

Should you have any questions concerning this report please call me.

D. W. Frazier, 1000, MS-335, ORNL (6-0347)

DWF:cet (QA-88-26)

MARTIN MARIETTA

ternal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

April 18, 1988

R. B. Fitts

DOE Environmental Survey Program - Quality Assurance (QA) Review of the ORNL Environmental Sampling Group

Please find attached the report from the above activity.

Due to the urgency of this situation we have distributed draft reports to the Environmental Sampling Group. Further distribution should be made by your office. Please request corrective actions and allow P. L. Howell to track, review and verify adequacy of the completed action items as per the Charter, dated February 25, 1988.

All of the requested QA reviews are now complete. Any Additional information concerning the reviews (review notes, evidentiary information) is available to you upon request.

Should you have further concerns or questions about anything in the reports or QA concerns in your program, please call me or P. E. Melroy, ORNL's Quality Manager.

D. W. Frazier

D. W. Frazier, 1000, MS-335, ORNL (6-0347)

DWF:cet (QA-88-31)

Attachments

1. NPDES Sample Assignments/Duties
2. Request for Environmental Sampling
3. Letter from L. W. McMahon, Oak Ridge Environmental Survey Program Review-Final Review and Recommendations

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Quality Assurance (QA) Review of the ORNL Environmental Sampling Group

Issued to:

R. B. Fitts

April 18, 1988

Issued By:

D. W. Frazier, Review Team Leader

A. A. Haloumi

P. L. Howell

L. W. McMahon

INTRODUCTION

On April 13, 1988, the QA review team consisting of A. A. Halouma, P. L. Howell, L. W. McMahon, and D. W. Frazier met with ORNL personnel J. B. Murphy and D. C. Pickel to conduct a QA review of the documentation. K. L. Daniels in the Department of Environmental Monitoring (DEM) Division, Data Management Group Leader, discussed the Group's involvement in the program. A checklist of areas of concern was provided to the Sampling Group prior to the activity. A response to this checklist was supplied to the team which addressed the documentation techniques, disposal procedures, sampling plan deviations, training, and personnel qualifications.

SCOPE

This part of the QA review was also requested by R. B. Fitts, Program Manager of the Oak Ridge Environmental Survey Program (ORESP) to obtain an independent evaluation of participant's compliance to the DOE Environmental Survey Sampling and Analysis Plan for the Pantex Site. Discussion centered around Standard Operating Procedures (SOP) in the areas of concern and the effectiveness of applying lessons learned from each site's sampling activity.

COMMENDABLE EFFORTS NOTED

SAMPLING GROUP

1. Have applied techniques from the survey sampling to the ORNL NPDES sampling activities. Resultant Standard Operating Procedure "NPDES Sample Assignment/ Duties" has helped to make the program more efficient. See Attachment 1 to this report.

2. Have developed a very good working relationship with the DEM Data Management Group.

3. Developed the Soil Gas sampling methodology.

4. Excellent training course developed for sampling crews for the NPDES program, with others under development such as for RCRA, and others. Documented training records are kept for the whole division.

5. Developed the request for environmental sampling to help with current sampling at ORNL. See Attachment 2 of this report.

DATA MANAGEMENT

6. The communication links provided by this group has been the glue which has kept all parties bound together - excellent effort.

DEFICIENCIES/CONCERNS

1. It was noted that several written SOP's are needed to strengthen this portion of the ORESP.

Recommendation: As part of the QA program for this activity the following SOP's will be written:

- Organization - show roles and responsibilities, general operating procedure for field sampling, definition of authority, field change or deviation authority, etc.
- Quality Control procedures - show frequencies for duplicates, blanks, etc.
- Maintenance and Calibration procedures.

2. The SOP for "Packing and Shipping Procedure" has been in draft since 9-3-87.

Recommendation: Format, formalize (sign and date), and issue this procedure as soon as possible.

3. There was no documentation of required or perceived training needs or any documented plan for training course development.

Recommendation: Develop a list to document areas of where training programs are and which ones need to be developed, including examples of OJT, classroom, checklist and testing experiences.

4. It was noted that the Calibration Log Sheet contained information based on some acceptance criteria.

Suggestion: Define acceptance criteria on the Calibration Log Sheets.

5. It was noted that the sampling methodologies had not been verified to check their accuracy and actual practices in the field.

Suggestion: All sampling methodologies should be checked to verify that they are accurate and so reflect actual field practices.

6. It was noted that field log sheets, although numbered, were stored with stapled pages and loose-leaf binders used during assimilation.

Suggestion: Have the field log sheets bound in a 19-hole spiral binder prior to archival in the case file. See last page of letter to D. W. Frazier from L. W. McMahon dated April 15, 1988, entitled Oak Ridge Environmental Survey Program Review - Final Review an Recommendations, Attachment 3.

7. While conducting a review at ORGDP the Brookhaven sample coolers began arriving and it was noted that the S/A plan was not followed in the area of sample quantity. There was a deviation: 3-liters of aqueous material was to be sent, however, only 1-liter was sent with the explanation that this is what ORNL uses.

Recommendation: As a spot check to assure that the S/A plan is followed, arrange to have someone from your shop conduct a surveillance on incoming samples.

DATA MANAGEMENT

Suggestion: Data management teams should consider reviewing hard copy lab generated CLP forms against the electronic database to assure that lab evaluated data is the data generated.

Suggestion: Assure that the annotated lab data is properly interpreted. (Coordinate a meeting with lab and your team to accomplish this.)

Suggestion: Develop a training program using lab personnel experienced in the generation of CLP data for the data management team. We believe this will strengthen the communication needed to work closely with the lab personnel.

ATTACHMENT 1

NPDES SAMPLE ASSIGNMENTS/DUTIES

In order to assure that all NPDES compliance samples and field measurements are attained within the prescribed time frame contained in the ORNL Permit, the following measures will be taken:

1. The Environmental Sampling Group (ESG) field technicians will be divided into two sampling groups; one group (4 people) will have NPDES as one of its assignments. (The availability of 4 technicians with experience in NPDES sampling is an improvement over the present situation in which 1 technician has the lead role with 1 backup) Betty Hensley, the field technician now holding the lead role for NPDES will be in the group and will take the lead role for training other group members. Fred Taylor, ESG staff member responsible for NPDES sampling, will assure that the field training encompasses every aspect of sample collection, field measurements, completeness of log sheets, completeness of Analytical Request Forms, and completeness of Chain-of Custody forms.

2. Field training will be supported by classroom training.

3. Monthly and weekly schedules for NPDES sampling will be developed by Taylor at least 1 week prior to the first day of the month, and posted on a bulletin board in room H-247. (A master schedule will also be developed that reflects schedules for all compliance sampling) The schedules will reflect the following:

   1) normal sampling day for daily, 3 per week, weekly, 2 per month, and monthly samples. (a Quarterly schedule will be developed for quarterly and annual samples)

   2) deadline for each frequency

   3) a "initial box" for each sample/field measurement

Each morning (Mon-Fri) Taylor will check the schedule and make written assignments. The assignment cards will be given to Hensley who will check, and in turn make assignments to the field technicians.

When field technicians return to the laboratory after collecting samples they will use the daily log to review samples/field measurements taken and initial the appropriate box on the schedule.

Each afternoon (Mon-Fri) Taylor and a designated technician will be responsible for a daily check of the schedule to assure what samples/field measurements have been taken, and what samples/field measurements need to be taken.

When each schedule is completed, it will be filed.

John Murphy will make periodic checks on all aspects of this procedure, and Keith Owneby will perform internal QA checks on completeness of all forms

This procedure will be initiated in March, 1988.

John B. Murphy
Environmental Sampling Group

ATTACHMENT 2

REQUEST FOR ENVIRONMENTAL SAMPLING

1. Suspected Environmental Problem

2. Supporting Information

3. Purpose of Sampling

4. Description of Area (include any known gradients or factors influencing distribution of contaminants of interest, and map or hand drawing)

5. Suspected Zone of Contamination (vertical and horizontal)

6. Analyses Desired (specify detection limits)

7. Charge number for analyses

8. Date data needed

9. Additional Information/Comments

_____ Requester

_____ Date

DRAFT

MARTIN MARIETTA

ternal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

ATTACHMENT 3

April 15, 1988

D. W. Frazier

Oak Ridge Environmental Survey Program Review - Final Review and Recommendations

During the second review on April 11, Mike Guerin's and John Hayden's comments and questions expressed previously (Pantex PCB/Pesticide Data Review, Guerin to Frazier, March 25, 1988) regarding the pesticide/PCB data were addressed. I will note how these issues were resolved and then offer some conclusions from the review.

Issues Noted in Guerin's Memo

1. The data packages reviewed on February 23-26 did not reflect extensive data evaluation and checks. Contradictory results were reported within the data set (duplicate Form I's with different results), within AnaLIS, and within the SAIC database. Two causes for this were identified; misunderstanding by the laboratory about how to present CLP data and transfer of raw data to SAIC. As of the second review on April 11 the lab is reprocessing the CLP packages to reflect the necessary data checks and evaluation.

2. The calibrations did not meet the CLP linearity requirement. Specific instruction is found on pages D-32 through D-35 and E-52 of the 10/86 SOW. The additional 5 point standards used by the lab to demonstrate linearity were at a higher concentration range than required. In addition the response factors used for calculations were a averaged. This process was reviewed with John Hayden on 4/11 and his questions regarding the linearity and continuing calibration requirements were resolved.

3. To insure SAIC database is correct, hard copies of the lab evaluated data will to be given to SAIC.

4. Abnormalities previously noted in computer generated forms have been corrected.

5. After re-evaluating the blank data and correcting the Form I data, the concern about blank contamination has been resolved. The single positive hit must be addressed in the case narrative.

6. Over the past year to 18 months, EPA-EMSL has been quite nebulous regarding the use of an appropriate surrogate as well as the value of Dibuty/Chlorandate (DBC) recovery data. The lab was operating under the assumption that mirex was an acceptable alternative to DBC. In terms of the SOW used for the DOE Survey work it was not. However, while no criteria is available to evaluate mirex recovery, it can be used to make some technical judgement as to how well the overall extraction and analysis process is working. This issue must also be addressed in a case narrative. (Analysis data to evaluate mirex is provided as Attachment 6.)

7. The questions posed by the Guerin memo were addressed on 4/11 with John Hayden as follows:

   (a) A single Form I is used to report quantitative, confirmed data. Raw data from both columns is to be included in the package. The data reported on Form I is the laboratory validated results.

   (b) If the lineartiy check from EVAL A, B, and C exceeds 10% for aldrin, endrin, or DBC discontinue the analysis, troubleshoot the equipment/ technique, and meet this requirement before continuing analysis. If DDT exceeds the 10% requirement see paragraph 4.5.4.4, page E-59 of the 10/86 SOW. The footnote on Form VIII PEST-1 refers to DDT only.

   (c) There is no reference to tentatively identified compounds on Form X.

OVERALL ASSESSMENT OF PANTEX PESTICIDE/PCB DATA

While appropriate to make professional judgments and express concerns on the validity of data, the additive nature of QC factors out of specification is difficult to express. The reviewer as well as the laboratory has a responsibility to inform users of the data of all concerns in order to assist that user in avoiding inappropriate use of the data while at the same time not precluding data necessary to facilitate the progress of projects requiring the availability of the data. While data which does not meet specified requirements is never fully acceptable, this line-of-thought is consistent with EPA guidance on laboratory data evaluation (Technical Directive Document No. HQ-8410-01, Laboratory Data Validation, Functional Guidelines For Evaluating Pesticide/PCB's Analysis, May 28, 1985). Using guidance from this document, I suggest reporting the data annotated as outlined below while fully explaining any non-conformance in the case narratives. I suggest this for the following reasons:

1. Factors beyond the control of the laboratory were a cause of many QC non-conformances.

   (a) There was miscommunication between management and the lab concerning project requirements, capabilities available at the time of Pantex sampling, and capacity to handle the workload within the time frame allotted.

   (b) There were continuing changes in program requirements, by DOE-HQ, concerning the CLP reporting requirements and documentation, and

   (c) Continuing changes to the Sampling and Analysis Plan even during sampling.

2. Making data available in this manner will facilitate the progress of the Pantex project.

I. Suggested procedure to annotate Pantex Pesticide/PCB data

Sample Holding Times - If 40 CFR 136 holding times are exceeded, flag all positive results as estimated (J) and sample quantitation limits as estimated (UJ) and annotate data to the effect that holding times were exceeded.

II. Pesticides Instrument Performance -

1. DDT Retention Time - If the retention time of DDT is less than 12 minutes, a close examination of the chromatography is necessary to assure that adequate separation of individual components is achieved. If adequate separation is not achieved, all affected compound data are unusable and must be flagged with (R).

2. Retention Time Windows - Retention time windows are used in qualitative identification. When these retention time windows have not been met, positive results should be considered tentative (N).

3. DDT/Endrin Degradation Check

   a. DDT breakdown is greater than 20%;

      (1) All quantitative results for DDT should be considered estimated and flagged with (J).

      (2) Qualitative and quantitative results for DDD and DDE should be considered estimated and tentatively identified and flagged with (JN).

      (3) All other pesticide PCB results should be inspected very closely to determine their validity.

   b. If Endrin breakdown is greater than 20%;

      (1) All quantitative results for endrin should be considered estimated and flagged with (J).

      (2) Qualitative and quantitative results for Endrin ketone should be considered as tentative and flagged with (NJ).

      (3) All other results should be inspected very closely to determine their validity.

4. Retention Time Check

   a. If the retention time shift for DBC is greater that 2.0% for packed column or greater than 0.3% for capillary column, the analysis should be

Status of Laboratory Operations for Future Work

The laboratory personnel have a better understanding of CLP QA/QC requirements and are working within their means to insure capabilities are in place to handle future work. The Hewlett Packard (HP) RTA system is operational. On-site training by HP personnel, well versed in the use of Aquarius software is scheduled for mid-May. Two scan boxes previously recommended to increase productivity for semivolatile data processing has been ordered.

Communication between the sampling team and analytical team has improved and the sampling schedule at INEL has been lengthened in an attempt to resolve capacity issues in light of holding time concerns. Since 300 volatile organics will exceed the labs capacity, the aide of one or more other laboratories should be arranged as soon as possible.

Review of Sampling and Data Management Activities in Support of DOE Survey

On the morning of April 13, a short time was spent with Donna Pickel, John Murphy, and Karen Daniels reviewing the ORNL field participation in the Pantex project. Murphy reiterated the evolution of program requirements regarding field QC activities and their subsequent implementation by the ORNL team. At Murphy's initiative he has updated his on-site NPDES sampling program to include many of the DOE Environmental Survey program field QC protocols and intends further QC improvements to the RCRA sampling as well. From this discussion it appears the participation of the ORNL sampling team in the DOE Environmental Survey has resulted in improvements to the on-site monitoring programs at ORNL. Murphy provided the review team a written response to the review team checklist which addressed the documentation techniques, disposal procedures, sampling plan deviations, and training and personnel qualifications.

I would offer a single suggestion as to how this work effort has been documented in that the field log sheets should be bound by 19-hole punch spiral binder prior to archival in the case file. This should serve as better binding for storage than the staples and loose-leaf binders used during assimilation.

Karen Daniels is responsible for the data management activities. Much of this work has been contracted to SAIC. A review of SAIC work was reported earlier (McMahon to Frazier, March 18, 1988). Again, I would reiterate the recommendation that the data management teams review hard copy, lab generated CLP forms against the electronic database to insure that lab evaluated data is the data represented in the

database. Furthermore, a meeting between lab personnel and the data management team will likely be needed to insure the annotated lab data is properly interpreted. Dealing with CLP QA/QC requirements is equally new to the data management team. I believe a training program, by lab personnel experienced in the generation of CLP data, would be beneficial for the data management team and strengthen the communication skills needed to deal with the CLP lab.

Please call me if I can provide further information.

L. W. McMahon, 9704-1, MS-001, Y-12 (4-7535)

cc: T. R. Butz/C.C. Hill
L. L. McCauley/C.W. Kimbrough

OAK RIDGE NATIONAL LABORATORY
OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC

POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37831

April 21, 1988

Distribution

Martin Marietta Energy Systems QA Audit of
The Oak Ridge Environmental Survey Program

Attached is the final report from the internal QA Audit of the Oak Ridge National Laboratory activities for the DOE Environmental Survey Program. The audit was commissioned by me and, for the ORNL Analytical Chemistry Division (ACD) by D. Shults, Director of the ORNL ACD at the request of D. K. Knight, the DOE Environmental Survey Program Manager.

I would welcome any comments you might wish to make regarding this report.

Sincerely,

Robert B. Fitts, Program Manager
DOE Environmental Survey
Environmental Sciences Division

RBF:tmp

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APR 22 1988

April 18, 1988

R. B. Fitts

DOE Environmental Survey Program - Final Quality Assurance (QA) Review of the ORNL Analytical Chemistry Division's Organic, Inorganic, Radiochemical, and High Explosives Analysis Laboratories

Please find attached the report from the above activities. In order to understand the final report, please reference the cover letter for the Review of the Pantex Site Organic Data Generated by the ORNL Analytical Chemistry Division (ACD), dated March 23, 1988. This cover letter is included with this report as Attachment 6.

Due to the urgency of this situation we have distributed draft reports to the labs. Further distribution should be made by your office. Please request corrective actions and allow P. L. Howell to track, review and verify adequacy of the completed action items as per the Charter, dated February 25, 1988.

All of the requested QA reviews of the ORNL ACD's Organic, Inorganic, Radiochemical and High Explosives analysis labs are now complete. Any additional information concerning the reviews (review notes, evidentiary information) is available to you upon request.

Should you have further concerns or questions about anything in the reports or QA concerns in your program, please call me or P. E. Melroy, ORNL's Quality Manager.

D. W. Frazier

D. W. Frazier, 1000, MS-335, ORNL (6-0347)

DWF:cet (QA-88-30)

Attachments:

1. Copy of Sample control and Chain-of-Custody Sheet with suggested additions
2. Letter - Oak Ridge Environmental Survey Program Review - Final Review and Recommendations - To Frazier, From McMahon
3. Lists of the revised Organic and InorganicStandard Operating Procedures reviewed
4. Total list of organic SOP's to be revised
5. Total list of inorganic SOP's to be revised
6. Cover letter and Review Report (from L. W. McMahon) from the Pantex site data review

Final Report of the Second Quality Assurance (QA) Review of the ORNL Analytical Chemistry Division's Organic, Inorganic, Radiochemistry, and High Explosives Analysis Laboratory Participating in the DOE Environmental Survey Program

Issued to:

R. B. Fitts

April 18, 1988

Issued By:

D. W. Frazier, Reyiew Team Leader

S. K. Holladay

P. L. Howell

L. W. McMahon

A. N. Weisbin

A. A. Halouma

INTRODUCTION

On April 11-12, 1988, the QA review team consisting of A. A. Halouma, S. K. Holladay, P. L. Howell, L. W. McMahon, A. N. Weisbin and D. W. Frazier met with ORNL personnel W. R. Laing, J. E. Caton Jr., W. H. Griest, J. C. Price, J. W. Wade, C. A. Treese, J. A. Hayden, and S. J. Bobrowski, prior to beginning the review of the subject laboratories. A checklist including the areas of concern for the review had been provided prior to the activity. The status of the corrective action items from the EPA audits of the program conducted in June 1987 and January 1988 and from the first QA review were also addressed. This report will reflect, as best could be determined, the status of subject labs readiness to be audited by the EPA in connection with the requirements of the statement of work. Since this is the final report, items from the first report are included to provide a comprehensive overall summary of this status.

SCOPE

This QA review was requested by R. B. Fitts, Program Manager of the Oak Ridge Environmental Survey Program (ORESP) and ORNL Analytical Chemistry Division (ACD) Director W. D. Shults, to obtain an independent evaluation of participant's compliance to established guidelines to the Contract Laboratory Program protocol. The Draft of ORNL USEPA Contract Laboratory Program (CLP) Statement of Work for Organic and Inorganic Analysis Multi-Media, Multi-Concentration SOW No. 787, and good lab practices were used as the basis for the review. The team began in the Sample Receiving Laboratory and proceeded to review the Organic, Inorganic, Radiochemistry, and High Explosives analysis laboratories.

COMMENDABLE EFFORTS NOTED

ORGANICS LABORATORY

1. Volatile organic matrix spikes, tune criteria, and surrogate recoveries are being reviewed on a batch-to-batch basis - relates a good effort to comply with protocol in spite of man-power needs.

2. Instrument run log notebooks were well thought-out and designed.

3. There was an excellent effort to develop software to produce the required PCB\Pesticide CLP forms. Further efforts to include additional useful information to the Form 1D was made prior to the second QA review.

4. Review of the linearity of standards, surrogate recoveries, matrix spikes and matrix spike duplicates is now evident in the Organic labs prior to sample reporting.

5. There has been a commendable effort put forth to address the corrective action items from the EPA audits and the first QA review.

6. The semivolatile data evaluation, although not complete at the time of this second review, is moving toward completion since additional instrumentation has been ordered and further training in the use of the software is scheduled with Hewlett Packard Company representatives.

7. The final report of Pantex VOA data has been generated to correctly state quantitative values, positive contaminate identifications, documentation of deviations from the protocol, and documentation of corrective actions taken for out-of-control conditions.

INORGANICS LABORATORY

8. Applicable inorganic technical and CLP procedures were made accessible in notebooks for use by each analyst - very good practice.

9. Exemplary documentation of notebooks in compliance to the CLP protocol in the ICP and Atomic Absorption labs.

10. Revised standard operating procedures, and implementation thereof has begun.

11. All biographical data on personnel was well documented.

12. Certification records were available on all personnel including the EPA procedures that they were certified to perform - excellent.

13. CAPA Sample Prep lab notebooks and records were exemplary.

14. A holding time traceability system has been established in this section, and is being tested in the organic section. By request number the sample is compared to the holding time date and to the program due date, whichever date is earlier is printed as the deadline.

Status: Incomplete

ATOMIC ABSORPTION LAB

14. Training records to CLP procedure are complete.

15. Procedures in use were on hand for analysts use.

MERCURY LAB

16. The sample prep and mercury labs were very well organized.

RADIOCHEMISTRY

17. Chain-of-custody system for paperflow and sample management appeared to be an effective system for the present set-up.

18. Documentation of instrument maintenance, specific weekly counting activities, instrument setting log, and QC were found to be exemplary.

HIGH EXPLOSIVES LABORATORY

19. Even though this lab is not under the CLP protocol, several SOP's were written to cover the involvement in the program.

20. Data transfer and CLP form generation are being patterned after the PCB/PEST Form I and are quite comprehensive - excellent effort.

ASBESTOS LAB

21. Involvement for the Environmental Survey in the Asbestos lab was found to be very well organized, instrument and standard operating procedures were in place, training - past and future plans were excellent, master log book is noteworthy, lab security is well thought out and implemented, and waste management was handled by sending all of the sample (including the portion analyzed) back to the customer, just an exemplary effort.

DEFICIENCIES/RECOMMENDATIONS

GENERAL:

This review included a more thorough study of the standard operating procedures (SOP) throughout the labs. A. N. Weisbin, spent a considerable amount of time reviewing newly written SOP's against the CLP requirements. The list of Organic and Inorganic SOP's reviewed and conclusions drawn can be found in Attachment_3 to this report. Consider that the recommendations and comments in the attachment are the team's recommendations to be incorporated into the SOP.

1. There were too many different forms requiring varying information, and inconsistently used for the same purpose in use throughout the laboratories, which made sample tracking very difficult. Although the number of forms has not decreased, the Organic lab has re-designed their chain-of-custody form to reflect only the needed information.

Recommendation: This applies specifically to work under the CLP protocol; Use a centralized receiving record, or a log to record the incoming samples.

Comment:

A. The Organic Lab Chain-of-Custody form has been revised to reflect their informational needs. Three suggested additions are included for your consideration as a result of previous audits (1) the number of containers received, (2) the site name, and (3) state whether the container holds a sample or an extract. (See Attachment 1, copy of the form.)

B. In order for sample tracking to be more efficient, consider numbering the forms to cross-reference Request for Analytical Services form with the Chain-of-Custody form.

C. There is now a central sample tracking system in place.

Status: Complete

2. There is no consistent documentation to the customer concerning as-received sample nonconformances.

Recommendation: Written documentation of sample nonconformances should accompany phone calls to notify the customer. An entry can be made directly on the Request for Analytical Services form. This could be called out in the Sample Receiving and Inspection for the DOE Environmental Survey Program Standard Operating Procedure.

Comment: This item is covered in Draft SOP-002, Sample Receiving and Inspection for the DOE Environmental Survey Program.

Status: Complete

3. The lack of man-power which was evident in the sample receiving area during the first review is being handled.

Recommendation: During the interim, it will be necessary to properly train temporary personnel. The use of a simple stepwise checklist made up from the SOP to assure that everything gets done can be used, or simply train some relief personnel to the SOP for back-up (especially in the sample receiving areas.)

Comment: This item is also covered by Draft SOP-002, as in item #4.

Status: Complete

4. Different AnaLis sample identification numbers were assigned to the same sample for multi-analysis (VOA, SVO, ICP, Hg, etc.) was found to be inefficient and time consuming when compiling data reports for a sample.

Recommendation: Consider centralization of the sample log-in function. Man-power and terminals for this function could yield a more efficient sample tracking system with several avenues to data retrieval at one source. Consideration of this for the CLP program is strongly advised by the QA review team.

Comment: Lab personnel have developed a sample tracking system which allows samples to be located via request numbers or assigned lab numbers. Therefore a central login would not be necessary.

Status: Complete

5. A lack of awareness of the Analytical Chemistry Division's general policy for sample disposal was Train employees in the use of applicable SOPs.

Comment: Draft SOP-013 will be issued by June 1, 1988. Training of the sample receiving personnel to the SOP has already taken place.

Status: Incomplete

6. Printed forms were completely filled in. This was much improved over the situation observed during the last review.

Comment: This area should be monitored on an unscheduled basis to assure that it is continuously being done.

Status: Complete

7. Personnel should be made aware of the data validation process. A documented data validation process is scheduled to be written to cover this issue.

Comment: Standard operating procedures to be revised or written should have targeted completion dates.

Status: Incomplete

8. Date of receipt on chemicals were inconsistently applied.

Recommendation: Management must assure that policy regarding age of chemicals used for any aspect of analysis is set up and implemented. This allows chemicals to be used on a first-in first-out basis.

Status: Incomplete

9. Non-target parameter laboratories have very little familiarity with QA/QC and evidentiary requirements.

Recommendation: Strongly consider conducting documented QA/QC discussions at regular intervals during general meetings or separately, whichever meets the need. Regular meetings should document attendance if safety or QA/QC is discussed and kept in training file.

Status: Incomplete

10. Non-target parameter labs were found to be weak in the implementation of standard operating procedures (SOPs).

Recommendation: Train employees in the use of applicable SOPs.

Status: Incomplete

11. Glassware Cleaning procedures, posted above sinks for easy reference by user, were not signed and dated by management.

Recommendation: All Technical and Standard Operating Procedures should be signed and dated by applicable management to show that the procedure is an official document.

Status: Incomplete

12. Notebook reviews were being performed, but repeated obliterations without initials or dates of the action were found.

Recommendations: Instructions for how to fill out a notebook are available in the Martin Marietta Energy System's laboratory notebooks and handling of errors is a part of the instructions. Training to these instructions should be a part of the regular group meetings for old and new hires. An error should have a single line drawn through it, initialed, and dated.

Comment: Draft SOP-003, Requirements for Recording and Correcting Lab Entries for the Environmental Survey Program has been written to address this deficiency. Training of all ACD employees to the SOP has been planned and will be complete by June 1, 1988.

Status: Incomplete

13. The mechanism for handling future CLP work has changed. Future work will incorporate analyst review and interpretation of all data prior to reporting quantitative values, and to assure that the required QC criteria are met before proceeding with the analysis.

Status: To be monitored during analysis of next CLP samples.

ORGANIC LABORATORIES

14. Although writing and revision of SOP's are in progress, it is doubtful that all of the SOP's called out on the list supplied to the team will be completed prior to another EPA audit.

Recommendation: Prepare an action plan for completing the writing and revision of SOP's, with specifics, such as SOP name, completion date, review and comment due date, issue date, training to SOP completion date, and show evidence that the plan is being followed. Be reasonable in this activity, set dates that can be achieved, but dates that reflect urgency to have this activity completed.

Status: Incomplete

15. While tracking an Argonne CLP sample, it was noted that there was no Chain-of-Custody form, nor original request for services resulting in an incomplete paperflow.

Recommendation: Prepare a receiving and completed data package checklist to be reviewed for essential paperwork in a CLP package for each file.

Comment: This type problem will be handled with the implementation of the appropriate SOP's. However, this is still a concern until the SOP's are implemented. A copy of this checklist was supplied to the lab by L. W. McMahon.

Status: Incomplete

16. Training to the CLP protocol is being planned for the Organic labs staff. Arrangements are being made to obtain the services of EPA personnel to conduct the training in mid-May.

Status: Incomplete

17. There was insufficient data handling software/hardware during the first review. Presently, arrangements have been made with Hewlett-Packard Company representative to further train staff to use the new RTA System, and two additional Scan Boxes have been ordered to make the system efficient which will increase data evaluation productivity.

Status: Incomplete

18. There is now documentation of corrective actions in the GC-MS and PCB/PEST labs.

Status: Complete

19. The daily check on the refrigerator temperature is now being performed and recorded. Temperature excursions are handled by adjusting the controls until the event is under control. The Temperature Controlled Sample Storage Areas: Records and Maintenance SOP, is to be written and implemented. The Organic Analysis lab supervisor has committed to supply the team with a schedule for the completion of the organic SOP's.

Status: Incomplete

20. Sample concentration data is now being flagged to show the appropriate blanks concentrations.

Status: Incomplete

21. Data validation will be performed by two people in the GC-MS lab, as well as by the Group Supervisor, when possible, in a manner that will expedite sample analysis and data handling.

Comment: Unscheduled monitoring should confirm continued practice.

Status: Complete

22. There was evidence that only ~~three~~ two performance evaluation samples out of five quarters were completed and reported.

Recommendation: In order to access the labs ability and capability to operate under the CLP protocol, the performance evaluation samples must be completed and reported to show good faith that the samples can be analyzed as necessary.

Status: Incomplete

PESTICIDE/PCB LABORATORY

During this QA review, L. W. McMahon reviewed in detail the PCB/PEST data as it is now being evaluated and the semivolatile data as it is presently generated using the Aquarius software. Please find a draft version of his report to me in Attachment 2, dated April 15, 1988 entitled Oak Ridge Environmental Survey Program Review - Final Review and Recommendations. The recommendations stated in his report are official recommendations of the QA review team and will be considered as such.

22a. Lack of sufficient number of Gas Chromatographs (GC) and personnel for project workload was noted during the first review. At present, another GC has been borrowed for CLP work until a recently ordered system is in-house and set up. Management is actively interviewing to add personnel to the workforce. There can be no date set for personnel addition, this activity will have to be monitored closely to expedite the process.

Status: Incomplete

23. A better understanding of the CLP protocol is now evident, such as personnel now are aware that the Form VIII Evaluation Standards must be within specification prior to sample analyses; that the raw data reported on Form I is the laboratory validated results, and that tentatively identified compounds must be referenced on Form X. However, the following recommendations must be made in an effort to strengthen this area.

Recommendation:

- Give SAIC hardcopy of data to use to verify the final electronic CLP form generation.
- Continue to put the PCB/PEST data together in the CLP package.
- Report all quantitation data as estimated flagged with a "J".
- If matrix spike recovery = 0, the data associated with it should be flagged as not useful.
- Alter computer program on sample calculation for the following; discontinue averaging the response factors, and quantitate on the nearest appropriate Individual A or B standard.
- All organic staff need additional training to the CLP protocols.

24. SAIC should take out the packed and capillary column data that they now have and replace it with the data on the present Form I.

Status: Incomplete

25. Case narrative should explain the rationale for altering Forms II and VIII and should also address Form III.

Status: Incomplete

26. Confirm via comparison the information on the forms vs the information in the AnaLis database.

Status: Incomplete

VOLATILE ORGANICS

The status of the VOA data was reported in a letter to D. W. Frazier, from L. W. McMahon entitled Review of Pantex Data at ORNL 2/23/88 - 2/26/88, dated March 2, 1988. (See Attachment 7.)

SEMI-VOLATILE ORGANICS

29. The evaluation of the raw data generated on the GC-MS Chem stations is now taking place through the use of the RTA to produce the CLP forms. The information is being assembled into CLP data packages.

Status: Incomplete

30. The review team has similar concerns with the semi-volatile organic data as with the volatile organic data, such as matrix spike results being outside the QC window, detection limits and results needing to be corrected for moisture content, and positive hits reported as estimated values. The number of CLP non-conformances is probably not so extensive that the data should all be declared as Level III quality. This conclusion was based on the evaluation of limited data available at the time of the review. The semi-volatile organic data evaluation by the labs' staff was not complete. It has been predicted that this data evaluation will not be complete for several weeks.

Status: Incomplete

HIGH EXPLOSIVES LAB

31. Sample receipt is inadequate. Chain-of-custody is not carried through to receiving personnel at Bldg. 2026 from ORNL Receiving personnel.

Recommendation: Some type of arrangements will be made and documented with ORNL Receiving such that someone in the Lab must sign for the incoming samples. They are presently left at the front door of the High Explosives lab Bldg. 2026 until the cooler is found.

Status: Incomplete

INORGANIC LABS

GENERAL:

32. Control work sheets containing the results of analysis are now being put into laboratory notebooks in the % solid and fluorometric Uranium analysis lab.

Status: Complete

33. Notebook entries are being made in black ink.

Status: Complete

34. Violations of error correction protocol (single line through error, initials, and date) were observed in notebooks throughout the lab.

Recommendation: See recommendation under Deficiency #12.

Status: Incomplete

35. The review of the notebooks by supervision or designee obliterated actual data in several notebooks.

Recommendation: An area on the data page should be allotted for witnesses signatures and/or stamps.

Status: Unscheduled monitoring to confirm continued action.

ICP LAB

36. Lack of back-up instrumentation presently on line in the ICP laboratory.

Recommendation: Provide documented policy or agreements for back-up in case the present ICP instrument fails.

Comment: To date the team has not received any assurances that this concern has been handled.

Status: Incomplete

CYANIDE LAB

37. There is a need for awareness of the methods used in the lab (SW-846, EPA-600, and CLP method EPA-335.2) for different types of samples.

Recommendation: Train employees so that they will be aware of such information.

Comment: This can be handled in regular group discussion meetings.

Status: Incomplete

38. There was no awareness that there are specified concentrations with which the instrument should be calibrated.

    a. This was reflected in the lack of frequent instrument standardizations.

    b. General lab QA/QC not strictly followed;
       - Conductivity of water is not recorded.
       - Balance is not regularly calibrated.

Recommendation: Implement SOP's to alleviate this situation.

Comment: Assure that employees in this lab are following the QA/QC procedures for the ACD as well as for the Environmental Survey Program.

Status: Incomplete

39. There was no SOP for washing glassware at the sink.

Recommendation: Post SOP at sink in the Cyanide analysis lab.

Status: Incomplete

40. Reagents should be dated upon receipt before storage in the refrigerator.

Recommendation: Initial and date all incoming reagents, standards, etc. for use in sample analysis to allow first-in first-out usage of supplies.

Status: Requires unscheduled monitoring for continuous action.

RADIOCHEMISTRY LAB

41. Procedures are still in the old format, but updating to conform to the NQA-1 format is in progress.

Recommendation: Document expected completion of this activity.

Status: Incomplete

42. The Environmental Survey Manual is in the process of assigning ESM numbers for the Radiochemical procedures.

Status: Complete

43. The Sample Receiving, Logging and Distribution procedure was found to be inadequate. There is no QA input and it is not written in procedural format.

Recommendation: This procedure is a strawman and is in need of being completed, "adding the meat of how to do the receiving, logging and distribution." The SOP is a part of the QA process and was written so that when it is implemented will assure that these processes don't fall through a crack.

Status: Incomplete

ASBESTOS LAB

44. Standard operating procedures for this lab are not written, but a system is definitely in place.

Recommendation: Inorganic lab SOP's should include the Asbestos lab in all areas.

Status: Incomplete

ATTACHMENT I

MARTIN-MARIETTA ENERGY SYSTEMS, INC.
OAK RIDGE NATIONAL LABORATORY

SAMPLE CONTROL AND CHAIN-OF-CUSTODY SHEET

REQUEST NO.: _____ SAMPLE NUMBERS: _____

MATRIX: _____ REMARKS: _____

CIRCLE THE APPROPRIATE ANALYSIS: VOA SVO PEST/PCB OTHERS: _____

CONTAINER DESCRIPTIONS: _____

NAME _____ PHONE _____ ADDRESS _____

SHOULD THE REMAINING SAMPLE BE RETURNED TO THE CUSTOMER? YES NO

NUMBER OF CONTAINERS RECEIVED _____ SAMPLE or EXTRACT (CIRCLE ONE)

SITE NAME _____

CHAIN-OF-CUSTODY

DATE RECEIVED	TIME RECEIVED	TRANSFERRED FROM	TRANSFERRED TO	ACD SAMPLE NUMBERS	PURPOSE	STORAGE LOCATION

DRAFT

Internal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

ATTACHMENT 2
Detailed Review of PCB/PEST Data Evaluations

April 15, 1988

D. W. Frazier

Oak Ridge Environmental Survey Program Review - Final Review and Recommendations

During the second review on April 11, Mike Guerin's and John Hayden's comments and questions expressed previously (Pantex PCB/Pesticide Data Review, Guerin to Frazier, March 25, 1988) regarding the pesticide/PCB data were addressed. I will note how these issues were resolved and then offer some conclusions from the review.

Issues Noted in Guerin's Memo

1. The data packages reviewed on February 23-26 did not reflect extensive data evaluation and checks. Contradictory results were reported within the data set (duplicate Form I's with different results), within AnaLIS, and within the SAIC database. Two causes for this were identified; misunderstanding by the laboratory about how to present CLP data and transfer of raw data to SAIC. As of the second review on April 11 the lab is reprocessing the CLP packages to reflect the necessary data checks and evaluation.

2. The calibrations did not meet the CLP linearity requirement. Specific instruction is found on pages D-32 through D-35 and E-52 of the 10/86 SOW. The additional 5 point standards used by the lab to demonstrate linearity were at a higher concentration range than required. In addition the response factors used for calculations were a averaged. This process was reviewed with John Hayden on 4/11 and his questions regarding the linearity and continuing calibration requirements were resolved.

3. To insure SAIC database is correct, hard copies of the lab evaluated data will to be given to SAIC.

4. Abnormalities previously noted in computer generated forms have been corrected.

5. After re-evaluating the blank data and correcting the Form I data, the concern about blank contamination has been resolved. The single positive hit must be addressed in the case narrative.

6. Over the past year to 18 months, EPA-EMSL has been quite nebulous regarding the use of an appropriate surrogate as well as the value of Dibuty/Chlorandate (DBC) recovery data. The lab was operating under the assumption that mirex was an acceptable alternative to DBC. In terms of the SOW used for the DOE Survey work it was not. However, while no criteria is available to evaluate mirex recovery, it can be used to make some technical judgement as to how well the overall extraction and analysis process is working. This issue must also be addressed in a case narrative. (Analysis data to evaluate mirex is provided as Attachment 6.)

7. The questions posed by the Guerin memo were addressed on 4/11 with John Hayden as follows:

   (a) A single Form I is used to report quantitative, confirmed data. Raw data from both columns is to be included in the package. The data reported on Form I is the laboratory validated results.

   (b) If the lineartiy check from EVAL A, B, and C exceeds 10% for aldrin, endrin, or DBC discontinue the analysis, troubleshoot the equipment/ technique, and meet this requirement before continuing analysis. If DDT exceeds the 10% requirement see paragraph 4.5.4.4, page E-59 of the 10/86 SOW. The footnote on Form VIII PEST-1 refers to DDT only.

   (c) There is no reference to tentatively identified compounds on Form X.

OVERALL ASSESSMENT OF PANTEX PESTICIDE/PCB DATA

While appropriate to make professional judgments and express concerns on the validity of data, the additive nature of QC factors out of specification is difficult to express. The reviewer as well as the laboratory has a responsibility to inform users of the data of all concerns in order to assist that user in avoiding inappropriate use of the data while at the same time not precluding data necessary to facilitate the progress of projects requiring the availability of the data. While data which does not meet specified requirements is never fully acceptable, this line-of-thought is consistent with EPA guidance on laboratory data evaluation (Technical Directive Document No. HQ-8410-01, Laboratory Data Validation, Functional Guidelines For Evaluating Pesticide/PCB's Analysis, May 28, 1985). Using guidance from this document, I suggest reporting the data annotated as outlined below while fully explaining any non-conformance in the case narratives. I suggest this for the following reasons:

1. Factors beyond the control of the laboratory were a cause of many QC non-conformances.

   (a) There was miscommunication between management and the lab concerning project requirements, capabilities available at the time of Pantex sampling, and capacity to handle the workload within the time frame allotted.

   (b) There were continuing changes in program requirements, by DOE-HQ, concerning the CLP reporting requirements and documentation, and

   (c) Continuing changes to the Sampling and Analysis Plan even during sampling.

2. Making data available in this manner will facilitate the progress of the Pantex project.

I. Suggested procedure to annotate Pantex Pesticide/PCB data

Sample Holding Times - If 40 CFR 136 holding times are exceeded, flag all positive results as estimated (J) and sample quantitation limits as estimated (UJ) and annotate data to the effect that holding times were exceeded.

II. Pesticides Instrument Performance -

1. DDT Retention Time - If the retention time of DDT is less than 12 minutes, a close examination of the chromatography is necessary to assure that adequate separation of individual components is achieved. If adequate separation is not achieved, all affected compound data are unusable and must be flagged with (R).

2. Retention Time Windows - Retention time windows are used in qualitative identification. When these retention time windows have not been met, positive results should be considered tentative (N).

3. DDT/Endrin Degradation Check

   a. DDT breakdown is greater than 20%;

      (1) All quantitative results for DDT should be considered estimated and flagged with (J).

      (2) Qualitative and quantitative results for DDD and DDE should be considered estimated and tentatively identified and flagged with (JN).

      (3) All other pesticide PCB results should be inspected very closely to determine their validity.

   b. If Endrin breakdown is greater than 20%;

      (1) All quantitative results for endrin should be considered estimated and flagged with (J).

      (2) Qualitative and quantitative results for Endrin ketone should be considered as tentative and flagged with (NJ).

      (3) All other results should be inspected very closely to determine their validity.

4. Retention Time Check

   a. If the retention time shift for DBC is greater that 2.0% for packed column or greater than 0.3% for capillary column, the analysis should be

considered unusable for that sample(s) with discernable chromatographic peaks and results flagged with an (R).

b. The absence of a DBC peak does not constitute a violation of the above condition since DBC may be absent due to low recovery of dilution.

III. Calibration

1. Initial Calibration - If criteria for linearity are not met, all associated quantitative results should be considered estimated and flagged with (J).

2. Continuing Calibration

a. If the % Difference between calibration factors during the 12 hour period is greater than 15% for the compound(s) being quantitated, flag all associated positive quantitative results as estimated and flagged with (J).

b. If the % difference is > 20% than the CRLOD is estimated and flagged with (UJ).

IV. Matrix Spike/Matrix Spike Duplicate

1. No action is taken on Matrix Spike/Matrix Spike Duplicate (MS/MSD) Data alone to qualify an entire Case.

2. The results of the matrix spike and matrix spike duplicate can be used in conjunction with other QC criteria to aid the user in applying more informed professional judgement when necessary.

3. On a sample-by-sample basis, the following suggestion on using MS/MSD results is provided for the specific sample spiked. If the results are positive (above detection limit) and the percent recovery is zero, the results of the unspiked sample for which (MS/MSD were performed are flagged with a (J) as estimated. If the results are less than the detection limit and spike recovery is zero, the results for the spiked compound(s) with zero recovery for the unspiked MS/MSD sample should be flagged as unusable with an (R). Multiple zero recoveries for compounds may suggest more general application of qualifiers.

VII. Compound Identification - Compound results reported without meeting qualitative criteria for two column confirmation should be flagged as not detected with a (U), using professional judgement to assign appropriate Sample Detection Limit.

Status of Laboratory Operations for Future Work

The laboratory personnel have a better understanding of CLP QA/QC requirements and are working within their means to insure capabilities are in place to handle future work. The Hewlett Packard (HP) RTA system is operational. On-site training by HP personnel, well versed in the use of Aquarius software is scheduled for mid-May. Two scan boxes previously recommended to increase productivity for semivolatile data processing has been ordered.

Communication between the sampling team and analytical team has improved and the sampling schedule at INEL has been lengthened in an attempt to resolve capacity issues in light of holding time concerns. Since 300 volatile organics will exceed the labs capacity, the aide of one or more other laboratories should be arranged as soon as possible.

Review of Sampling and Data Management Activities in Support of DOE Survey

On the morning of April 13, a short time was spent with Donna Pickel, John Murphy, and Karen Daniels reviewing the ORNL field participation in the Pantex project. Murphy reiterated the evolution of program requirements regarding field QC activities and their subsequent implementation by the ORNL team. At Murphy's initiative he has updated his on-site NPDES sampling program to include many of the DOE Environmental Survey program field QC protocols and intends further QC improvements to the RCRA sampling as well. From this discussion it appears the participation of the ORNL sampling team in the DOE Environmental Survey has resulted in improvements to the on-site monitoring programs at ORNL. Murphy provided the review team a written response to the review team checklist which addressed the documentation techniques, disposal procedures, sampling plan deviations, and training and personnel qualifications.

I would offer a single suggestion as to how this work effort has been documented in that the field log sheets should be bound by 19-hole punch spiral binder prior to archival in the case file. This should serve as better binding for storage than the staples and loose-leaf binders used during assimilation.

Karen Daniels is responsible for the data management activities. Much of this work has been contracted to SAIC. A review of SAIC work was reported earlier (McMahon to Frazier, March 18, 1988). Again, I would reiterate the recommendation that the data management teams review hard copy, lab generated CLP forms against the electronic database to insure that lab evaluated data is the data represented in the

database. Furthermore, a meeting between lab personnel and the data management team will likely be needed to insure the annotated lab data is properly interpreted. Dealing with CLP QA/QC requirements is equally new to the data management team. I believe a training program, by lab personnel experienced in the generation of CLP data, would be beneficial for the data management team and strengthen the communication skills needed to deal with the CLP lab.

Please call me if I can provide further information.

L. W. McMahon, 9704-1, MS-001, Y-12 (4-7535)

cc: T. R. Butz/C.C. Hill
L. L. McCauley/C.W. Kimbrough

ATTACHMENT 3

Organic Lab - List of New Standard Operating Procedures (SOP) Reviewed

A. N. Weisbin
4-11-88

Recommendations and Comments:

SOP #1	Sample Login and Identification for the DOE Environmental Survey Program (Draft dated 3-12-88 - not approved)
	- 7.2.10 - "Arrange for the proper and secure storage of all samples" - too general.
	- Delete "...QA/QC section, if not applicable", statement.
SOP #6	Personnel Signature and Initial Record
SOP #4	Sample Storage for the DOE Environmental Survey Program (Refrigerators)
SOP #2	Duties and Responsibilities of Sample Custodian
SOP #3	Sample Chain of Custody
	- Procedure should address answers to questions of "Who signs what?" (signature and date) "Who has ultimate responsibility?"
SOP #5	Sample Storage Area Security
SOP #8	Sample Tracking
	- How are corrections made? Signed for? Attachments?
SOP #9	Sample Preparation Bench Sheet
	- Sect. 6.2. - How will the sample be identified?
	- Sect. 6.3. - Incomplete
SOP #17	Document Flow
	- Incomplete
	- Need responsible person also for each document.

Inorganic - List of Standard Operating Procedures (SOP) Reviewed

A. N. Weisbin
4-12-88

Recommendations and Comments:(Applies to all SOP's)

1. Recommend that the Scope and Purpose be separated.
2. Recommend that the QA/QC applicability statement be deleted.
3. Suggest that the summary should be "requirements".
4. Suggest that the list of forms be an attachment in the procedure.

SOP # 001	Duties and Responsibilities of Sample Custodian for the DOE Environmental Survey Program
SOP # 002	Sample Receiving and Inspection
Suggestion:	- 7.4.11 Reference secure storage and login procedures... Be specific, reference which secure storage and which login procedure will be used.
SOP # 003	Requirements for Recording and Correcting Laboratory Entries for the Environmental Survey Program
SOP # 004	Sample Login and Identification
SOP # 005	Personnel Signature and Initial Record
SOP # 006	Monitoring Analytical Balance Performance
SOP # 007	Sample Storage
SOP # 008	Sample Security
SOP # 009	Monitoring Cold Storage Temperatures
SOP # 011	Sample Chain-of-Custody
SOP # 013	Sample disposal

See comprehensive listing of all SOP's in Attachment 5 to this report.

ATTACHMENT 4

STANDARD OPERATING PROCEDURES

ORGANIZATIONAL

1. SAMPLE LOGIN AND IDENTIFICATION ✓
2. DUTIES AND RESPONSIBILITIES OF SAMPLE CUSTODIAN ✓
3. SAMPLE CHAIN-OF-CUSTODY ✓
4. SAMPLE STORAGE ✓
5. SAMPLE STORAGE AREA SECURITY ✓
6. PERSONNEL SIGNATURE AND INITIAL RECORD ✓
7. SAMPLE IDENTIFICATION
8. TRACKING SAMPLE ANALYSES ✓
9. SAMPLE REQUEST LOG NOTEBOOK
10. SAMPLE PREPARATION LOG
11. SAMPLE PREPARATION BENCH SHEET ✓
12. VOLATILES ANALYSIS INJECTION LOG
13. SEMIVOLATILES ANALYSIS INJECTION LOG
14. GCMS BACKLOG SHEET
15. PESTICIDES/PCBS ANALYSIS INJECTION LOG
16. PROGRESS REPORT
17. DOCUMENT FLOW ✓
18. DOCUMENT CONTROL
19. ORGANIC GCMS DATA REVIEW
20. REVIEW OF SAI-TREATED VOLATILES DATA
21. ORGANIC PESTICIDES DATA REVIEW
22. ORGANIZATION AND ASSEMBLY OF CASE FILE
23. ORGANIZATION AND ASSEMBLY OF EPA ORGANIC DATA PACKAGE
24. DOCUMENT/DATA PACKAGE SHIPPING
25. TRACEABILITY OF STANDARDS
26. ORGANIC STANDARDS STORAGE AND CUSTODY
27. ORGANIC REAGENT TRACEABILITY
28. TRACEABILITY OF MATRIX AND SURROGATE SPIKING SOLUTIONS
29. STORAGE OF MATRIX AND SURROGATE SPIKING SOLUTIONS
30. REQUIREMENTS FOR RECORDING, VALIDATING, AND CORRECTING ENTRIES
31. TEMPERATURE CONTROLLED SAMPLE STORAGE AREAS: RECORDS AND MAINTENANCE
32. CLEANING OF GLASSWARE
33. BALANCE OPERATION CHECK
34. DISPOSAL OF ENVIRONMENTAL SAMPLES
35. LABORATORY SAFETY

DRAFT

Susan Holladay (4-11-88)

ATTACHMENT 5

STANDARD OPERATING PROCEDURES FOR THE DOE ENVIRONMENTAL SURVEY PROGRAM

X • DUTIES AND RESPONSIBILITIES OF SAMPLE CUSTODIAN
X • SAMPLE RECEIVING AND INSPECTION
X • REQUIREMENTS FOR REPORTING AND CORRECTING LABORATORY ENTRII
X • SAMPLE LOGIN AND IDENTIFICATION
X • SAMPLE STORAGE
X • SAMPLE SECURITY
X • SAMPLE CHAIN-OF-CUSTODY
X • SAMPLE TRACKING
X • PERSONNEL SIGNATURE AND INITIAL RECORD
X • MONITORING COLD STORAGE TEMPERATURES
X • SAMPLE DISPOSAL
X • MONITORING ANALYTICAL BALANCE PERFORMANCE
• DOCUMENT CONTROL
• ANALYTICAL PROJECT FILE ORGANIZATION
• CASE FILE ASSEMBLY
• DATA MANAGEMENT AND SECURITY
• MONITORING WATER QUALITY
• CLEANING GLASSWARE

X = DRAFT COMPLETED

Sophie Bobrowski
Analytical Chemistry Division
April 11, 1988

Attachment 6

Oak Ridge Environmental Survey Program - Review of the Pantex Site Organic Data Generated by the ORNL Analytical Chemistry Division (ACD)

Issued to:

R. B. Fitts

March 23, 1988

Issued by:

D. W. Frazier

D. W. Frazier, Review Team Leader

A. H. Halouma

A. H. Halouma

P. L. Howell

P. L. Howell

L. W. McMahon

L. W. McMahon

MARTIN MARIETTA

Internal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

March 23, 1988

R. B. Fitts

DOE Environmental Survey Program - Review of the Pantex Site Organic Data Generated by the ORNL Analytical Chemistry Division (ACD).

In January 1988, EPA representatives reviewed the Pantex Site data generated by the ORNL ACD Organic labs. As a result of that audit, the data was declared suspect. A quality assurance review team was chosen at MM-ES to conduct an independent review of the data. On February 23, 24, & 26, 1988, this activity took place to assess the status or usefulness of the data in light of the comments made, and to document an independent evaluation of the participant's compliance to established guidelines as stated in the CLP statement of work.

Selected organic data, generated by ORNL, on environmental samples collected at Pantex as part of the DOE Environmental Survey were reviewed by the team. The following summary will discuss our conclusions based on compliance to requirements of the CLP protocol or from a view of the data being legally defensible versus actual usefulness from a technical point of view. However, prior to stating the conclusions drawn from the review, the team requests that the following issues/comments be recognized and considered.

1. Recognize:

   a. That the Organic Lab employees were directed to analyze the sample set from Pantex within the holding times and produce data. The lab received 195 volatile organic analyses (VOA), 203 semivolatile organic (SVO), and 154 PCB/Pesticides to be analyzed by two employees for ~75% of the project, (~25% of the samples were analyzed by one person) on 4 GC/MS instruments equipped with auto-samplers, two gas chromatographs with auto-samplers (which were not operational 100% of the project) operated by one or two employees;

   b. That these samples came in one delivery;

   c. That laboratory capacity was estimated to be 40 samples per week for the three parameters including sample preparation.

2. Recognize:

   a. That long hours and diligent efforts were expended by all concerned to produce the data within the specified holding times.

b. It was readily apparent that sufficient staff and instrumentation were not available to handle the workload from the Pantex Site.

c. Furthermore, it is suspected that sufficient laboratory capacity does not exist in any single DOE laboratory to handle this project given the short holding times associated with the organic samples.

d. At the time of the Pantex sample analyses, only 10% of the data was to be reported as full CLP data packages.

3. Recognize:

a. That the ORNL Organic lab, like the other DOE laboratories, was unaccustomed to providing the level of documentation required by CLP.

b. There is a definite learning curve which all laboratories, including ORNL, must undergo before producing CLP level data efficiently and in quantity.

4. Consider:

a. The results in light of the CLP statement of work which when adhered to, should produce data that is legally defensible in a court of law.

b. That technically, in a broad sense, most of the data is useful for the volatile organics (both soil and water samples).

It is with these issues in mind that the review is summarized below. Specific comments and notes from the review can be supplied upon request.

The VOA data, although not documented to the degree that a third party could recreate the analysis, were retrievable. The level of CLP non-compliances was not unreasonable for the two soil data sets reviewed considering the time frame available for the analyses to be completed. On the other hand, the VOA data reviewed for two water data sets had numerous errors which caused serious concerns. The chief cause of non-compliances appeared to have been a lack of communication or interpretation of CLP requirements, insufficient software to allow timely data interpretation by the analysts, and insufficient time and resources to properly document required information to the level required by the CLP.

1. **Recommendation:** The final report of Pantex VOA data should be regenerated to correctly state quantitative values, positive contaminate identifications, documentation of deviations from the protocol, and documentation of corrective actions taken for out-of-control conditions.

The most serious concerns were with the Pesticide/PCB data. There was an excellent effort to produce the forms electronically, however, the evaluation of the required QC samples was less than adequate. According to the data reviewed, quantitative values

appeared to be reported based on raw electronic data, rather than analyst review and interpretation which is essential.

The linearity evaluation check did not meet CLP requirements on any of the analysis batches. In conclusion, there were enough errors found in the documentation to cause the team to doubt the validity of the results to be reported. Considering that the Gas Chromatograph Electron Capture detector data is more difficult to reconstruct, and that all linearity checks were outside the QC window, it is doubtful that useful data can be regenerated from the raw electronic data, as with the VOA's.

2. **Recommendation:** Future CLP work should incorporate analyst review and interpretation of all data prior to reporting quantitative values, assure that the required QC criteria are met before proceeding with the analysis.

The laboratory evaluation and interpretation of the Semivolatile data had not been completed at the time of the review. There was insufficient data to evaluate the usefulness of the Pantex semivolatiles analysis.

3. **Recommendation:** Due to the length of time since the analysis were performed and the target completion date, the evaluation of this data should be given top priority in order to ultimately generate the necessary CLP forms to complete the data package.

A major concern of the team was the data that SAIC and DEM have in the Pantex data base. None of the data in the SAIC database should be considered as laboratory evaluated and approved. SAIC has provided a useful service which aided the laboratory process raw data, and generate CLP forms. However, it appeared that SAIC and DEM had misinterpreted raw data as final analysis results. The data required processing and laboratory evaluation prior to being put onto the final CLP forms. To reiterate, a considerable amount of data review and evaluation is required on the part of the laboratory before any of the Organic analytical results from the Pantex site can be considered final.

4. **Recommendation:** All of the data in the SAIC data bases should be discarded, and only the final results, validated by laboratory staff should be included in the data. The team understands that the release of the data prior to validation was to aide in the development of the required software. However, there was insufficient resources for the amount of review that this entailed.

Should you have any questions concerning this report please call me.

D. W. Frazier, 1000, MS-335, ORNL (6-0347)

DWF:cet (QA-88-26)

MAR 8 1988

MARTIN MARIETTA

Internal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

March 2, 1988

D.W. Frazier

Review of Pantex Data at ORNL 2/23/88 - 2/26/88

Selected Organic data, generated by ORNL, on environmental samples collected at Pantex as part of the DOE Environmental Survey were reviewed by myself as a member of the review team on February 23-24 and 26. The purpose of the review was to assess the usefulness of the data in light of comments made by DOE and EPA during a program review in January.

Before stating conclusions drawn from the review, please allow me to make a few pertinent comments. The long hours and diligent efforts by the analysts and chemists who have worked on the Pantex analyses should be recognized. It is readily apparent that sufficient staff and instrumentation were not available to handle the workload from Pantex. Furthermore, I suspect sufficient laboratory capacity did not exist in any single DOE laboratory to handle this project given the short holding times associated with the organic samples. Compounding this issue is the fact that ORNL, like the other DOE laboratories, was unaccustomed to providing the level of documentation required by CLP. There is a definite learning curve which all laboratories, including ORNL, must undergo before producing CLP level data efficiently and in quantity. It is with these issues in mind that my review is summarized below. Specific comments and notes from the review are included in the attachment.

The VOA data, although not documented to the degree that a third party could recreate the analysis, were retrievable. The level of CLP non-compliances was not unreasonable for the two data sets I reviewed. The chief cause of non-compliances appear to have been lack of communication as to CLP requirements and insufficient software to allow timely data interpretation by the analysts. The final report of this data should be regenerated to correctly state quantitative values and positive contaminate identifications. Considering the samples were relatively "clean", useful information can still be gathered provided the issues noted in the attachment are addressed.

The most serious concerns are with the Pesticide/PCB data. Based on the data presented it appears quantitative values were reported based on raw electronic data rather than analyst review and interpretation. The linearity evaluation check did not meet CLP requirements on any of the analysis batches. Enough errors were found in the documentation to create doubt in the validity of the results reported. Considering that the GC ECD

data is more difficult to reconstruct, and that all linearity checks were outside the QC window, it is doubtful that useful data can be regenerated as with the VOA's.

The laboratory evaluation and interpretation of the Semivolatile data had not been completed at the time of the review. Insufficient data exists to evaluate the usefulness of the Pantex semivolatiles.

A major concern is the data SAIC and DEM have in the Pantex data base. No data in the SAIC database should be considered as laboratory evaluated and approved data. SAIC has provided a useful service in aiding the laboratory process raw data. However, it appears SAIC and DEM have misinterpreted raw data, requiring processing, and laboratory evaluation as final analysis results. This is not the case!! A considerable amount of data review and evaluation is required on the part of the laboratory before any of the Organic analytical results from the Pantex site can be considered final.

Please call me if I can provide any other information.

L. Wayne McMahon

L.W. McMahon, 9704-1, MS-001, Y-12 (4-7535) - NoRC

LWM:da

Attachment: As stated

cc/attach: T. R. Butz/C. C. Hill
L. L. McCauley/C. W. Kimbrough

VOA Data Reviewed at ORNL 2/23-2/26

VOA Data - Two sets of VOA soil data were reviewed. The sample sets were selected at random from the GC/MS Instrument Operations Logbook. The laboratory personnel stated that the VOA data had been compiled as CLP packages for delivery to EMSL-LV but the laboratory records had been dismantled and the VOA data filed by run day with all like forms combined as a case file of Pantex data. This has resulted in renumbering of the pages as well as duplication of many forms and raw data thus making the data review more difficult.

The lab has prepared Instrument Operation Logbooks which detail the analysis sequence. The logbooks were very useful in defining an analysis batch. The lab staff detailed how the data was compiled for the Pantex data. SAIC has written software to aid in calculations and preparation of the VOA CLP forms. The software provided by SAIC has been most useful in "crunching numbers" but has generated a large amount of "Form I data" which needs to be carefully scrutinized by the laboratory.

The area report tables and quant reports output by the Laboratory Chem Station Data Systems were often included with the raw data along with a second report table "from a Lotus File". The documentation as it exists is often conflicting and leads to many questions. Laboratory staff were needed to explain how certain response factors and quantitative numbers were obtained. The explanation was always provided. The documentation, as it exists, can not be used to reconstruct the analysis without the aid of the individual performing the analysis. Also, there is no indication that the detection limits for soils or quantitative results for soils have been corrected to allow for percent moisture.

I. VOA analyses of 6/7/87, Instrument O

- Logbook shows sequence of analysis as follows for VOA's requested on Pantex requistion number 91283.

LAB Ident.	Description
BFB Tune	
06707201	50 ppb CCC run
067VWB01	Blank 6/7
870607-016	PX012031
-017	PX012019
-018	PX053052
-019	PX053052
-020	PX053041
-021	PX045018
-022	PX045029
-023	PX045030

The last sample of this set (PX045030) was ran outside the twelve window of tune, CCC, and blank requirements. However, the BFB tune file was not altered during the entire Pantex project according to the chemist. The tune and CCC run of the following days run were within spec.

- Form V, BFB tune. The computer generated form V misstates the ion abundance criteria for mass 174 as "> 2% of mass 174". The correct statement should be > 50% of mass 95. The bar graph and mass listing are within requirements and the tune as reported for mass 174 is correct.

- Form VII, Continuing Calibration Check (CCC) - The 50ppb CCC and SPCC requirements were met.

- Lab Blank. Methylene chloride (11.5 ppb) and acetone (10.4 ppb) are reported. This trace level of background is typical for oraganic laboratories. Only mass spectra of Methylene chloride is given and no standard spectra are included.

- Form II, Surrogates - 25 of 27 surrogates reported with this set are within the QC window.

- Form III, Matrix Spike (MS) and Matrix Spike Duplicate (MSD) - No Matrix spikes were analyzed with this set. The analyst misinterpreted the CLP procedure to require only one set of matrix spikes per twenty samples without regard to matrix type. A water MS and MSD were analyzed with a set of water samples (on instrument G) on this same day. However, this does not meet the requirement of MS and MSD for the soil sample set under review.

- Form IV, Blank data. A water blank, rather than a blank of similar matrix was analyzed. The form correctly reflects the samples associated with this set and that the last analysis was outside the twelve hour window.

- Form VIII, internal standard areas - All internal standard areas were within the QC windows established.

- Form I, results. The laboratory personnel stated that the completed Form I's were still being reviewed to insure flags were properly assigned to the data. It was also reported that the data had already been delivered as a complete CLP package.

A large number of compounds, from several samples, are reported to be present at a level less than the required reporting detection limit (an estimated value) and thus are flagged with a J. Many compounds are reported as "0 J ug/kg". No spectra were included for the majority of compounds

reported as estimated values. It appears that the data on the Form I's represent positive hits of the quantitation ion rather than reported final results based on review of mass spectral data. These positive hits may in fact be due to background or "electronic noise".

The J flag should be used to note the concentration of a tentatively identified compound as estimated or to flag a Target Compound as being present but at a level less than the quantitation limit. In either case, a conclusion that a compound is present in the sample is to be based on mass spectral data that matches standard spectra or that meets the identification criteria based on spectral interpretation. The Form I data reviewed in this set appears to report a positive identification for many compounds, however a review of the raw data indicates few positive identifications based on mass spectral data. Only one sample appears to have a target compound significantly above the quantitation limit. Toluene is reported at 58 ppb in sample PX045029. Raw and background subtracted spectra are included which identify toluene as being present but the CLP required standard reference spectra is missing.

Mass Spectal data for this set should be reviewed to determine presence of Target Compounds. The Form I results should be regenerated to reflect actual reportable results. On regenerating the results the % moisture determination is to be used to calculate actual detection limits and quantifiable results. Lab personnel stated that no results had been corrected for moisture at the time of this review.

- Form VI, Calibration data. The last calibration date was 6/2. The response factors were reviewed and the calculations spot checked. The calibration data were acceptable.

II. VOA Analyses of 6/12/87, Instrument O

- Sample ID's and order of analysis taken from GC/MS Instrument Operations Logbook

Lab Ident.	Description
BFB Tune	
50 ppb	50 ppb CCC run
870611-226	PX020019
870611-227	PX020020
870611-228	PX020031
870611-229	PX020042
870611-230	PX020053
870611-231	PX020064
870611-231	PX020064 MS
870611-231	PX020064 MSD

The last run was again outside the twelve hour window of BFB tune, CCC, and instrument blank requirements.

- Form V, BFB Tune. Ion Abundance Criteria statement for mass 174 is incorrect as noted previously. All mass % relative abundances on the computer generated form are " 0 ". The zeros have been stricken and hand entry of data recorded without any notations. Bar graph and mass listing met requirements.

- Form VII, Continuing Calibration Check. SPCC and CCC requirements were met. Two area report tables, with different areas are included with the documentation. Input from lab personnel was needed to determine which areas were used to determine the response factors.

- Lab Blank. The Form I report for the lab blank reports Methylene Chloride, Acetone, and 2-butanone at 5 ppb or above. Many compounds are reported to be present at less than 1ppb (OJ). The only spectra documenting the presence of any compounds was for methylene chloride and the standard reference spectra was missing for it.

- Form II, Surrogate recovery. 26 of 27 surrogate recoveries were within QC window.

- Form III, Matrix Spike results. 9 of 10 Matrix spike recoveries were within the QC window while the relative percent difference between duplicates was in the QC window for all 5 matrix spike compounds. However the Form III was not properly completed to report these results.

A report of MS and MSD data, generated by SAIC, was reviewed (Summary of Pantex Volatiles, Run = 0612). This output has MS and MSD % recoveries which differ from the Quant reports in the lab.

- Form IV, Blank Data. Time of analysis reported for last sample run shows the run to be outside the twelve hour window. A water blank was utilized.

- Form VIII, Internal Standard Area - The sample identifications on the form do not differentiate the MS and MSD runs from the sample run. 24 of 27 internal areas met the QC window. The three outside the window represent all three standards from the final run of the day (PX020064 MSD). The peak areas from this run differ by a factor of approximately 50 from the other runs in this set.

- Form I, Results. In general many positive results are reported as estimated values (flagged with J) but the raw data does not substantiate these results. As with the set of data previously discussed, the Form I's need considerable rework to reflect the chemist interpretation on the data.

In addition, all detection limits and results should be corrected for moisture content.

Examples of problems are noted:

* PX020019 - acetone and MEK results should be flagged with a B. Only spectra included is that of methylene chloride. Three copies of Form I are included: Two appear to be duplicates, a third reports different results.

* PX020020 - Many positive hits reported as estimated values, no spectra to support identifications.

* PX020042 - Methylene chloride and acetone are correctly flagged with B's, MEK is not. Duplicate pages in the package complicate the review process.

* PX020064 MSD - No From I included, only TIC and quant report. The total-ion-chromatogram for this sample indicates very low response of internal standards and surrogates. The pattern of the TIC indicates that perhaps the purge and trap device malfunctioned on this run. This is also likely to be the cause for the three internal standards from this run to be outside the QC window.

For these reasons and for those sited on the first set, the mass spectral data should be reviewed to determine presence and absence of target compounds and Form I data regenerated to reflect data review by the laboratory.

- Form VI, Calibration data - The same calibration file (6/2/87) was used for this set.

<u>Summary of Pantex PCB/Pesticide Data Reviewd at ORNL 2/23 -2/26</u>

It was readily apparent that considerable time and effort had gone into the development of software to "crunch the numbers" and generate the CLP Pesticide/PCB forms. However, a review of the data also revels that the software is still in a development stage. While the GC/MS data readily lends itself to computerization, the day-to-day GC data evaluation is based more on operator experience and day-to-day interpretation of chromatographic patterns. Decisions must be made daily, often hourly on various operating conditions that may influence the results (background, sample matrix, and late eluting peaks that interfere with the next run for example). Programming these decisions into computer software is complex at best and lab personnel should be commended for progress to data. However, in regard

date.

to the Pantex data a number of concerns must be expressed. The most pressing concern is that "electronic data" (i.e. raw, unevaluated data) has been accepted by SAIC prior to laboratory evaluation. In addition, the bulk of the documentation appears to report analysis results based soley on electronic processing rather than operator evaluation.

More difficulty was experienced in determining a sample "batch" for the review. The chemist was uncertain if the samples had been analyzed in such a manner as to relate a blank, Matrix spike (MS) and Matrix Spike Duplicate (MSD) with a given set of samples. A review of the Analytical Services Form, Sample Preparation Logsheet, and GC Instrument Operations Logsheet reveled the following samples from Pantex Request # 91339 as a "batch".

Laboratory Indent.	Description
870615-213	PX052017
870615-214	PX052028
870615-215	PX052039
870615-216	PX052040 *
870615-217	PX052051
870615-218	PX052062
870615-219	PX052073
870615-220	PX052084
870615-221	PX052095
870615-222	PX052108
870615-223	PX052119
870615-224	PX052120
870615-225	PX052131
PX91339SB	Blank

* Prepared as unspiked, matrix spike and matrix spike duplicate

The three forms were needed to relate this as a batch since;

- Only Pantex sample identifications were used on the GC log
- Only Lab sample identifications were used on the Sample Prep Log
- Only the Service request form relates both lab and Pantex Identifications
- The GC log omits the first numerical digit of the Pantex sample identification due to field size allowed by the computer program.

This set of samples were received on 6/15, extracted on 6/26 and analyzed on 9/15 thru 9/17 (1 day beyond extraction holding time, and 52 days beyond analytical holding time).

- Form II, Surrogate Recovery - Mirex was used as the surrogate rather than Dibutylchlorendate (DBC). Assuming the QC advisory guidelines for DBC can be extended to mirex, 9 of 16 surrogates are outside the advisory

window. Since Mirex was used as the surrogate rather than DBC, the number of non-compliances can not be evaluated.

- Form III, Matrix Spike (MS) and Matrix Spike Duplicate (MSD) - The form reviewed had the proper header (Soil Pesticide Matrix Spike) but the QC limits stated on the form were those for water. The comments on the form state that the samples were prepared incorrectly with no further explanation of what was done incorrectly. 12 of 12 MS recoveries were outside QC limit while the form data reports 1 of 6 % RPD out. In fact 5 of 6 RPD were out with only dieldrin reproducing with 0% recovery. The chemist stated that the computer was not programmed (at the time of the Pantex project) to report negative % RPD as out-of-control since the CLP procedure did not specify negative values as out-of-control. In fact the absolute value should be considered and it was implied that the computer program had been so modified.

  Sample PX052040 and been analyzed unspiked and as MS and MSD. The matirx spike compounds were gamma-BHC, heptachlor, aldrin, dieldrin, endrin, and 4,4'-DDT. The analysis results of this sample (Form I data, unspiked), matrix spike, and matrix spike duplicate are noted below. Also included are the sample results as reported in AnaLIS.

Compound Reported	Packed Column Form I	AnaLIS	Form I MS	Form I MSD
alpha-BHC			83.59	19.07
beta-BHC	8.07			
Endosulfan I	16.03	8.00	29.47	13.34
4,4'-DDT		16.00		19.32
aldrin			20.16	

Besides the fact that poor recoveries were obtained on the spiked samples, the presence or absence of other contaminates in the sample are questionable based on the various results reported above.

- Form IV, Blank data. Samples associated with this set are noted. The Form I report for the blank (PX91339SB) shows 16 ug/kg heptachlor. The quant report for this blank (part of the raw data) reports 19.14 ug/Kg beta-BHC and 30.00 ug/Kg Heptachlor. Data from other blanks (PX91306SB, PX91306SB, PX91275WB) analyzed as part of the Pantex project were reviewed. It was noted that aldrin, heptachlor epoxide, endosulfan II and hetpachlor were reported at levels of 12.44 to 53.67 ug/kg.

- Form VIII, Evaluation Standards Summary. The percent relative standard deviation (%RSD) of calibration factors for aldrin, endrin, DBC, and DDT is not to exceed 10% on the quantiation (packed) column.

  The procedure makes an exception to this rule for DDT. This linearity check for each 72 hour run sequence for the Pantex project was reviewed and is summarized below.

Date of analyses	Number compounds exceeding 10% RSD	Smallest % RSD Reported for outliers
7/30 - 8/2	3 of 4	18
8/6 - 8/12	3 Of 4	15
9/10 - 9/13	3 of 4	13
9/14 - 9/15	2 of 4	10
9/28 - 10/1	4 of 4	15
10/1 - 10/2	4 of 4	38
10/14 - 10/21	4 of 4	38
10/15 - 10/17	4 of 4	30

Based on EPA data evaluation criteria, all quantitative results would questioned.

Summary of Pantex Semivolatile Data Reviewed at ORNL 2/23-2/26

SAIC has worked with lab personnel to develop software to generate the CLP documentation for the Semivolatiles as they did for the Volatiles. Although considerable work has been completed, data processing for the semivolatiles has not been completed to the extent of the Volatiles. It was explained that as semivolatiles are analyzed by GC/MS, data files containing peak number for identification purposes, retention time, quantitation mass, and peak area of the quantitative ion are uploaded to SAIC for processing. The laboratory received back from SAIC not analyses batches but the entire set of Pantex data. Corrections were made to the output from SAIC and returned. The next submission contained data which had been corrected for dilution factors. A third submission was in the laboratory for evaluation at the time of the review.

While the SAIC work has been helpful to the laboratory, it has not provided the timely processing of data needed by lab personnel to effectively evaluate the data. The Semivolatile data for Pantex is at best in the very early stage of evaluation by the laboratory.

A review of data to date included Pantex samples from requestion 91332. The samples were extracted on 6/24/87 and analyzed on 11/2/87, beyond the analytical holding time. Data for a second set of samples, analyzed on 8/10 were also reviewed. The amount of data available at the time of the review is insufficient to make an evaluation of its acceptability for the DOE Survey Program. A few comments are noted on the available data below.

- The two instrument tunes for DFTPP reviewed met the tune criteria.

- The instrument calibration of 11/1 had only the response factors for the SPCC and CCC compounds calculated. This is the minimum information needed to determine if samples can be run. The lab is dependent on the SAIC software to calculate all response factors.

- On the CCC run of 8/10 the percent difference in RF from the calibration run for hexachlorobutadiene exceeded the 25% requirement (31.39%). All other CCC and SPCC compounds (16 of 17) were within established QC window.

- No blank, MS, or MSD data were located for the set analyzed on 11/2/87.

- Surrogate recoveries had not been determined for the majority of analyses. An SAIC report of analysis results on sample 870615-132 (PX015023) dated 2/23/88 was reviewed. The report included results with and without correction for the dilution factor. The dilution factor was recorded as 35. Assuming the surrogate spike levels were as designated in the CLP, the recoveries were calculated as shown below.

Surrogate Compound	Assumed Spike Level	% Recovery at at DF of 1	% Recovery at DF of 35
Nitrobenzene-d5	50 ug/L	12	218
2-Fluorobiphenyl	50	15.2	272
p-terphenyl-d14	50	17.6	311
Phenol-d6	100	16.7	589
2-fluorophenol	100	11.6	408
2,4,6-TBP	100	33.6	1180

Phenol-d6 and 2,4,6-TBP are within the QC window assuming the dilution factor was 1 and not 35. However, an assessment of surrogate recoveries would premature at this stage since the laboratory is still processing the data.

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ORNL Results of Inorganic and Organic Performance Evaluation Studies

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PERFORMANCE EVALUATION SCORES FOR ORNL

Date Received	Code	Score
	QB1FY89 Inorganic	86.7 (CAR)
07/19/88	QB4FY88 Inorganic	89.5 (CAR)
04/20/88	QB3FY88 Inorganic	96.3
01/22/88	QB2FY88 Inorganic	94.1
10/22/87	QB1FY88 Inorganic	86.5 (CAR)
08/11/87	QB4FY87 Inorganic	96.0
05/13/87	QB3FY87 Inorganic	86.6 (CAR)
	QB1FY89 Organic	60.6 (CAR)
07/28/88	QB4FY88 Organic	73.0 (CAR)
04/28/88	QB3FY88 Organic	78.7 (CAR)
01/25/88	QB2FY88 Organic	62.3 (CAR)
08/17/87	WP-019 Nontarget inorganic	Acceptable
02/24/88	WP-020 Nontarget inorganic	Acceptable
08/31/88	WP-021 Nontarget inorganic	Acceptable
10/23/87	QB1FY88 Organic	*
08/13/87	QB4FY87 Organic	*
04/28/87	QB3FY87 Organic	*

* Did not report samples for scoring (see attached letter).

CAR = Corrective Action Required

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MARTIN MARIETTA

nternal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.
September 15, 1988

R. B. Fitts

Quarterly Blind (QB) Samples for Organic Analysis

This memo is my response to your request for information about the QB samples that EPA sent to the Organic Services Group in support of the Environmental Survey Program. We received eight samples:

No.	QB Number	Period	Received	Reported
1	QB6437	Qtr 1, FY87	10/16/86	12/31/86
2	QB6666	Qtr 2, FY87	1/23/87	4/10/87
3	QB7144	Qtr 3, FY87	4/28/87	No
4	QB7760	Qtr 4, FY87	8/13/87	No
5	QB8124	Qtr 1, FY88	10/23/88	No
6	QB8783	Qtr 2, FY88	1/25/88	3/31/88
7	QB9300	Qtr 3, FY88	4/28/88	6/1/88
8	QB10015	Qtr 4, FY88	7/28/88	In Process

As you can see, results from three consecutive samples were not reported to EPA. We did not complete the data packages for these three samples because of excessive workloads of higher priority at the time. I need to elaborate on this on a sample-by-sample basis in order to clearly show the conditions that existed at the time.

The analytical work was done on QB7144, but the data package was not completed. Samples from the Pantex site took precedence over QB7144. The Pantex sample consignment arrived over a 10-day period starting June 6, 1987. (For two days during this 10-day period we were audited by DOE/EPA including the DOE Manager.) At that time the available staff consisted of one secretary and myself to log in, distribute and report; three sample preparation technicians, (including two technicians borrowed when the samples arrived); two staff members in the GC/MC Laboratory; two persons in the gas chromatography laboratory; and one staff member along with his Group Leader to determine high explosives, soil gas, etc. Because this sample load far exceeded our capacity, we did not have time to finish assembling the data package for QB 7144. We simply could not get all pending work completed even when maximum amount of overtime was worked by all available staff. Preparation of water samples was performed by the two staff members assigned to the gas chromatography laboratory while the personnel assigned to the preparation laboratory devoted all efforts exclusively to soil preparation. The two-person GC/MS staff worked very long hours to complete volatiles analysis within holding times. Our main objective was to maximize the number of holding

times satisfied for (1) volatiles analysis and (2) pesticide and semivolatiles preparation. The great majority of these holding times were satisfied. In short, because our priorities were to analyze local samples and Survey samples before directing attention to the QB Sample, we did not have time to devote to the complete of the data package for QB7144. (Incidentally, at that time all CLP data packages coming from our laboratory had to be developed manually. All results were manually input and forms were handwritten. Thus QB7144 was never submitted to the EPA.)

Sample consignments from Lawrence Livermore and Sandia arrived in our organic analysis laboratory during the period of August 8 to August 17, 1987. QB7760 arrived on August 13, 1987. Work still remained to be done on the analysis of semivolatiles and pesticides from Pantex. At this time our preparation capacity was slightly greater, (three technicians in the preparation laboratory prepared water samples and satellite laboratory from another Section in the Division prepared all soil samples). However, the two-person gas chromatography staff was still working on the analysis of Pantex pesticide samples as well as samples received locally. The real limitation at this time was the GC/MS staff where the most knowledgeable person was not available because of a traffic accident. An able technician was borrowed to bring the staff level to two. However, the borrowed technician was completely unfamiliar with this laboratory operation and arrived during a period of intense activity. Thus the contribution of the second GC/MS staff member was not optimal. Problems for the GC/MS effort were compounded by the fact that the Lawrence Livermore/Sandia sample load contained nearly three hundred volatile organic samples. (Our capacity for volatiles at that time was 30-60 volatile organic samples per month.) Our priority was to analyze local and Survey samples before expending the significant amount of time required to manually complete and assemble a CLP data package for QB7760. Thus, we never began to assemble QB7760.

QB8124 arrived on October 23, 1987. At that time we had analyzed only 15 of the semivolatiles prepared from the Lawrence Livermore/Sandia samples. The decision was made to send approximately three-fourths of the Lawrence Livermore/Sandia semivolatile sample preparation to other laboratories so that we could get ready for Survey samples from Argonne and adhere to all holding times. Thus QB8124 was prepared and analyzed, but the manual data treatment and package preparation could not be completed before the Survey samples from Argonne arrived (November 11, 1987 to November 23, 1987). Even with a larger staff, [2 persons in receiving/distribution/reporting; 3 persons in GC/MS; 3 persons in sample preparation plus the satellite laboratory for soils sample preparation; and 3 persons in the gas chromatography (pesticide/PCB) laboratory], much overtime was required to service local samples and complete the analysis of the Argonne Survey samples in the permitted time frame. The data gathering phase of the analysis of the Argonne samples was completed in late December 1987. At that time, much of our efforts had to be directed toward an audit by DOE/EPA which was scheduled for January 14-15, 1988. Since the next quarter QB was scheduled to arrive shortly (in January),

we decided not to complete the data package for QB8124, but rather to put our effort on the next (second quarter) QB sample.

QB8783 was received on January 25, 1988. It was submitted to the EPA on March 31, 1988.

QB9300 was received on April 28, 1988, and the results were submitted to the EPA on June 1, 1988. This was the first QB sample for which a great majority of the forms were processed electronically. During April and May 1988 the GC/MS staff (now consisting of four persons) received training in data processing from data system experts provided by the vendor that had supplied the data system. Since that time, data processing for complete packages (CLP) has progressed rapidly.

QB10015 was received on July 28, 1988, (during another audit/data review). Data packages for volatiles and semivolatiles have been assembled and are in the review process.

This memo is only an abbreviated history of our handling of the several QB samples that we have received. If I can provide further information, please let me know.

John Caton

J. E. Caton, 4500S, MS-6120 (4-4861)

JEC:db

cc: M. R. Guerin
P. L. Howell
W. R. Laing
W. D. Shults

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

FEB 07 1989

Mr. William R. Laing
Oak Ridge National Laboratory
P. O. Box 2008, 45005 MS-127
Oak Ridge, TN 37831

Dear Mr. Laing:

The results of the participation of your laboratory in the Environmental Monitoring Systems Laboratory-Las Vegas (EMSL-LV) first quarter Inorganic Performance Evaluation Study (QB1, FY89 Inorganic) are enclosed. This includes copies of the statistical information on the numbers of laboratories in the program that had difficulties with specific analytes.

For scores of less than 100 for each quarterly blind performance evaluation sample, the Department of Energy (DOE) Environmental Survey requires that the laboratory provide a formal response which would describe any changes or corrective actions that have been taken to improve analytical performance and eliminate deficiencies. That response will become a part of the quality assurance record for analytical work completed by the laboratory for sites in the DOE environmental survey. In order to meet delivery times for data document publication, please send your corrective action responses to Vincent Fayne at DOE Headquarters with copies sent to me at the EMSL-LV within 15 days of receipt of this letter.

This office will be glad to furnish any counsel and further information regarding this work.

Sincerely,

Harold A. Vincent FEB 13 1989

Distribution:
Reply needed for CAPA by Feb. 22.
W R Laing

Che
Quality

Enclosures

cc: (w/Enclosures)
Vincent Fayne, DOE HQ
Alan Crockett, INEL

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INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 89

LABORATORY NAME: Oak Ridge National (TN) [H2]
PERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
LABORATORY RANK: Above = 26 ; Same = 0 Below = 14

% Score: 86.7
REPORT DATE: 12/15/19
MATRIX: WATER

ELEMENT NAME	LAB RESULTS 95 % CI LOWER	UPPER	REPORTED VALUE	QUALIFIER CODE	PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	T #
ALUMINUM	433	617	553		0	3	0	0	0	
ANTIMONY	60.0	67	50	U	12	4	0	1	0	
ARSENIC	66	95	78.5		0	1	1	5	0	
BARIUM	340	425	386		0	1	0	0	0	
BERYLLIUM	135	162	153		0	2	0	1	0	
CADMIUM	151	184	168		0	5	0	1	0	
CALCIUM	d	d	1050	B	0	0	0	0	0	
CHROMIUM	62	79	72		0	1	0	0	1	
COBALT	172	225	196		0	0	0	0	0	
COPPER	171	208	192		0	3	0	0	0	
IRON	100.0	158	107		0	3	0	1	0	
LEAD	46	74	56.2		0	0	0	4	0	
MAGNESIUM	d	d	1260	B	0	0	0	0	0	
MANGANESE	149	185	163		0	2	0	1	0	
MERCURY	12	23	16		0	6	0	1	0	
NICKEL	100	141	118	E	0	0	0	0	0	
POTASSIUM	16200	20400	9700	X	1	5	0	0	0	
SELENIUM	26	40	36.4		0	2	0	3	1	
SILVER	c	c	6	U	0	0	0	6	1	
SODIUM	11700	14200	12550		1	3	0	0	0	
THALLIUM	51	77	61.2		0	4	1	2	1	
VANADIUM	101	127	113		0	2	0	0	0	
ZINC	56	93	71.6		0	2	0	1	0	

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 1
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 0
WATER :

OF DUPLICATES OUT: 0
WATER :

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 89

LABORATORY NAME: Oak Ridge National (TN) [H2]
PERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
LABORATORY RANK: Above = 26 Same = 0 Below = 14

% Score: 86.7
REPORT DATE: 12/15/1
MATRIX: SOIL

ELEMENT NAME	95 % CI LOWER	95 % CI UPPER	LAB RESULTS REPORTED VALUE	QUALIFIER CODE	#LABS NOT-ID	#LABS MIS-QUANT	PROGRAM DATA #LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT
ALUMINUM	6290	19500	13600		0	1	0	0	1
ANTIMONY	c	c	7.8	U	0	0	0	27	1
ARSENIC	3.8	10	6.6		0	5	0	9	2
BARIUM	164	209	177		0	1	0	0	0
BERYLLIUM	1.0	1.4	1.6	E X	8	2	0	0	0
CADMIUM	c	c	1.2		0	0	0	0	3
CALCIUM	42100	49700	47600		0	2	0	0	0
CHROMIUM	10	22	15.4	E	0	2	0	1	1
COBALT	10.0	14	10.8		1	1	0	0	0
COPPER	16	30	24.1		0	2	0	1	3
IRON	14600	20300	18800		0	0	0	0	0
LEAD	85	220	126		0	0	0	6	16
MAGNESIUM	2870	4570	4160		0	0	0	0	0
MANGANESE	567	698	741	E X	0	4	0	0	0
MERCURY	c	c	0.04	B	0	0	0	3	3
NICKEL	13	27	21.2	E	0	1	0	0	0
POTASSIUM	1080	3500	2572		1	2	0	0	0
SELENIUM	c	c	0.15	B	0	0	0	21	0
SILVER	c	c	0.9	U	0	0	0	7	0
SODIUM	d	d	229	B	0	0	0	0	0
THALLIUM	c	c	0.22	U	0	0	0	3	0
VANADIUM	15	39	29.9		0	1	0	1	0
ZINC	109	147	122		0	0	0	0	1

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 2
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 1
SOIL : Sb

OF DUPLICATES OUT: 0
SOIL :

NOTE

The Analytical Operations Branch of the Office of Emergency and Remedial Response requires that laboratories who have scores of under 90% detail the corrective action they plan to undertake. The laboratories must document in a letter to their Project Officer, Deputy Project Officer, and the EMSL-LV within two weeks of receipt of the results of this study, the source of the problem(s) and the corrective action(s) the laboratory plans to undertake to prevent the problem(s) from occurring in future quarterly Blind PE samples.

c CI WERE NOT SET SINCE 40 % OR MORE OF THE LABORATORIES SUBMITTED A NON-USABLE VALUE.
d CI NOT USED. SEE SCORING NOTES, PROCEDURE FOR GRADING U-VALUES NO. 4.
B INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL.
E INDICATES A VALUE ESTIMATED OR NOT REPORTED DUE TO THE PRESENCE OF INTERFERENCES.
S INDICATES VALUE DETERMINED BY THE METHOD OF STANDARD ADDITION.
* CORRELATION COEFFICIENT FOR THE MSA IS LESS THAN 0.995.
NR NOT REQUIRED.
U ANALYZED FOR BUT NOT DETECTED.
X VALUE WAS OUTSIDE BOTH THE WARNING AND THE ACTION LIMIT. POINTS DEDUCTED.
$ VALUE WAS OUTSIDE THE WARNING LIMIT ONLY. NO POINTS DEDUCTED.
- VALUE NOT SUBMITTED FOR THIS PARAMETER.
# INDICATES A FALSE POSITIVE BY DIXON'S TEST. POINTS DEDUCTED.
? BEST ESTIMATE OF VALUE AND/OR QUALIFIER. POOR COPY AND/OR ILLEGIBLE VALUE SUBMITTED.
< INDICATES A VALUE LESS THAN THE CRDL OR THE INSTRUMENT DETECTION LIMIT.
[] INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS B-FLAG.
() INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS B-FLAG.

SCORING NOTES:

CONFIDENCE INTERVALS (CI) WERE DERIVED FROM LABORATORY SUBMITTED VALUES. LESS THAN VALUES (<x), U-VALUES, AND NON-SUBMITTED VALUES (-) WERE NOT USED IN THE CALCULATION OF THE CI.

PROCEDURE FOR GRADING U-VALUES

1. ANY U-VALUE RESPONSE (INSTRUMENT DETECTION LIMIT) > CRDL FOR THE APPROPRIATE DILUTION, EVEN IF IT IS IN THE 95 % CI, CAUSES A POINT DEDUCTION. IF 25 % OR MORE OF THE LABORATORIES REPORT A U-VALUE OVER THE CRDL, NO POINTS ARE DEDUCTED FOR ANY LABORATORY, POSSIBLY INDICATING A MATRIX INTERFERENCE IN THE SAMPLE.

2. IF CRDL < LOWER CI, THEN USE CI AS SET.

3. IF LOWER CI < CRDL AND CRDL < UPPER CI, THEN SET LOWER CI TO ZERO (0). NO POINTS DEDUCTED FOR IDENTIFICATION OR QUANTITATION LESS THAN OR EQUAL TO THE CRDL.

4. IF CRDL > LOWER AND UPPER CI, THEN NO CI USED. PARAMETER DROPPED FROM THE SCORING. NO POINTS DEDUCTED FOR IDENTIFICATIONS OR QUANTITATIONS. FALSE POSITIVES POSSIBLE.

NOTE THAT ONLY CLP LABORATORIES WERE USED IN THE CALCULATION OF THE CI.

NOTE THAT A U-VALUE FOLLOWED BY X (U X) MEANS THAT POINTS WERE LOST FOR IDENTIFICATION AND QUANTITATION.

OAK RIDGE NATIONAL LABORATORY
OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2008
OAK RIDGE, TENNESSEE 37831

February 22, 1989

Vincent Fayne
USDOE
Forrestal Bldg, EH-24
Independence Ave., SW
Washington, DC 20585

Dear Mr. Fayne:

In response to ORNL's score of 86.7 for the QB-1 FY 89 Inorganic Performance Evaluation Study, the changes/corrective action are described below.

The result for potassium on the water sample was well below the 95% CI. It has been surmised that a dilution error was made, as all QC for this analysis was good. Greater care will be made in the future when dilutions are made. The soil sample results indicated that Be and Mn were slightly above the limits. An investigation is currently in progress to re-evaluate the interelement correction factors for these elements.

Sincerely,

Julia Thompson

Julia Thompson
ICP Spectroscopist

W. R. Laing

W. R. Laing
Program Manager

JKT:WRL:lp

cc: Harold Vincent

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

OCT 24 1988

Mr. William R. Laing
Oak Ridge National Laboratory
P. O. Box 2008, 45005 MS-127
Oak Ridge, TN 37831

Dear Mr. Laing:

The results of the participation of your laboratory in the EMSL-LV fourth quarter inorganic performance evaluation study (QB4, FY88, INORGANIC) are enclosed. This includes copies of the analysis reports for inorganics in soil and water samples. The reports also present statistical information on the numbers of laboratories that had difficulties with specific analytes.

The score for your laboratory was 89.5. The DOE environmental survey requires a formal response from each laboratory, describing any changes or actions taken to identify and correct any deficiencies and to improve laboratory performance. That response will become part of the quality assurance record for analytical work done by your laboratory for sites in the DOE environmental survey. In order to meet schedule times for data document publication, corrective action responses should be sent within 15 days of receipt of this letter.

This office will be glad to furnish any counsel and further information regarding this work.

Sincerely,

Harold A. Vincent

Harold A. Vincent
Chemist, Quality Assurance Research Branch
Quality Assurance and Methods Development Division

Enclosures

cc:
Vincent Fayne, DOE HQ
Alan Crockett, INEL

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INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 88

ORATORY NAME: Oak Ridge National (TN) [H2]
'ORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
NRATORY RANK: Above = 20 Same = 0 Below = 17

% Score: 89.5
REPORT DATE: 9/26/1988
MATRIX: WATER

	LAB RESULTS				PROGRAM DATA					
ENT NAME	95 % CI LOWER	95 % CI UPPER	REPORTED VALUE	QUALIFIER CODE	#LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
IINUM	725	930	839		0	6	0	0	0	38
IMONY	60.0	90	76		0	3	0	4	0	38
NIC	26	39	31.1		0	1	0	2	1	38
IUM	2790	3260	3070		0	2	0	0	0	38
LLIUM	30	40	36		0	0	0	0	0	38
IUM	6.9	13	9.8		0	4	0	1	0	38
IUM	5190	6270	5790		0	2	0	0	0	38
NIUM	31	49	45		0	4	0	0	0	38
LT	72	96	82		0	1	0	0	0	38
ER	60	100	83		0	2	0	0	0	38
	1600	1890	1690		0	2	0	2	0	38
	54	77	48.8	X	0	0	0	2	2	38
ESIUM	7840	9040	8400		0	1	0	0	0	38
ANESE	46	57	54		0	2	0	0	0	38
URY	6.3	10	8.7		0	5	0	0	0	38
EL	113	163	137		0	3	0	0	1	38
SSIUM	8380	10700	9150		0	2	0	0	0	38
NIUM	11	19	15.5		0	0	0	5	1	38
ER	10.0	15	8.3	B	15	1	0	2	1	38
UM	17100	22100	20300		0	3	0	0	0	38
LIUM	29	50	35.6		1	4	0	5	3	38
DIUM	54	69	72	X	0	6	0	0	0	38
	30	59	70	X	0	6	0	0	1	38

ELEMENTS NOT-IDENTIFIED: 0
ELEMENTS MIS-QUANTIFIED: 3
FALSE POSITIVES: 0

MATRIX SPIKES OUT: 0
: :

DUPLICATES OUT: 0
:

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 88

ORATORY NAME: Oak Ridge National (TN) [H2]
FORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
ORATORY RANK: Above = 20 Same = 0 Below = 17

% Score: 89.5
REPORT DATE: 9/26/1988
MATRIX: SOIL

MENT NAME	95 % CI LOWER	95 % CI UPPER	LAB RESULTS REPORTED VALUE	LAB RESULTS QUALIFIER CODE	PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
UMINUM	4630	17500	12000		0	1	0	0	1	38
TIMONY	12.0	58	21		3	2	0	27	0	38
SENIC	242	378	318		0	6	0	2	2	38
RIUM	94	146	119		0	3	0	1	0	38
RYLLIUM	4.4	7.7	7.1	E	1	2	0	2	0	38
DMIUM	13	20	15	E	0	7	0	2	0	38
LCIUM	49000	61300	56800		0	4	0	0	0	38
ROMIUM	42	63	49	E	0	2	0	1	0	38
BALT	35	58	47		0	4	0	1	0	38
PPER	1710	2100	1800		0	4	0	0	0	38
ON	13500	26000	20500		0	4	0	0	0	38
AD	302	412	336		0	5	0	2	1	38
GNESIUM	29900	37900	35100		0	3	0	0	0	38
NGANESE	4310	5660	5240		0	4	0	1	0	38
RCURY	1.9	4.4	3.9		0	2	0	0	1	38
CKEL	20	50	36		0	2	0	1	0	38
TASSIUM	1000.0	1440	1026		0	5	0	0	0	38
LENIUM	4.8	16	11.5		1	3	0	4	2	38
LVER	3.8	10	8.2		0	4	0	5	2	38
DIUM	d	d	290	B	0	0	1	0	0	38
ALLIUM	6.5	14	10		1	3	0	6	0	38
ADIUM	24	58	41	E	0	2	0	1	0	38
NC	206	338	268		0	3	0	5	0	38

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 0
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 2
IL : Sb, Ag

OF DUPLICATES OUT: 0
IL :

CONFIDENCE INTERVALS (CI) WERE DERIVED FROM LABORATORY SUBMITTED VALUES. LESS THAN VALUES (<x), ESTIMATED VALUES ([x]), E-VALUES, U-VALUES, AND NON-SUBMITTED VALUES (-) WERE NOT USED IN THE CALCULATION OF THE CI.

d CI NOT USED. SEE SCORING NOTES, PROCEDURE FOR GRADING U-VALUES NO. 4.
A INDICATES AN OUTLIER FROM GRUBB'S TEST. NOT USED IN THE CALCULATION OF THE CI. POINTS DEDUCTED.
B INDICATES THAT THE COMPOUND WAS FOUND IN THE BLANK.
E INDICATES A VALUE ESTIMATED OR NOT REPORTED DUE TO THE PRESENCES OF INTERFERENCE. EXPLANATORY INCLUDED ON THE COVER PAGE.
S INDICATES VALUE DETERMINED BY METHOD OF STANDARD ADDITION.
U ANALYZED FOR BUT NOT DETECTED.
X VALUE WAS OUTSIDE BOTH THE WARNING AND THE ACTION LIMIT. POINTS DEDUCTED.
VALUE WAS OUTSIDE THE WARNING LIMIT ONLY. NO POINTS DEDUCTED.
- VALUE NOT SUBMITTED FOR THIS PARAMETER.
* INDICATES A FALSE POSITIVE BY DIXON'S TEST. POINTS DEDUCTED.
? BEST ESTIMATE OF VALUE AND/OR QUALIFIER. POOR COPY SUBMITTED.
WARNING LIMIT (90 PERCENT CI).
ACTION LIMIT (95 PERCENT CI).

SCORING NOTES: PROCEDURE FOR GRADING U-VALUES

1. ANY U-VALUE RESPONSE (LABORATORY DETECTION LIMIT) > CRDL, EVEN IF IT IS IN THE 95 % CI, CAUSES A POINT DEDUCTION. IF 25 % OR MORE OF THE LABORATORIES REPORT A U-VALUE OVER THE CRDL, THEN NO POINTS ARE DEDUCTED FOR ANY LABORATORY. THIS COULD INDICATE A MATRIX INTERFERENCE IN THE SAMPLE.

2. IF CRDL < LOWER CI, THEN USE CI AS SET.

3. IF LOWER CI < CRDL AND CRDL < UPPER CI, THEN SET LOWER CI TO ZERO (0). NO POINTS DEDUCTED FOR IDENTIFICATION OR QUANTITATION LESS THAN OR EQUAL TO THE CRDL.

4. IF CRDL > LOWER AND UPPER CI, THEN NO CI USED. ANALYTE DROPPED FROM THE SCORING. NO POINTS DEDUCTED FOR IDENTIFICATIONS OR QUANTITATIONS. FALSE POSITIVES POSSIBLE.

NOTE THAT ONLY CLP LABORATORIES WERE USED IN THE CALCULATION OF THE CI.

NOTE THAT A U-VALUE FOLLOWED BY X (U X) MEANS THAT POINTS WERE LOST FOR IDENTIFICATION AND QUANTITATION.

NOTE

The Analytical Operations Branch of the Office of Emergency and Remedial Response requires that laboratories who have scores of under 90% detail the corrective action they plan to undertake. These laboratories must document in a letter to their Project Officer, Deputy Project Officer, and the EMSL-LV within two weeks of receipt of the results of this study, the source of the problem(s) and the corrective action(s) form occurring in future Quarterly Blind PE samples.

OAK RIDGE NATIONAL LABORATORY
OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2008
OAK RIDGE, TENNESSEE 37831

XC

November 2, 1988

Vincent Fayne
USDOE
Forrestal Bldg, EH-24
Independence Ave., SW
Washington, DC 20585

Harold Vincent
EMSL-LV
P. O. Box 93478
Las Vegas, NV 89193-3478

Gentlemen:

Oak Ridge National Laboratory participated in the EMSL-LV fourth quarter inorganic performance evaluation study (QB4, FY88, INORGANIC) receiving a score of 89.5. It is assumed, no detailed score sheet was received, that points were deducted for mis-quantification of lead (GFAAS), vanadium (ICP), and zinc (ICP) in the WATER sample. Additional points were deducted for matrix spike noncompliance results for antimony (ICP) and silver (ICP) in the SOIL sample.

Poor spike recovery for antimony in soil digestions continues to be a problem. As mentioned in previous response letters, the digestion technique is being evaluated. No progress has been made in correcting the problem as of this date. Recoveries for silver in soil digestions have never been a problem in the past, and no clear reason for the QB4 noncompliance has been found. Silver analyses will be monitored carefully during future DOE Site Survey work.

Vanadium on the JY48 suffers from adjacent channel interference from the strong emitter magnesium which cannot be accommodated using software driven interelement correction. Manual correction is required. A service call is expected shortly and this situation will be evaluated again.

It is believed that the poor zinc performance is a result of contamination during digestion, as the calibration verification and 2XCRDL standard results were in compliance. Greater effort will be made to ensure that digestion vessels and glass pipets are contamination free before use and that handling during digestion does not result in contamination.

All quality control parameters for lead analysis in the WATER sample were in compliance throughout the run. The sample was diluted to bring the observed result within the calibration range of the instrument and it is felt that the error stems from improper pipeting. Greater care will be taken in the future to ensure that pipets are calibrated and functioning properly.

Please call if you have any questions.

Sincerely,

Katherine Whaley

Katherine Whaley
ICP Spectroscopist

WR Laing

William Laing
Program Manager

cc: R. B. Fitts

BCC: Whaley
Ferguson
Halladay
Harwell
Bobrowicz

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

JUL 15 1988

Mr. William R. Laing
Oak Ridge National Laboratory
P. O. Box 2008, 45005 MS-127
Oak Ridge, TN 37831

Dear Mr. Laing:

The results of the participation of your laboratory in the EMSL-LV third quarter inorganic performance evaluation study (QB3, FY88, Case Number 9302) are enclosed. This includes copies of the analysis reports for inorganics in soil and water samples. the reports also present statistical information on the numbers of laboratories having difficulties with specific analytes.

The score for your laboratory is higher than 90 so that no formal response is required describing any changes or corrective actions taken to improve the performance evaluation score. However, it is still prudent for your laboratory to examine all factors affecting the scoring and take any actions which would improve those scores.

This office will be glad to furnish any council and further information regarding this work.

Sincerely,

Harold A. Vincent

Harold A. Vincent,
Chemist, Quality Assurance Research Branch
Quality Assurance and Methods Development Division

Enclosures

cc: (w/enclosure)
D. K. Knight, DOE HQ

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INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 88

ABORATORY NAME: Oak Ridge National (TN) [C3]
ERFORMANCE LEVEL: ACCEPTABLE
ABORATORY RANK: Above = 6 Same = 1 Below = 30

% Score: 96.3
REPORT DATE: 6/15/1988
MATRIX: WATER

LEMENT NAME	95 % CI LOWER	95 % CI UPPER	LAB RESULTS REPORTED VALUE	QUALIFIER CODE	#LABS NOT-ID	#LABS MIS-QUANT	PROGRAM DATA #LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
LUMINUM	1790	2190	1960		0	3	0	0	0	38
NTIMONY	86	156	115		2	3	0	3	0	38
RSENIC	40	58	48.6		0	1	0	5	3	38
RIUM	265	331	314		0	3	0	1	0	38
RYLLIUM	5.0	6.7	5.9		2	1	0	0	0	38
DMIUM	65	82	79		0	2	0	1	0	38
LCIUM	8970	11000	10400		0	3	0	0	0	38
ROMIUM	90	117	111		0	2	0	0	0	38
BALT	61	87	78		0	1	0	0	0	38
PPER	126	170	154		0	3	0	1	0	38
ON	492	621	568		0	1	0	0	1	38
AD	5.0	7.5	5.2		3	8	0	4	2	38
GNESIUM	5740	6770	6940	X	0	4	0	0	0	38
NGANESE	35	50	46		0	2	0	0	0	38
RCURY	2.8	5.2	4.3		0	0	0	4	1	38
CKEL	48	85	70		0	4	0	1	0	38
TASSIUM	6700	8220	7800		0	4	0	0	0	38
LENIUM	39	62	54.6		0	1	0	0	2	38
VER	10.0	15	11		13	2	0	4	3	38
DIUM	8970	10900	10700		0	4	0	0	0	38
LLIUM	17	31	21.4		1	4	0	7	0	38
ADIUM	64	93	87		0	1	0	0	0	38
C	124	178	166		0	2	0	0	0	38

F ELEMENTS NOT-IDENTIFIED: 0
F ELEMENTS MIS-QUANTIFIED: 1
F FALSE POSITIVES: 0

F MATRIX SPIKES OUT: 0
ER :

DUPLICATES OUT: 0
R :

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 88

LABORATORY NAME: Oak Ridge National (TN) [C3]
PERFORMANCE LEVEL: ACCEPTABLE
LABORATORY RANK: Above = 6 Same = 1 Below = 30

% Score: 96.3
REPORT DATE: 6/15/1988
MATRIX: SOIL

ELEMENT NAME	95 % CI LOWER	95 % CI UPPER	LAB RESULTS REPORTED VALUE	LAB RESULTS QUALIFIER CODE	PROGRAM DATA #LABS NOT-ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TO #L
ALUMINUM	8310	16200	13000		0	3	0	0	0	
ANTIMONY	c	c	10	U	0	0	0	27	1	
ARSENIC	2.0	2.3	1.4	B	7	7	0	4	2	
BARIUM	40.0	57	50		0	0	0	3	0	
BERYLLIUM	c	c	0.48	B	0	0	1	1	0	
CADMIUM	c	c	0.98		0	0	1	0	1	
CALCIUM	1000.0	4150	2570		0	0	0	0	0	
CHROMIUM	13	34	23		0	1	0	2	0	
COBALT	d	d	6.4		0	0	0	0	0	
COPPER	8.9	22	15		0	1	0	1	0	
IRON	8720	19000	14300		0	1	0	0	0	
LEAD	3.2	7.1	4.8		1	3	0	8	5	
MAGNESIUM	3340	5550	4520		0	3	0	0	0	
MANGANESE	171	282	237		0	3	0	3	1	
MERCURY	c	c	0.04	B	0	0	2	2	2	
NICKEL	24	45	35		0	2	0	1	0	
POTASSIUM	d	d	355	B	0	0	1	0	0	
SELENIUM	c	c	0.25	U	0	0	0	12	0	
SILVER	c	c	1	U	0	0	1	9	1	
SODIUM	d	d	163	B	0	0	0	0	0	
THALLIUM	c	c	0.14	U	0	0	1	3	1	
VANADIUM	17	53	38	E	0	3	0	0	0	
ZINC	31	59	49		0	0	0	1	3	

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 0
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 1
SOIL : Sb

OF DUPLICATES OUT: 0
SOIL :

c CI WERE NOT SET SINCE 40 % OR MORE OF THE LABORATORIES SUBMITTED A NON-USABLE VALUE.
d CI NOT USED. SEE SCORING NOTES, PROCEDURE FOR GRADING U-VALUES NO. 4.
B INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL.
E INDICATES A VALUE ESTIMATED OR NOT REPORTED DUE TO THE PRESENCE OF INTERFERENCES.
S INDICATES VALUE DETERMINED BY THE METHOD OF STANDARD ADDITION.
NR NOT REQUIRED.
U ANALYZED FOR BUT NOT DETECTED.
X VALUE WAS OUTSIDE BOTH THE WARNING AND THE ACTION LIMIT. POINTS DEDUCTED.
0 VALUE WAS OUTSIDE THE WARNING LIMIT ONLY. NO POINTS DEDUCTED.
- VALUE NOT SUBMITTED FOR THIS PARAMETER.
+ INDICATES A FALSE POSITIVE BY DIXON'S TEST. POINTS DEDUCTED.
? BEST ESTIMATE OF VALUE AND/OR QUALIFIER. POOR COPY AND/OR ILLEGIBLE VALUE SUBMITTED.
< INDICATES A VALUE LESS THAN THE CRDL OR THE INSTRUMENT DETECTION LIMIT.
[] INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS B-FLAG.
() INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS B-FLAG.

SCORING NOTES:

CONFIDENCE INTERVALS (CI) WERE DERIVED FROM LABORATORY SUBMITTED VALUES. LESS THAN VALUES (<x), U-VALUES, AND NON-SUBMITTED VALUES (-) WERE NOT USED IN THE CALCULATION OF THE CI.

PROCEDURE FOR GRADING U-VALUES

1. ANY U-VALUE RESPONSE (INSTRUMENT DETECTION LIMIT) > CRDL FOR THE APPROPRIATE DILUTION, EVEN IF IT IS IN THE 95 % CI, CAUSES A POINT DEDUCTION. IF 25 % OR MORE OF THE LABORATORIES REPORT A U-VALUE OVER THE CRDL, NO POINTS ARE DEDUCTED FOR ANY LABORATORY, POSSIBLY INDICATING A MATRIX INTERFERENCE IN THE SAMPLE.

2. IF CRDL < LOWER CI, THEN USE CI AS SET.

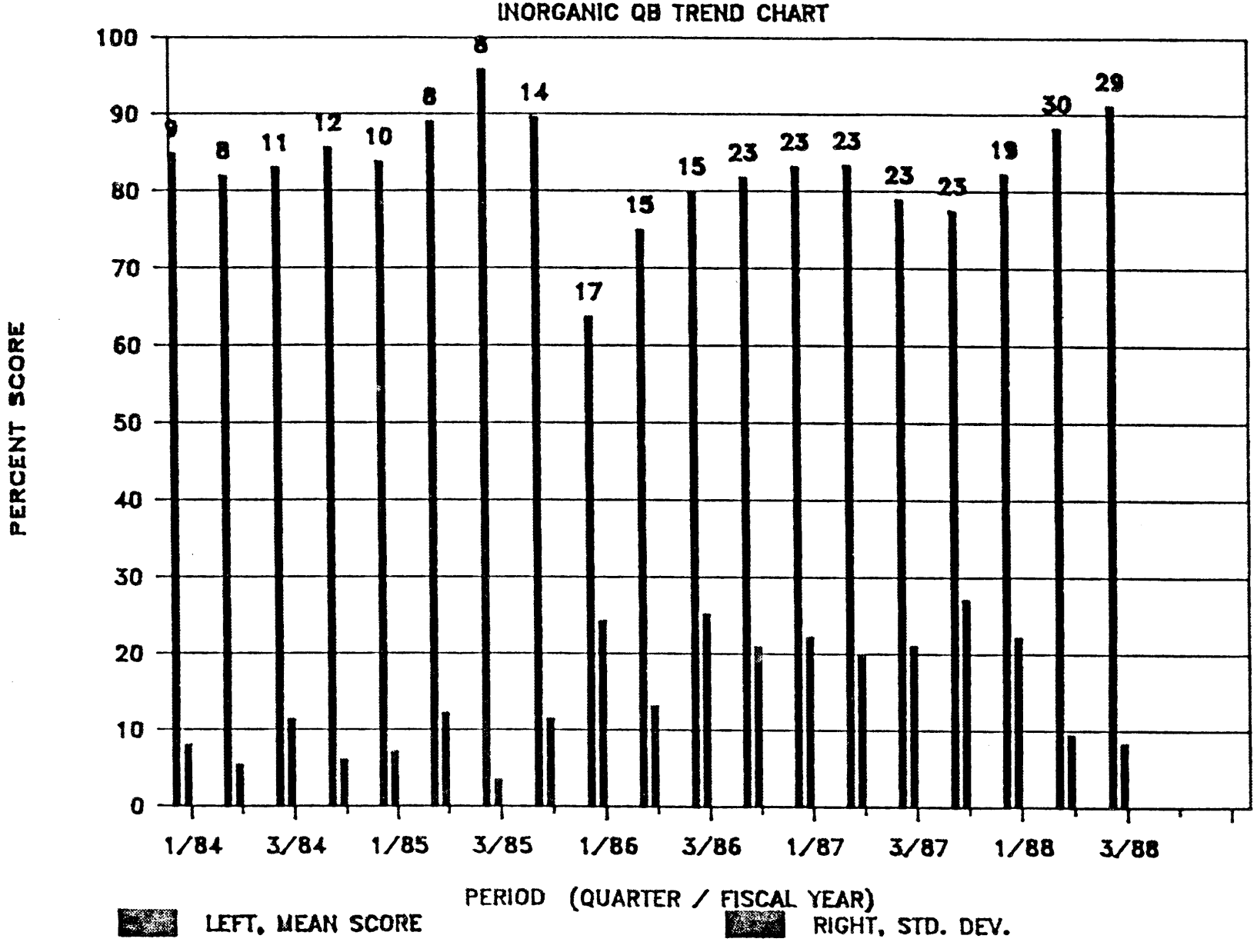
3. IF LOWER CI < CRDL AND CRDL < UPPER CI, THEN SET LOWER CI TO ZERO (0). NO POINTS DEDUCTED FOR IDENTIFICATION OR QUANTITATION LESS THAN OR EQUAL TO THE CRDL.

4. IF CRDL > LOWER AND UPPER CI, THEN NO CI USED. PARAMETER DROPPED FROM THE SCORING. NO POINTS DEDUCTED FOR IDENTIFICATIONS OR QUANTITATIONS. FALSE POSITIVES POSSIBLE.

NOTE THAT ONLY CLP LABORATORIES WERE USED IN THE CALCULATION OF THE CI.

NOTE THAT A U-VALUE FOLLOWED BY X (U X) MEANS THAT POINTS WERE LOST FOR IDENTIFICATION AND QUANTITATION.

PERFORMANCE EVALUATION STUDIES



Enclosure 1A

For your convenience included here are:

1) Scoring System
2) Footnotes
3) Your ILSR

The Analytical Operations Branch of the Office of Emergency and Remedial Response requires that laboratories who have scores of under 90 percent detail the corrective action they plan to undertake. These laboratories must document in a letter to their Project Officer, Deputy Project Officer, and the EMSL-LV within two weeks of receipt of the results of this study, the source of the problem(s) and the corrective action(s) the laboratory plans to undertake to prevent the problem(s) from ocurring in future Quarterly Blind PE samples.

ATTACHMENT 1

The following information explains the details about the Individual Laboratory Summary Report, Program Summary Report, Summary of Laboratory Scores, and specific information about the scoring procedures.

The Scoring Procedures

The confidence interval (CI) calculation and the scoring algorithm are the intrinsic parts of the Quarterly Blind (QB) study. At present, the 95 percent CI are calculated from CLP laboratory-submitted results. All reported results are compared to the CI. Elements that were found to be not identified, mis-quantified and reported false positives are flagged and used in the calculation of the score. False positives are values at exceedingly high concentrations which can be caused by contamination or interference. In addition, matrix spike accuracy and duplicate precision are included in the scoring. Other details are explained in the footnotes which accompany the Individual Laboratory Summary Report.

Confidence intervals were calculated from the laboratory-submitted values using the statistical procedure Biweight which does not generate outliers. Instead, the laboratory-reported results are weighted relative to their position from the mean.

The following equation is used to calculate the percent score (% score) for each laboratory.

$$\% \text{ Score} = 100 - (5A_w + B_w + 2C_w) - (5A_s + B_s + 2C_s) - 0.5S - D$$

where A = number of mis-identifications

$$B = \left[1 - \left[\frac{T - x}{T}\right]^{1.5}\right] * 50$$

T = total number of elements
x = number of mis-quantitations
C = number of false positives
S = number of matrix spikes outside the criteria
D = number of duplicates outside the criteria
w = water matrix
s = soil matrix

The Scoring Procedures (continues)

The following scoring categories are recommended by the Environmental Monitoring System Laboratory, Las Vegas (EMSL-LV) under the directive of the National Program Office:

1. 100 to 90 percent - Acceptable Performance, No Corrective Action Necessary

2. 90 to 75 percent - Acceptable Performance, Corrective Action Necessary

3. below 75 percent - Unacceptable Performance, Corrective Action Mandatory

A score below 75% results in the failure of a performance evaluation (PE) sample.

Individual Laboratory Summary Report

Header / Qualifier	Explanation
LABORATORY NAME	laboratory name and location (state) and assigned alpha-numeric code
PERFORMANCE LEVEL	laboratory performance falls into one of three (3) categories:
	ACCEPTABLE — % score greater than or equal to 90
	ACCEPTABLE - Corrective Action Necessary — % score greater than or equal to 75 and less than 90
	UNACCEPTABLE - Corrective Action Mandatory — % score is less than 75
LABORATORY RANK	comparison of CLP laboratories only for which a % score was calculated
	Above — number of laboratories whose % score is greater than the laboratory's % score
	Same — number of laboratories whose % score is the equal to the laboratory's % score
	Below — number of laboratories whose % score is less than the laboratory's % score
% SCORE	percent score calculated using the scoring equation
REPORT DATE	date that the Individual Laboratory Summary report is printed and in the format, month/day/year (for example, 1/23/88)
MATRIX	sample matrix (water or soil)

Individual Laboratory Summary Report (Continued)

Header / Qualifier	Explanation
ELEMENT NAME	the 23 target analytes required by the Statement of Work
95 % CI	95 percent confidence interval (CI) calculated for each element using the Biweight procedure with CLP laboratory-submitted results
LOWER	lower limit of CI
UPPER	upper limit of CI
LAB RESULTS	laboratory-reported values and qualifiers
REPORTED VALUE	laboratory-reported concentration
QUALIFIER CODE	laboratory-reported qualifier(s) pertaining to the preceding value
PROGRAM DATA	pertains to only CLP laboratory-submitted values
# LABS NOT ID	number of CLP laboratories which did not identified the element
# LABS MIS-QUANT	number of CLP laboratories which mis-quantified the element
# LABS FALSE POS	number of CLP laboratories which reported the element at an exceedingly high concentration
MSPK OUT	number of matrix spike recoveries outside the criteria
DUP OUT	number of duplicates (RPDs) outside the criteria
TOTAL # LABS	number of CLP laboratories whose values were used in the statistical study of the program data

Individual Laboratory Summary Report (continued)

Header / Qualifier	Explanation
# OF ELEMENTS NOT IDENTIFIED	number of elements was not identified by the laboratory
# OF ELEMENTS MIS-QUANTIFIED	number of elements mis-quantified by the laboratory
# OF FALSE POSITIVES	number of elements reported at an exceedingly high concentration by the laboratory
# OF MATRIX SPIKE OUT	number of matrix spike recoveries outside the criteria and the element(s)
# DUPLICATES OUT	number of duplicates (RPDs) outside the criteria and the element(s)

Program Summary Report

Header / Qualifier	Explanation
MATRIX	sample matrix (water or soil)
REPORT DATE	date that the Program Summary Report is printed and in the format, month/day/year (MM/DD/YY)
ELEMENT DATA	element data generated with CLP laboratory-submitted results
ELEMENT NAME	the 23 elements required by the Statement of Work
SPIKE LEVEL	the level spiked into the sample
95 % CI	95 percent confidence interval (CI) calculated for each element using the Biweight procedure with CLP laboratory-submitted results
LOWER	lower limit of CI
UPPER	upper limit of CI
MEAN RESULT	average/mean of the values used in the calculation of the CI
STANDARD DEVIATION	standard deviation of the values used in the calculation of the CI
PROGRAM DATA	pertains to only CLP laboratory-submitted values
# LABS NOT ID	number of CLP laboratories which did not identified the element
# LABS MIS-QUANT	number of CLP laboratories which mis-quantified the element
# LABS FALSE POS	number of CLP laboratories which reported the element at an exceedingly high concentration
MSPK OUT	number of matrix spike recoveries outside the criteria
DUP OUT	number of duplicates (RPDs) outside the criteria

Program Summary Report (continues)

Header / Qualifier	Explanation
TOTAL # LABS	number of CLP laboratories whose values were used in the statistical study of the program data
# OF LABS WITH ACCEPTABLE PERFORMANCE	number of CLP laboratories whose % score is greater than or equal to 90
# OF LABS WITH ACCEPTABLE PERFORMANCE - CORRECTIVE ACTION NECESSARY	number of CLP laboratories whose % score is greater than or equal to 75 and less than 90
# OF LABS WITH UNACCEPTABLE PERFORMANCE - CORRECTIVE ACTION MANDATORY	number of CLP laboratories whose % score is less than 75

Summary of Laboratory Scores

Header / Qualifier	Explanation
LAB NAME	SMO assigned laboratory lab code
CODE	assigned alpha-numeric laboratory code
SCORE	% score calculated for each laboratory
NOT ID	number of elements was not identified (the "A" in the % Score equation)
MIS-QUANT	number of elements mis-quantified (the "B" in the % Score equation)
FALSE POS	number of false positives reported (the "C" in the % Score equation)
MSPK OUT	number of matrix spike recoveries outside the criteria (the "S" in the % Score equation)
DUP OUT	number of duplicates (RPDs) outside the criteria (the "D" in the % Score equation)

QB 3 FY 88 INORGANIC, CASE NO. 9302

c CI WERE NOT SET SINCE 40 % OR MORE OF THE LABORATORIES SUBMITTED A NON-USABLE VALUE.
d CI NOT USED. SEE SCORING NOTES, PROCEDURE FOR GRADING U-VALUES NO. 4.
B INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL.
E INDICATES A VALUE ESTIMATED OR NOT REPORTED DUE TO THE PRESENCE OF INTERFERENCES.
S INDICATES VALUE DETERMINED BY THE METHOD OF STANDARD ADDITION.
NR NOT REQUIRED.
U ANALYZED FOR BUT NOT DETECTED.
X VALUE WAS OUTSIDE BOTH THE WARNING AND THE ACTION LIMIT. POINTS DEDUCTED.
0 VALUE WAS OUTSIDE THE WARNING LIMIT ONLY. NO POINTS DEDUCTED.
- VALUE NOT SUBMITTED FOR THIS PARAMETER.
+ INDICATES A FALSE POSITIVE BY DIXON'S TEST. POINTS DEDUCTED.
? BEST ESTIMATE OF VALUE AND/OR QUALIFIER. POOR COPY AND/OR ILLEGIBLE VALUE SUBMITTED.
< INDICATES A VALUE LESS THAN THE CRDL OR THE INSTRUMENT DETECTION LIMIT.
[] INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS B-FLAG.
() INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS B-FLAG.

SCORING NOTES:

CONFIDENCE INTERVALS (CI) WERE DERIVED FROM LABORATORY SUBMITTED VALUES. LESS THAN VALUES (<x), U-VALUES, AND NON-SUBMITTED VALUES (-) WERE NOT USED IN THE CALCULATION OF THE CI.

PROCEDURE FOR GRADING U-VALUES

1. ANY U-VALUE RESPONSE (INSTRUMENT DETECTION LIMIT) > CRDL FOR THE APPROPRIATE DILUTION, EVEN IF IT IS IN THE 95 % CI, CAUSES A POINT DEDUCTION. IF 25 % OR MORE OF THE LABORATORIES REPORT A U-VALUE OVER THE CRDL, NO POINTS ARE DEDUCTED FOR ANY LABORATORY, POSSIBLY INDICATING A MATRIX INTERFERENCE IN THE SAMPLE.

2. IF CRDL < LOWER CI, THEN USE CI AS SET.

3. IF LOWER CI < CRDL AND CRDL < UPPER CI, THEN SET LOWER CI TO ZERO (0). NO POINTS DEDUCTED FOR IDENTIFICATION OR QUANTITATION LESS THAN OR EQUAL TO THE CRDL.

4. IF CRDL > LOWER AND UPPER CI, THEN NO CI USED. PARAMETER DROPPED FROM THE SCORING. NO POINTS DEDUCTED FOR IDENTIFICATIONS OR QUANTITATIONS. FALSE POSITIVES POSSIBLE.

NOTE THAT ONLY CLP LABORATORIES WERE USED IN THE CALCULATION OF THE CI.

NOTE THAT A U-VALUE FOLLOWED BY X (U X) MEANS THAT POINTS WERE LOST FOR IDENTIFICATION AND QUANTITATION.

OAK RIDGE NATIONAL LABORATORY
OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2008
OAK RIDGE, TENNESSEE 37831

September 21, 1988

Randal Scott
Sampling & Analysis Program Manager
Office of Environmental Audit and Compliance
US Dept. of Energy
Forrestal Bldg.
1000 Independence Ave.
Washington, DC 20585

Dear Randal:

The score received by Oak Ridge National Laboratory, X-10, for the QB3-FY88 inorganic performance evaluation study was 96.3 percent. Points were deducted for mis-quantification of magnesium in the water sample and for nonconformance antimony spike results in the soil sample.

Associated calibration verification data for both elements were in control throughout analysis. Analysis results for re-digested QB2-FY88 water sample were within the control limits for magnesium. Assuming no instrument glitch at time of analysis, the problem would seem to be contamination at either/or both the preparation and/or analysis stages. We will more carefully clean our glassware and work spaces in the future.

In the case of antimony, the spike recovery for the water sample was in control. Historically we have had problems with loss of antimony during soil digestions involving the CLP procedure. Efforts are ongoing to ascertain at what point in the digestion the loss occurs.

Sincerely,

Katherine Whaley

Katherine Whaley
ICP Spectroscopist

W R Laing

W. R. Laing
DOE Site Survey Program Manager
Analytical Chemistry Division

KSW:WRL:lp

cc: Harold Vincent

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

APR 12 1988

Mr. W. R. Laing
Oak Ridge National Laboratory
Building 4500 S. MS-131
Oak Ridge, TN 37831-6107

Dear Mr. Laing:

The results of the participation of your laboratory in the EMSL-LV ~~first~~ second quarter inorganic performance evaluation study (QB2, FY88, Case Number 8782) are enclosed. This includes copies of the analysis reports for inorganics in soil and water samples and a comparison table showing the distribution of scores of all laboratories participating. The number of misses for each element is also listed.

This office will be glad to furnish any council and further information regarding this work.

Sincerely,

Harold A. Vincent

Harold A. Vincent,
Chemist, Quality Assurance Research Branch
Quality Assurance and Methods Development Division

Enclosures

APR 20 1988

cc:
Pamela Howell

cc:(w/o encl
D. K. Knight,

Price
Bobrowski
Whaley
~~Hackney~~
Ferguson
Herndon
Muscle
Shults

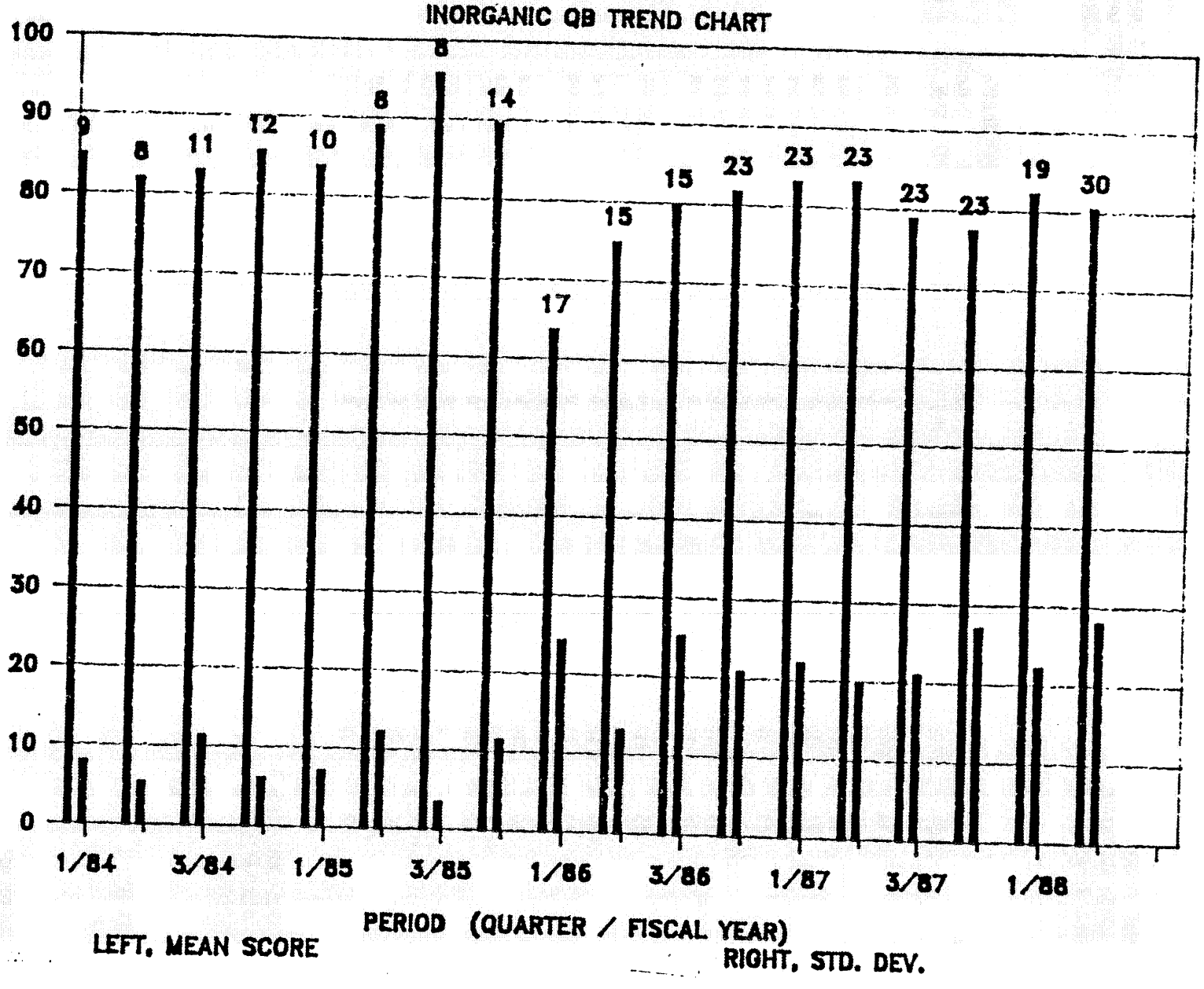
Another good PE score!
Rerun this PE with the new QB3 which has just been received. You will be able to compare results with those reported here.
W R Laing

Enclosure 1A

The EMSL-LV is adhering to the National Program Office guidelines with the following requirement. For each parameter which you failed to correctly identify or quantitate or which you reported as a false positive (parameters not added into this PE sample, but found by your laboratory at concentrations exceeding contract requirements), please document in a letter to your Project Officer, Deputy Project Officer and myself within two weeks of receipt of this letter, the source of the problem(s) and the corrective action(s) taken to prevent the problem from occurring in future quarterly blind PE samples.

Details of the new scoring procedure are shown on the following "Attachment 1." For your convenience, included here is the Individual Laboratory Summary Report (ILSR) for your laboratory and a graphical programmatic summary of scores.

PERFORMANCE EVALUATION STUDIES



Ave. for 30 labs was 80, our score was 94.1

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR OB 2 FY 88

LABORATORY NAME: ORNL
PERFORMANCE LEVEL: ACCEPTABLE
LABORATORY RANK: Above = 11 Same = 1 Below = 18

% Score: 94.1
REPORT DATE: 3/23/1988
MATRIX: WATER

ELEMENT NAME	95 % CI LOWER	95 % CI UPPER	LAB RESULTS REPORTED VALUE	QUALIFIER CODE	PROGRAM DATA #LABS MIS ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTAL #LABS
ALUMINUM	2540	3300	2990		0	1	0	0	0	31
ANTIMONY	0	111	82.9		3	0	0	1	3	31
ARSENIC	68	106	89.6		0	1	0	0	0	31
BARIUM	372	450	691	X	0	4	0	0	1	31
BERYLLIUM	38	51	44.7		0	1	0	0	0	31
CADMIUM	19	32	27.4	E	0	0	0	0	1	31
CALCIUM	12300	15500	14600		0	2	0	0	0	31
CHROMIUM	14	40	33		0	0	0	0	1	31
COBALT	66	113	91.7	E	0	0	0	0	0	31
COPPER	180	244	213		0	2	0	1	2	31
IRON	355	442	430	E	0	4	0	0	0	31
LEAD	12	25	17.7		0	0	0	3	2	31
MAGNESIUM	7830	9600	8970		0	2	0	0	0	31
MANGANESE	62	81	73.1	E	0	1	0	0	0	31
MERCURY	10	20	15.6		0	2	0	1	1	31
NICKEL	86	126	107		0	1	0	0	1	31
POTASSIUM	8810	12400	10600		0	2	0	0	0	31
SELENIUM	18	28	26		0	2	0	1	0	31
SILVER	c	c	9.5	B	0	0	0	5	0	31
SODIUM	6100	8320	7150		0	5	0	0	0	31
THALLIUM	51	88	58.8		0	1	0	7	1	31
VANADIUM	118	154	148		0	1	0	1	0	31
ZINC	47	66	57		0	5	0	1	2	31

OF ELEMENTS NOT IDENTIFIED: 0
OF ELEMENTS MISQUANTIFIED: 1
OF FALSE POSITIVES: 0

OF DUPLICATES OUT: 2
WATER : Sb, Ba
SOIL :

OF MATRIX SPIKES OUT: 1
WATER :
SOIL : Sb

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 88

Our score

LABORATORY NAME: ORNL
PERFORMANCE LEVEL: ACCEPTABLE
LABORATORY RANK: Above = 11 Same = 1 Below = 18

% Score: 94.1
REPORT DATE: 3/23/1988
MATRIX: SOIL

ELEMENT NAME	95 % CI LOWER	95 % CI UPPER	LAB RESULTS REPORTED VALUE	LAB RESULTS QUALIFIER CODE	PROGRAM DATA #LABS MIS ID	#LABS MIS-QUANT	#LABS FALSE POS	#LABS MSPK OUT	#LABS DUP OUT	TOTA #LAB
ALUMINUM	4790	11900	9690		0	2	0	0	0	31
ANTIMONY	0	53	33		3	3	0	20	0	31
ARSENIC	17	28	21.8		0	4	0	7	1	31
BARIUM	156	189	169		0	3	0	1	0	31
BERYLLIUM	16	21	18		0	0	0	1	0	31
CADMIUM	9.7	17	13.1		0	0	0	1	0	31
CALCIUM	75301	104001	90700		0	2	0	0	0	31
CHROMIUM	16	51	30.8		0	2	0	8	0	31
COBALT	71	92	75.3	E	0	1	0	0	0	31
COPPER	88	112	94.5		0	3	0	1	0	31
IRON	12600	17400	15300	E	0	3	0	0	0	31
LEAD	164	226	188		0	4	0	2	0	31
MAGNESIUM	40801	57101	48400		0	2	0	0	0	31
MANGANESE	2810	3530	3220	E	0	7	0	1	0	31
MERCURY	12	24	17.6		0	3	0	2	1	31
NICKEL	26	54	37.9		0	2	0	3	0	31
POTASSIUM	0	1970	1690		0	4	0	0	0	31
SELENIUM	6.5	20	16		0	3	0	4	4	31
SILVER	33	52	45.6		0	3	0	5	1	31
SODIUM	d	d	361	B	0	0	0	0	0	31
THALLIUM	19	43	29.8		0	0	0	6	2	31
VANADIUM	41	70	58.3	E	0	1	0	0	0	31
ZINC	162	289	189		0	2	0	2	0	31

OF ELEMENTS NOT IDENTIFIED: 0
OF ELEMENTS MISQUANTIFIED: 0
OF FALSE POSITIVES: 0

OF DUPLICATES OUT: 2
TER : Sb, Ba
IL :

OF MATRIX SPIKES OUT: 1
TER :
IL : Sb

b CONFIDENCE INTERVALS (CI) WERE DERIVED FROM LABORATORY SUBMITTED VALUES. LESS THAN VALUES (<x), U-VALUES, AND NON-SUBMITTED VALUES (-) WERE NOT USED IN THE CALCULATION OF THE CI.
c CI WERE NOT SET SINCE 40 % OR MORE OF THE LABORATORIES SUBMITTED A NON-USABLE VALUE.
d CI NOT USED. SEE SCORING NOTES, PROCEDURE FOR GRADING U-VALUES NO. 4.
B INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS ()-FLAG.
D INDICATES A DILUTION.
E INDICATES A VALUE ESTIMATED OR NOT REPORTED DUE TO THE PRESENCE OF INTERFERENCES.
S INDICATES VALUE DETERMINED BY THE METHOD OF STANDARD ADDITION.
NR NOT REQUIRED.
U ANALYZED FOR BUT NOT DETECTED.
X VALUE WAS OUTSIDE BOTH THE WARNING AND THE ACTION LIMIT. POINTS DEDUCTED.
0 VALUE WAS OUTSIDE THE WARNING LIMIT ONLY. NO POINTS DEDUCTED.
- VALUE NOT SUBMITTED FOR THIS PARAMETER.
* INDICATES A FALSE POSITIVE BY DIXON'S TEST. POINTS DEDUCTED.
? BEST ESTIMATE OF VALUE AND/OR QUALIFIER. POOR COPY AND/OR ILLEGIBLE VALUE SUBMITTED.
< INDICATES A VALUE LESS THAN THE CRDL OR THE INSTRUMENT DETECTION LIMIT.
[] INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS B-FLAG.
() INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS B-FLAG.
D2 THE SAMPLE WAS DILUTED BY A FACTOR OF 2.
D4 THE SAMPLE WAS DILUTED BY A FACTOR OF 4.
D10 THE SAMPLE WAS DILUTED BY A FACTOR OF 10.
D20 THE SAMPLE WAS DILUTED BY A FACTOR OF 20.
D40 THE SAMPLE WAS DILUTED BY A FACTOR OF 40.
D50 THE SAMPLE WAS DILUTED BY A FACTOR OF 50.
W WARNING LIMIT (90 PERCENT CI).
AL ACTION LIMIT (95 PERCENT CI).

SCORING NOTES: PROCEDURE FOR GRADING U-VALUES

1. ANY U-VALUE RESPONSE (INSTRUMENT DETECTION LIMIT) > CRDL FOR THE APPROPRIATE DILUTION, EVEN IF IT IS IN THE 95 % CI, CAUSES A POINT DEDUCTION. IF 25 % OR MORE OF THE LABORATORIES REPORT A U-VALUE OVER THE CRDL, NO POINTS ARE DEDUCTED FOR ANY LABORATORY, POSSIBLY INDICATING A MATRIX INTERFERENCE IN THE SAMPLE.

2. IF CRDL < LOWER CI, THEN USE CI AS SET.

3. IF LOWER CI < CRDL AND CRDL < UPPER CI, THEN SET LOWER CI TO ZERO (0).
NO POINTS DEDUCTED FOR IDENTIFICATION OR QUANTITATION LESS THAN OR EQUAL TO THE CRDL.

4. IF CRDL > LOWER AND UPPER CI, THEN NO CI USED. PARAMETER DROPPED FROM THE SCORING.
NO POINTS DEDUCTED FOR IDENTIFICATIONS OR QUANTITATIONS.
FALSE POSITIVES POSSIBLE.

NOTE THAT ONLY CLP LABORATORIES WERE USED IN THE CALCULATION OF THE CI.

NOTE THAT A U-VALUE FOLLOWED BY X (U X) MEANS THAT POINTS WERE LOST FOR IDENTIFICATION AND QUANTITATION.

SUMMARY OF LABORATORY SCORES
QB 2 FY 88

CODE	SCORE	NOT ID	MISQUANT	FALSE POS	MSPK OUT	DUP OUT
A1	72.8	0	6	0	5	5
A2	91.8	0	2	0	3	0
A3	-	-	-	-	-	-
B1	99.5	0	0	0	1	0
B2	72.3	0	7	0	4	3
B3	79.1	0	6	0	1	1
C1	96.1	0	1	0	1	0
C2	-	-	-	-	-	-
C3	-	-	-	-	-	-
D1	-	-	-	-	-	-
D2	94.1	0	1	0	1	2
D3	83	0	5	0	1	0
E1	95.6	0	1	0	2	0
E2	91.8	0	2	0	1	1
E3	-	-	-	-	-	-
F1	-	-	-	-	-	-
F2	-	-	-	-	-	-
F3	-	-	-	-	-	-
G1	86.5	0	4	0	1	0
G2	83.5	0	5	0	0	0
G3	98.5	0	0	0	3	0
H1	-	-	-	-	-	-
H2	-	-	-	-	-	-
I1	-	-	-	-	-	-
I2	-	-	-	-	-	-
J1	75.5	0	6	0	9	1
J2	98	0	0	0	4	0
K1	95.1	0	1	0	3	0
K2	-	-	-	-	-	-
L1	96.6	0	1	0	0	0
L2	-	-	-	-	-	-
M1	93.1	0	1	0	3	2
M2	89.8	0	2	0	7	0
N1	76.8	0	6	0	5	1
N2	87.5	0	3	0	3	1
O1	-	-	-	-	-	-
O2	99	0	0	0	2	0
P1	94.1	0	1	0	3	1
P2	96.6	0	1	0	0	0
Q1	-	-	-	-	-	-
Q2	-	-	-	-	-	-
R1	-	-	-	-	-	-
R2	-	-	-	-	-	-
S1	69.3	0	10	0	0	0
S2	-	-	-	-	-	-
T1	78	0	5	0	7	2
T2	-	-	-	-	-	-
U1	71.9	0	8	0	5	1
U2	-	-	-	-	-	-
V1	97.5	0	0	0	3	1
V2	94.6	0	1	0	2	1
W1	-	-	-	-	-	-
W2	-	-	-	-	-	-
X1	-	-	-	-	-	-
X2	-	-	-	-	-	-
Y1	90.8	0	2	0	3	1
Y2	-	-	-	-	-	-
Z1	-	-	-	-	-	-
Z2	89	0	3	0	2	0

ATTACHMENT 1

The following information explains the details about the Individual Laboratory Summary Report, Program Summary Report, Summary of Laboratory Scores, and specific information about the scoring procedures.

The Scoring Procedures

The confidence interval (CI) calculation and the scoring algorithm are the intrinsic parts of the Quarterly Blind (QB) study. At present, the 95 percent CI are calculated from CLP laboratory-submitted results. All reported results are compared to the CI. Elements that were found to be mis-identified, mis-quantitated and reported false positives are flagged and used in the calculation of the score. False positives are values at exceedingly high concentrations which can be caused by contamination or interference. In addition, matrix spike accuracy and duplicate precision are included in the scoring. Other details are explained in the footnotes which accompany the Individual Laboratory Summary Report.

Confidence intervals were calculated from the laboratory-submitted values using the statistical procedure Biweight which does not generate outliers. Instead, the laboratory-reported results are weighted relative to their position from the mean.

The following equation is used to calculate the percent score (% score) for each laboratory.

$$\%\ \text{Score} = 100 - (5A_w + B_w + 2C_w) - (5A^w_s + B^w_s + 2C^w_s) - 0.5S^s - D$$

where A = number of mis-identifications

$$B = \left[1 - \left[\frac{T - x}{T}\right]^{1.5}\right] * 50$$

T = total number of elements
x = number of mis-quantitations
C = number of false positives
S = number of matrix spikes outside the criteria
D = number of duplicates outside the criteria
w = water matrix
s = soil matrix

The Scoring Procedures (continues)

The following scoring categories are recommended by the Environmental Monitoring System Laboratory, Las Vegas (EMSL-LV) under the directive of the National Program Office:

1. 100 to 90 percent - Acceptable Performance, No Corrective Action Necessary

2. 90 to 75 percent - Acceptable Performance, Corrective Action Necessary

3. below 75 percent - Unacceptable Performance, Corrective Action Mandatory

A score below 75% results in the failure of a performance evaluation (PE) sample.

Individual Laboratory Summary Report

Header / Qualifier	Explanation
LABORATORY NAME	laboratory name and location (state) and assigned alpha-numeric code
PERFORMANCE LEVEL	laboratory performance falls into one of three (3) categories:
	ACCEPTABLE — % score greater than or equal to 90
	ACCEPTABLE - Corrective Action Necessary — % score greater than or equal to 75 and less than 90
	UNACCEPTABLE - Corrective Action Mandatory — % score is less than 75
LABORATORY RANK	comparison of CLP laboratories only for which a % score was calculated
	Above — number of laboratories whose % score is greater than the laboratory's % score
	Same — number of laboratories whose % score is the equal to the laboratory's % score
	Below — number of laboratories whose % score is less than the laboratory's % score
% SCORE	percent score calculated using the scoring equation
REPORT DATE	date that the Individual Laboratory Summary report is printed and in the format, month/day/year (for example, 1/23/88)
MATRIX	sample matrix (water or soil)

Individual Laboratory Summary Report (Continued)

Header / Qualifier	Explanation
ELEMENT NAME	the 23 target analytes required by the Statement of Work
95 % CI	95 percent confidence interval (CI) calculated for each element using the Biweight procedure with CLP laboratory-submitted results
LOWER	lower limit of CI
UPPER	upper limit of CI
LAB RESULTS	laboratory-reported values and qualifiers
REPORTED VALUE	laboratory-reported concentration
QUALIFIER CODE	laboratory-reported qualifier(s) pertaining to the preceding value
PROGRAM DATA	pertains to only CLP laboratory-submitted values
# LABS MIS-ID	number of CLP laboratories which mis-identified the element
# LABS MIS-QUAN	number of CLP laboratories which mis-quantitated the element
# LABS FALSE POS	number of CLP laboratories which reported the element at an exceedingly high concentration
TOTAL # LABS	number of CLP laboratories whose values were used in the statistical study of the program data

Individual Laboratory Summary Report (continued)

Header / Qualifier	Explanation
# OF ELEMENTS MIS-IDENTIFIED	number of elements mis-identified by the laboratory
# OF ELEMENTS MIS-QUANTIFIED	number of elements mis-quantitated by the laboratory
# OF FALSE POSITIVES	number of elements reported at an exceedingly high concentration by the laboratory

Program Summary Report

Header / Qualifier	Explanation
MATRIX	sample matrix (water or soil)
REPORT DATE	date that the Program Summary Report is printed and in the format, month/day/year (for example, 1/23/88)
ELEMENT DATA	element data generated with CLP laboratory-submitted results
ELEMENT NAME	the 23 elements required by the Statement of Work
SPIKE LEVEL	the level spiked into the sample
95 % CI	95 percent confidence interval (CI) calculated for each element using the Biweight procedure with CLP laboratory-submitted results
LOWER	lower limit of CI
UPPER	upper limit of CI
MEAN RESULT	average/mean of the values used in the calculation of the CI
STANDARD DEVIATION	standard deviation of the values used in the calculation of the CI
PROGRAM DATA	pertains to only CLP laboratory-submitted values
# LABS MIS-ID	number of CLP laboratories which mis-identified the element
# LABS MIS-QUAN	number of CLP laboratories which mis-quantitated the element
# LABS FALSE POS	number of CLP laboratories which reported the element at an exceedingly high concentration
TOTAL # LABS	number of CLP laboratories whose values were used in the statistical study of the program data

Program Summary Report (continues)

Header / Qualifier	Explanation
# OF LABS WITH ACCEPTABLE PERFORMANCE	number of CLP laboratories whose % score is greater than or equal to 90
# OF LABS WITH ACCEPTABLE PERFORMANCE - CORRECTIVE ACTION NECESSARY	number of CLP laboratories whose % score is greater than or equal to 75 and less than 90
# OF LABS WITH UNACCEPTABLE PERFORMANCE - CORRECTIVE ACTION MANDATORY	number of CLP laboratories whose % score is less than 75

Summary of Laboratory Scores

Header / Qualifier	Explanation
LAB NAME	SMO assigned laboratory lab code
CODE	assigned alpha-numeric laboratory code
SCORE	% score calculated for each laboratory
MIS-ID	number of elements mis-identified (the "A" in the % Score equation)
MIS-QUANT	number of elements mis-quantified (the "B" in the % Score equation)
FALSE POS	number of false positives reported (the "C" in the % Score equation)
MSPK OUT	number of matrix spike recoveries outside the criteria (the "S" in the % Score equation)
DUP OUT	number of duplicates (RPDs) outside the criteria (the "D" in the % Score equation)

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OAK RIDGE NATIONAL LABORATORY
OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37831

April 29, 1988

Harold Vincent
US EPA, EMSL-LV, QAD
P. O. Box 15027
Las Vegas, NV 89114

Dear Mr. Vincent:

According to instructions received with the QB-2-88 performance evaluation score sheet package, any quantified value falling outside the acceptance window should be explained in writing. Our score for this set was 94.1. The result for Ba on the water sample fell outside the upper range unit. The high value is believed to be caused by contamination during preparation as the duplicate result was also out for Ba. The soil sample, prepared in Erlenmeyer flasks, was not contaminated. The beakers used in the preparation of water samples will be cleaned more carefully in the future.

If a letter is not required for scores greater than 90, please let me know.

Sincerely,

Katherine Whaley

Katherine Whaley
ICP Spectroscopist

W R Laing

W. R. Laing
DOE Site Survey Program Manager

cc: Karen Knight

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ORL

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

W. R. Laing
Oak Ridge National Laboratory
P.O. Box X MS 127
Bethel Valley Rd.
Oak Ridge, TN 37831-6127

Dear Mr. Laing:

For your information and review, enclosed are the results for your participation in the EMSL-LV First Quarter Inorganic Performance Evaluation Study (QB1 FY-88, Case No. 8123). Your laboratory code is on your scoresheet. The samples were prepared by the EMSL-LV and consisted of one soil sample and two water samples. The homogeneous soil sample and one of the water samples were spiked with inorganic parameters. The other water sample was a blank. The samples were to be prepared and analyzed by current IFB procedures as per contract. All laboratories received the samples single blind. Also enclosed is more general information about the Superfund Performance Evaluation Program.

Thank you for your participation in this study. I trust that this information will be beneficial in your pursuit of excellence as a member of the community of laboratories analyzing hazardous waste samples.

Sincerely,

Larry C. Butler, Ph.D.
Supervisor, Performance Evaluation Program
Quality Assurance Research Branch
Quality Assurance Methods Development Division

Enclosures

cc: (w/out enclosures)
Mike Hurd, OERR (WH-548A)
Carla Dempsey, OERR (WH-548A)
William Langley, OERR (WH-548A)

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ROUTINE INORGANIC SCORE SHEET

Laboratory: Oak Ridge National (TN) (X2)
Quarter: 1

Date: 12/21/1987
Fiscal Year: 88

Maximum Number of Points Possible: 100

I. Case 8123, Water Matrix

A. Identification (- 5 Points * Number of Missed Identifications 0) - 0

B. Quantitation (Points Lost) - 13

$$1 - \frac{\text{Total Number of Elements (22)} - \text{Number Missed (4)}}{\text{Total Number of Elements (22)}} \overset{1.5}{} * (-50)$$

C. False Positives / Unmet CRDL's (- 2 Points * False Positives and Unmet CRDL's 0) - 0

II. Case 8123, Soil Matrix

A. Identification (- 5 Points * Number of Missed Identifications 0) - 0

B. Quantitation (Points Lost) - 0

$$1 - \frac{\text{Total Number of Elements (15)} - \text{Number Missed (0)}}{\text{Total Number of Elements (15)}} \overset{1.5}{} * (-50)$$

C. False Positives / Unmet CRDL's (- 2 Points * False Positives and Unmet CRDL's 0) - 0

III. Duplicate Precision (Maximum of 10 Points Deducted)
(- 1 Point * Number of Duplicate Results Outside of Control Limits 0) - 0
Water :
Soil :

IV. Matrix Spikes (Maximum of 10 Points Deducted)
(- ½ Point * Number of Matrix Spikes Outside of Control Limits 1) - 0.5
Water :
Soil : Sb

Total Number of Points Deducted: 13.5
Laboratory Point Score: 86.5
Laboratory Percent Score: 86.5

Ave. of 19 labs was 82

Lab scores below 90 require corrective action.

General Information About the Superfund
Performance Evaluation Program

Acceptance windows were determined from the actual data submitted by first rejecting outliers by Grubb's Test, and then determining the 90 and 95 percent confidence intervals from the remaining values using the EMSL-LV computer program "FENSTER." Further details about acceptance intervals are available in the footnotes to the enclosed spreadsheets. Also in the footnotes to the spreadsheets is the EMSL-LV method for scoring of U-flagged values.

In the future you will be receiving an inorganic laboratory profile package. Acceptance intervals will be generated using a robust technique called "BiWeight."

For your convenience, enclosed are the contractually required score sheet for your laboratory, a coded summary of scores, a set of coded analytical spread sheets, and a graphical programmatic representation of inorganic hazardous waste laboratory performance versus time. The left bar represents the mean score for each quarter. The number at the top of the left bar is the number of laboratories in each study. The right bar is the standard deviation of scores for each study. Your laboratory will benefit from comparing its score with the programmatic values (left bars).

The EMSL-LV is adhering to the National Program Office guidelines with the following requirement. Please note each parameter which you failed to correctly identify or quantitate or which you reported as a false positive (parameters not added into this PE sample, but found by your laboratory at concentrations exceeding contract requirements). You must document in a letter to your Project Officer and myself within two weeks of receipt of this letter, the source of the problem(s) and the corrective action(s) taken to prevent the problem from occurring in future quarterly blind PE samples.

FILE: QB1I88R3.WK1

CODED SUMMARY OF SCORES
FIRST QUARTER INORGANIC FY 88 CLP SINGLE BLIND
(QB 1 FY 88, CASE NO. 8123)

CODE	POINT SCORE	% SCORE	NO. OF DAYS LATE
G1	100.0	100.0	0
F2	98.5	98.5	0
A1	95.6	95.6	0
Z1	94.6	94.6	0
J1	92.1	92.1	0
S1	91.8	91.8	0
K1	91.0	91.0	0
O2	89.8	89.8	1
Y2	89.7	89.7	16
B3	88.6	88.6	13
P1	86.8	86.8	3
Y1	85.2	85.2	0
D1	85.0	85.0	1
C3	84.3	84.3	10
B1	83.7	83.7	15
G2	82.2	82.2	0
Z2	81.5	81.5	0
T1	79.6	79.6	0
C1	47.6	47.6	22
H2	*	*	*
I2	*	*	*
N1	*	*	*
K2	*	*	*

* NO DATA SUBMITTED AS OF DECEMBER 22, 1987

CODED SUMMARY OF SCORES
FIRST QUARTER INORGANIC FY 88 NON-CLP SINGLE BLIND
(QB 1 FY 88, CASE NO. 8123)

CODE	POINT SCORE	% SCORE	NO. OF DAYS LATE
G3	99.0	99.0	0
V2	99.5	99.5	1
I1	94.1	94.1	0
A2	90.7	90.7	15
W1	75.1	75.1	1
M2	71.4	71.4	0
R2	70.5	70.5	1
D2	24.4	30.5	27
E1	*	*	*
X1	87.2	87.2	3
F3	*	*	*
H1	*	*	*
N2	*	*	*
S2	*	*	*
V1	*	*	*
O1	*	*	*
L2	*	*	*
L1	71.9	89.9	0

* NO DATA SUBMITTED AS OF DECEMBER 22, 1987

CODED SUMMARY OF SCORES
FIRST QUARTER FY 88 INORGANIC REGIONAL SINGLE BLIND
(QB 1 FY 88, CASE NO. 8123)

CODE	POINT SCORE	% SCORE	NO. OF DAYS LATE
T2	*	*	*
E2	*	*	*
J2	*	*	*
U1	*	*	*
P2	74.9	74.9	6
F1	*	*	*
D3	*	*	*
Q1	*	*	*
R1	*	*	*
A3	*	*	*
W2	17.0	17.0	0
M1	47.0	47.0	6
U2	*	*	*

* NO DATA SUBMITTED AS OF OCTOBER 23, 1987

CODED SUMMARY OF SCORES
FIRST QUARTER INORGANIC FY 88 DOE SINGLE BLIND
(QB 1 FY 88, CASE NO. 8123)

CODE	POINT SCORE	% SCORE	NO. OF DAYS LATE
X2	86.5	86.5	1
Q2	82.4	82.4	27
E3	81.9	81.9	1
C2	*	*	*
B2	*	*	*

* NO DATA SUBMITTED AS OF DECEMBER 22, 1987

12/22/1987

OB 1 FY 88 INORGANIC, CASE NO. 8123

WATER SAMPLE (UG/L)

ELEMENT NAME	90 % CI 0 b LOWER	90 % CI 0 b UPPER	95 % CI 99 b LOWER	95 % CI 99 b UPPER	A1	A2	B1	B3	C1	C3	D1	D2	E3	F2
ALUMINUM	1010	1380	974	1410	1100	1290	1130	950 X	1440 X	1220	1170 E?	1300	1250	1181
ANTIMONY	c	c	c	c	53 U	60 U	60 U	3 U	21 U	32 U	1.2 U?	250 <*	5.7 U	12 U
ARSENIC	59	83	56	85	76 S	65.6	72	70	69	72	65 S	62	76.6	64
BARIUM	489	582	479	592	564	542	570	480 0	570	556	536	670 X	568	540
BERYLLIUM	61	75	60	76	73	66.3	67	60 0	62	69	66	60 0	73.6	71.3
CADMIUM	287	343	281	349	340	326	300	290 X	355 X	320	330	310	323	322.2
CALCIUM	7060	8470	6910	8620	7800	8752 X	7600	7300	8600 0	8050	7080 ?	10500 X	8300	8132
CHROMIUM	53	72	51	74	67	62.6	61	50 X	55	65	69	10 <	60.2 ?	67
COBALT	130	152	128	154	144	141	128 X	140	156 X	147	135	170 X	142	147
COPPER	563	689	549	703	696 0	642	592	600	653	631	600	630	633 E	652
IRON	664	827	649	845	759	728	740	780	810	720	716	720	569 E X	836 E 0
LEAD	27	39	26	40	37 S	34.6	36 S	30	25 X	39 S	31 S	50 < X	37.0	36
MAGNESIUM	11300	13000	11100	13200	12700	12350	12900	11800	13700 X	12100	12800	12700	12300	12320
MANGANESE	107	125	104	127	122	118	115	120	160 X	124	117	110	125	117
MERCURY	1.5	3.9	1.3	4.2	1.1 X	2.45	2.1	2.9	3.1	2.5	4.3 X	2.4	2.4	2.6
NICKEL	220	261	215	266	258	227	253	250	255	243	237	230	255	261
POTASSIUM	7710	11300	7330	11700	10200	10270	10100	8300	10900	9310	9460 ?	10900	9530 ?	9730
SELENIUM	30	50	27	52	38 ?	40.5	41	50	44	37	40	40	37.6	40
SILVER	63	100	59	104	86	83.4	75	90	86	85	71	67	83.5	79.1
SODIUM	13000	16000	12600	16300	15700	15370	11700 X	12600 0	16100 0	15100	14400 E	19000 X	14500	14180
THALLIUM	37	51	36	52	42	44.2	44	40	63 X	52 S 0	41	80 X	44	38
VANADIUM	278	304	270	307	299	292	287	280	325 X	301	292	340 X	293	291.5
ZINC	89	119	86	122	114	103	87 0	190 S X	113	102 E	112	100	99.4 E	108
TOTAL OUT (ACTION LIMIT)					1	1	2	3	0	0	1	7	1	0
TOTAL OUT (WARNING LIMIT)					1	0	1	3	2	1	0	1	0	1
TOTAL OUT (IDENTIFICATION)					0	0	0	0	0	0	0	1	0	0
TOTAL OUT (FALSE POSITIVE)					0	0	0	0	0	0	0	1	0	0

12/22/1987

GB I FY 88 INORGANIC, CASE NO. 8123

WATER SAMPLE (UG/L)

ELEMENT NAME	90 % CI B b LOWER	90 % CI B b UPPER	95 % CI BB b LOWER	95 % CI BB b UPPER	G1	G2	G3	I1	J1	K1	L1	M2	O2	P1
ALUMINUM	1010	1300	974	1410	1220	1150	1230	1200	1190	1100	- NR	1260	1260	1250
ANTIMONY	c	c	c	c	52 U	39 U	2	60 U	26 U	50 U	1 <	5 <	27 U	9.6 U
ARSENIC	59	83	56	85	67	71 S	64	72	70	66	73	49 X	70 S	69 S
BARIUM	489	582	479	592	578 E?	554	499	527	518	536	520	515	518	546
BERYLLIUM	61	75	60	76	67	69	65	71	69	67	71	64	67	70
CADMIUM	287	343	281	349	325	304	307	319	325	307	314	299	317	319
CALCIUM	7060	8470	6910	8620	8260	7420	7120	8000	7830	7890	- NR	7930	7630	7630
CHROMIUM	53	72	51	74	61	67	62	58	62	54	62	60	65	60
COBALT	130	152	128	154	141	140	142	134	141	138	145	114 X	145	141
COPPER	543	689	549	703	621	653	602	587	614	609	600	590	627	616
IRON	666	827	649	845	716	693	708	732	689	718	- NR	740	728	792
LEAD	27	39	26	40	33	33 S	35	34	36	28 S	36	42 X	33	34
MAGNESIUM	11300	13000	11100	13200	12900	11400	11900 E	12700	12400	12000	- NR	11730	12200	12200
MANGANESE	107	125	104	127	118 ?	113 E	111	112	109 E	113	- NR	110	115	116
MERCURY	1.5	3.9	1.3	4.2	2.5	2.5	2.9	2	2.4	2.7	2	2.7	2.6 ?	2.5
NICKEL	220	261	215	266	238 ?	235	243	224	237	246	250	205 X	240	235
POTASSIUM	7710	11300	7330	11700	9490	11800 X	10200	9720	9360	10000	- NR	9490	9850	9180
SELENIUM	30	50	27	52	40	40	36	40	35	32 S	40	41	44	35
SILVER	63	100	59	104	86	79	74	76	81	79	76	49 X	76	97
SODIUM	13000	16000	12600	16300	14800	15400	14200	15000	14800 E	15200	- NR	15440	14200	13100 ?
THALLIUM	37	51	36	52	47	45	42	40	48	43	47	35 X	38 S	45 E
VANADIUM	274	304	270	307	292	287	279	288	279	285	280	280	300	295
ZINC	89	119	86	122	89	113	107	94	109	90	120 O	98	100	105
TOTAL OUT (ACTION LIMIT)					0	1	0	0	0	0	0	6	0	0
TOTAL OUT (WARNING LIMIT)					0	0	0	0	0	0	1	0	0	0
TOTAL OUT (IDENTIFICATION)					0	0	0	0	0	0	0	0	0	0
TOTAL OUT (FALSE POSITIVE)					0	0	0	0	0	0	0	0	0	0

12/22/1987

00 1 FT 00 INORGANIC, CASE NO. 8123

WATER SAMPLE (UG/L)

ORNL

ELEMENT NAME	90 % CI 0 b LOWER	90 % CI 0 b UPPER	95 % CI 00 b LOWER	95 % CI 00 b UPPER	Q2	R2	S1	T1	V2	W1	X1	X2	Y1	Y2
ALUMINUM	1010	1380	970	1410	1240	1290 I	1230	1130	1260	1180 E	1160	1280	1390 0	1130
ANTIMONY	c	c	c	c	47 U	25 U	25 U	24 U	2.3 U	0.9 U	30 U	30 U	39 U	55 U
ARSENIC	59	83	56	85	61	77	63	85 E 0	75	79.6	60	69	83	68
BARIUM	489	582	479	592	505	569	547	531	555	530 E	509	561	538	561
BERYLLIUM	61	75	60	76	66	74	72	63	71	66	66.5 I	73	71	66
CADMIUM	287	383	281	349	312	320	324	293	320	296 E	283 0	341	308	301
CALCIUM	7060	8470	6910	8620	7630	8340	7930	7340	8000	7830 E	7390	7960	8070	7300
CHROMIUM	53	72	51	74	63 E	64	66	55	67	67.5	58.9	75 E E	67	78 E
COBALT	130	152	128	154	145	165 E	155 E	136	152	155 E	133	156 E	134	140
COPPER	563	689	549	703	617	700 0	669	546 E E	681	605	576	619	643	597
IRON	664	827	649	845	744	830 0	775	743 E	723	775 E	715	730	708	755
LEAD	27	39	26	40	41 E	30	29	37	35	31.6	36.2	43 E	30 S	38
MAGNESIUM	11300	13000	11100	13200	12100	13300 E	12200	11400	12900	12300 E	11300	13000	11900	12100
MANGANESE	107	125	104	127	116	125	120	105 E 0	119	118	104 0	123	116	115
MERCURY	1.5	3.9	1.3	4.2	2.8 (1	3.5	2.8	2.8	2.4	1.6	2.7	2.3	3.3	3.1
NICKEL	220	261	215	266	245	263 0	254	214 E	250	252	228	257	228	224
POTASSIUM	7710	11300	7330	11700	9840 E	10200	9040	7380 0	9200	7880	8180	9900	9580	9270 E
SELENIUM	30	50	27	52	39	38	38 S	34	39	37.4	42.8	41	39 S	34
SILVER	63	100	59	104	71 E	82	81	77	82	78.8	73.1	87 E	81	77
SODIUM	13000	16000	12600	16300	14700	16100 0	15300	13500	14700	14400 E	13300	16300	14500	13900
THALLIUM	37	51	36	52	49	46	29 A E	45	47	13.2 E	33.4 S E	60	46	52 (
VANADIUM	274	304	270	307	290	314 E	290	248 A E	305 0	297 E	291	322 E	319 A E	284
ZINC	89	119	86	122	90 E	101	111	72 A E	103	118 E	91.7	102	91	103
TOTAL OUT (ACTION LIMIT)					1	3	2	4	0	2	1	4	1	1
TOTAL OUT (WARNING LIMIT)					0	4	0	3	1	0	2	0	1	1
TOTAL OUT (IDENTIFICATION)					0	0	0	0	0	0	0	0	0	0
TOTAL OUT (FALSE POSITIVE)					0	0	0	0	0	0	0	0	0	0

12/22/1987

OU 1 FY 88 INORGANIC, CASE NO. 8123

WATER SAMPLE (UG/L)

ELEMENT NAME	90 % CI B b LOWER	90 % CI B b UPPER	95 % CI BB b LOWER	95 % CI BB b UPPER	Z1	Z2
ALUMINUM	1010	1380	974	1410	1090	1360
ANTIMONY	c	c	c	c	47 []	60 U
ARSENIC	59	83	56	85	67	80
BARIUM	489	582	479	592	499	563
BERYLLIUM	61	75	60	76	63	74
CADMIUM	287	343	281	349	287	335
CALCIUM	7060	8470	6910	8620	7500	8630 X
CHROMIUM	53	72	51	74	59	66
COBALT	130	152	128	154	131	167 A X
COPPER	563	689	549	703	589	666
IRON	666	827	649	845	805	807
LEAD	27	39	26	40	31	50 SA X
MAGNESIUM	11300	13000	11100	13200	11700	12900
MANGANESE	107	125	104	127	111	124
MERCURY	1.5	3.9	1.3	4.2	3.8	2.3 ?
NICKEL	220	261	215	266	229	243
POTASSIUM	7710	11300	7330	11700	7870	10300
SELENIUM	30	50	27	52	46	54 X
SILVER	63	100	59	104	58 X	104 0
SODIUM	13000	16000	12600	16300	14200	15300
THALLIUM	37	51	36	52	43	48 S
VANADIUM	274	304	270	307	273 0	290
ZINC	89	119	86	122	102 E	107

TOTAL OUT (ACTION LIMIT)	1	4
TOTAL OUT (WARNING LIMIT)	1	1
TOTAL OUT (IDENTIFICATION)	0	0
TOTAL OUT (FALSE POSITIVE)	0	0

12/22/87
GB1 FY 88 INORGANIC, CASE NO. 8123

WATER SAMPLE (UG/L)

ELEMENT NAME	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI # b LOWER	95 % CI # b UPPER	P2	M1	M2
ALUMINIUM	1010	1380	974	1410	1220	1190	1300
ANTIMONY	c	c	c	c	-2 U	-12.5 U	-50 U
ARSENIC	59	83	56	85	74	72.5	136 X
BARIUM	489	582	479	592	538	561	700 X
BERYLLIUM	61	75	60	76	72.3	74	66
CADMIUM	287	343	281	349	328	312	320
CALCIUM	7060	8470	6910	8620	7700	7490	6500 X
CHROMIUM	53	72	51	74	64.2	-50 U X	100 X
COBALT	130	152	128	154	152	134	150
COPPER	563	689	549	703	639	632	668
IRON	666	827	649	845	814	733	700
LEAD	27	39	26	40	34.4	36.6	-50 U X
MAGNESIUM	11300	13000	11100	13200	12600	13200	B 11800
MANGANESE	107	125	104	127	122	117	120
MERCURY	1.5	3.9	1.3	4.2	0.3 X	2.69	31 X
NICKEL	229	261	215	266	245	238	240
POTASSIUM	7710	11300	7330	11700	13200 X	9800	7300 X
SELENIUM	30	50	27	52	39.9	38.5	50
SILVER	63	100	59	104	89	95	80
SODIUM	13000	16000	12600	16300	14500	14900	13600
THALLIUM	37	51	36	52	46	40	50
VANADIUM	274	304	270	307	303	306	B -500 U X
ZINC	89	119	86	122	154 X	95	86 B

TOTAL OUT (ACTION LIMIT)	3	1	8
TOTAL OUT (WARNING LIMIT)	0	2	1
TOTAL OUT (IDENTIFICATION)	0	1	2
TOTAL OUT (FALSE POSITIVE)	0	0	0

b CONFIDENCE INTERVALS (CI) WERE DERIVED FROM LABORATORY SUBMITTED VALUES. OUTLIERS WERE REJECTED USING GRUBB'S TEST. LESS THAN VALUES (<x), U-VALUES, AND NON-SUBMITTED VALUES (-) WERE NOT USED IN THE CALCULATION OF THE CI.
c CI WERE NOT SET SINCE 40 % OR MORE OF THE LABORATORIES SUBMITTED A NON-USABLE VALUE.
d CI NOT USED. SEE SCORING NOTES, PROCEDURE FOR GRADING U-VALUES NO. 4.
A INDICATES AN OUTLIER FROM GRUBB'S TEST. NOT USED IN THE CALCULATION OF THE CI. POINTS DEDUCTED.
B INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS (1)-FLAG.
D INDICATES A DILUTION.
E INDICATES A VALUE ESTIMATED OR NOT REPORTED DUE TO THE PRESENCE OF INTERFERENCES.
S INDICATES VALUE DETERMINED BY THE METHOD OF STANDARD ADDITION.
NR NOT RECORDED.
U ANALYZED FOR BUT NOT DETECTED.
X VALUE WAS OUTSIDE BOTH THE WARNING AND THE ACTION LIMIT. POINTS DEDUCTED.
0 VALUE WAS OUTSIDE THE WARNING LIMIT ONLY. NO POINTS DEDUCTED.
- VALUE NOT SUBMITTED FOR THIS PARAMETER.
* INDICATES A FALSE POSITIVE BY DIXON'S TEST. POINTS DEDUCTED.
? BEST ESTIMATE OF VALUE AND/OR QUALIFIER. POOR COPY AND/OR ILLEGIBLE VALUE SUBMITTED.
< INDICATES A VALUE LESS THAN THE CRDL OR THE INSTRUMENT DETECTION LIMIT.
(1) INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS B-FLAG.
W WARNING LIMIT (90 PERCENT CI).
AC ACTION LIMIT (95 PERCENT CI).

SCORING NOTES: PROCEDURE FOR GRADING U-VALUES

1. ANY U-VALUE RESPONSE (INSTRUMENT DETECTION LIMIT) > CRDL FOR THE APPROPRIATE DILUTION, EVEN IF IT IS IN THE 95 % CI, CAUSES A POINT DEDUCTION. IF 25 % OR MORE OF THE LABORATORIES REPORT A U-VALUE OVER THE CRDL, NO POINTS ARE DEDUCTED FOR ANY LABORATORY, POSSIBLY INDICATING A MATRIX INTERFERENCE IN THE SAMPLE.

2. IF CRDL < LOWER CI, THEN USE CI AS SET.

3. IF LOWER CI < CRDL AND CRDL < UPPER CI, THEN SET LOWER CI TO ZERO (0).
   NO POINTS DEDUCTED FOR IDENTIFICATION OR QUANTITATION LESS THAN OR EQUAL TO THE CRDL.

4. IF CRDL > LOWER AND UPPER CI, THEN NO CI USED. PARAMETER DROPPED FROM THE SCORING.
   NO POINTS DEDUCTED FOR IDENTIFICATIONS OR QUANTITATIONS.
   FALSE POSITIVES POSSIBLE.

NOTE THAT ONLY CLP LABORATORIES WERE USED IN THE CALCULATION OF THE CI.

NOTE THAT A U-VALUE FOLLOWED BY X (U X) MEANS THAT POINTS WERE LOST FOR IDENTIFICATION AND QUANTITATION.

12/22/1987

ORE FY 88 INORGANIC, CASE NO. 6123

SOIL SAMPLE (MG/KG)

ELEMENT NAME	90 % CI B b LOWER	90 % CI B b UPPER	95 % CI BI b LOWER	95 % CI BI b UPPER	A1	A2	B1	B3	C1	C3	D1	D2	E3	F2
ALUMINUM	9140	16700	8320	17500	13600	15500	16200	14400	13900	16700	6.55 E7AX	7730 X	10100	9540
ANTIMONY	c	c	c	c	26 U	12 U	30 U	0.9 U	11 U	33 U	1.2 U	25	1.1	6 U
ARSENIC	4.3	9.6	3.7	10	0.2 S	5.88	7.5	7	11 X	6.6	5.2	7.2	7.5	5.1 U
BARIUM	123	162	119	166	153	141	145	150	167 X	154	119 0	170 X	134	134
BERYLLIUM	c	c	c	c	0.5 U	0.525	1.5 U	0.4 U	1.5 U	1.1	0.36 U	0.44	1.1 X	0.6 U
CADMIUM	c	c	c	c	2.4	2.56	2 U	1 U	4.3	0.81 U	0.53 U	0.7	0.5 U	1.2 U
CALCIUM	57100	69500	55700	70800	62600	59900	63500	63900	73600 X	65000	64600	157 X	57000 0	63333
CHROMIUM	12	24	11	25	18	19	16	20	15	41 0 X	15	13.4	41.1 X	15
COBALT	4.9	10	0.00	11	11 U	8.19	15 U	7.9 U	8.4 U	8.6 U	7.4 U	8.2	8.9	7 U
COPPER	29	43	27	46	40	37.8	36	40	41	36	32	35.5	33.5 X	32
IRON	15700	21000	15100	21500	19900	21400 0	19200	18500	19800	21500 0	12500 7A X	11500 X	18400	16621
LEAD	79	106	76	109	97	120 X	115 X	100	117 X	92	92	89	97.2	95
MAGNESIUM	24200	27200	23800	27500	26500	24000 0	27200	26600	29000 X	24800	25900	22800 X	23700 X	25010
MANGANESE	513	674	496	692	645	609	587	670	677 0	615	497 0	520	576	554
MERCURY	c	c	c	c	0.13	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.12	0.04 B	0.1 U
NICKEL	14	26	13	27	15 U	22.2	12 U X	20	22	31 0 X	15	16	30.3 X	20 U
POTASSIUM	1350	2930	1100	3100	2660	2589	2750	2400	2610	2640	1220 7 0	1320 0	1760	1847 U
SELENIUM	c	c	c	c	1.5 U	1 U	2.5 U	6.1 U	2.5 U	1 U	0.22 U	0.31	0.2 U	2.5 U
SILVER	c	c	c	c	3.4 U	2 U	5 U	2 U	2 U	6.1 U	1.9 U	1.4	0.03 B	3.1 U
SODIUM	d	d	d	d	321 U	217	750 U	260 U	260 U	280 U	11 U1A	1920	207	6 U
THALLIUM	c	c	c	c	1 U	2 U	5 U	0.4 U	3.6 U	2 U	0.26 U	2.4	0.38 U	5 U
VANADIUM	14	40	12	43	27	25.8	31	30	33	43 0	17	18	25.9	25.3
ZINC	106	127	104	130	126	125	114	130 0	127	122	110	100 X	114 X	108
TOTAL OUT (ACTION LIMIT)					0	1	2	0	5	2	2	6	3	0
TOTAL OUT (WARNING LIMIT)					0	2	0	1	1	2	3	1	1	0
TOTAL OUT (IDENTIFICATION)					0	0	0	0	0	0	0	0	0	0
TOTAL OUT (FALSE POSITIVE)					0	0	0	0	0	0	0	0	0	0

12/22/1987

OHI FT 88 INORGANIC, CASE NO. 8123

SOIL SAMPLE (MG/KG)

ELEMENT NAME	90 % CI 0 b		95 % CI 00 b											
	LOWER	UPPER	LOWER	UPPER	G1	G2	G3	I1	J1	K1	L1	M2	O2	P1
ALUMINUM	9140	16700	8320	17500	11600	13800	11042	13100	14100	11400	- NR	11530	15900	12300
ANTIMONY	c	c	c	c	26 U	7.7 U	0.4 U	14 U	5.2 U	25 U	0.7	1 <	8.9 UJ	6.0 U
ARSENIC	4.3	9.6	3.7	10	5.4	6.5 S	7.2 S	15 X	6.6 S	7.0 S	5	5.7	14 SA X	5.9 J
BARIUM	123	162	119	166	125 J	152	135	140	145	152	125	137	153	153
BERYLLIUM	c	c	c	c	2 U	0.4 U	0.3 B	1 U	0.77 BJ	1 U	0.7	1 <	1 UJ	1 U
CADMIUM	c	c	c	c	2 U	4 U	0.8 B	0.5 BJ	1 U	2.5 U	0.7	1.6	3.5 J	2.5
CALCIUM	57100	69500	55700	70800	61500	65100	64730	65500	61100	67800	- NR	57000 *	58000	63000
CHROMIUM	12	24	11	25	19	21	15.9	19	20	18	33 X	12.2	25 *	15
COBALT	4.9	10	0.00	11	4 BJ *	9.5 BJ	9 B	10 U	6.1 BJE	10 U	7.1	10 <	7.7 BJ	9.9 BJ
COPPER	29	43	27	44	29	36	35.9	35	38	32	33	31	39	29
IRON	15700	21000	15100	21500	17600	19400 E	16100	19700	17500	20100	- NR	17130	18300	19700
LEAD	79	106	76	109	95	90	101 B	103	127 A X	84 S	95	114 X	94 J	75 X
MAGNESIUM	24200	27200	23800	27500	24800	26800	25800	27000	25800	26200	- NR	22625 X	25000	25600
MANGANESE	513	674	496	692	580	543 N X	574	626	560	620	- NR	535	573	606
MERCURY	c	c	c	c	0.1 UJ	0.1 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 <	0.05 <	0.1 UJ	0.1 U
NICKEL	14	26	13	27	25	24	19.5	18	18	26	27 J *	18.7	22	36 A X
POTASSIUM	1350	2930	1180	3100	1900 BJ	2870	2400	2450	2180	1960 BJ	- NR	2195	3660 A X	2050 BJ
SELENIUM	c	c	c	c	0.9 U	3.5 U	0.5 B	1 U	5.4 UE	2.5 U	2 <	1 <	0.6 UJ	0.4 U
SILVER	c	c	c	c	4.9 U	1.0 U	1.4 U	2 U	1.2 U	4 U	0.08	1 <	1.4 UJ	3.3 BJ
SODIUM	d	d	d	d	165 BJ	207 BJ	221 B	215 BJ	823 BJA	215 BJ	- NR	236	361 BJ	252 BJ
THALLIUM	c	c	c	c	0.6 U	1.8 U	0.4 U	2 U	0.36 BJ	5 U	0.1 <	1 <	1.4 UJ	2.7 U
VANADIUM	14	40	12	43	21 BJ	29	20.6	29	31	29	30	28	41 J *	25
ZINC	106	127	104	130	109	114	116	114	110	114	107	108	117	111

TOTAL OUT (ACTION LIMIT)	0	1	0	1	1	0	1	2	2	2
TOTAL OUT (WARNING LIMIT)	1	0	0	0	0	0	1	1	2	0
TOTAL OUT (IDENTIFICATION)	0	1	0	0	0	0	0	0	0	0
TOTAL OUT (FALSE POSITIVE)	0	0	0	0	0	0	0	0	0	0

12/22/1987

ORL FY 88 INORGANIC, CASE NO. 8123

SOIL SAMPLE (MG/KG)

ORNL

ELEMENT NAME	90 % CI @ b LOWER	90 % CI @ b UPPER	95 % CI @ b LOWER	95 % CI @ b UPPER	Q2	R2	S1	T1	V2	W1	X1	X2	Y1	Y2
ALUMINUM	9140	16700	8320	17500	19700 X	8090 X	8960 0	13500 X	12600	7230 X	8430 0	11800	13800	9880
ANTIMONY	c	c	c	c	11 [1]	2.5 U	12 U	4.0 U	0.46 U?	0.17 U	6 U	5 U	7.0 U	12 U
ARSENIC	4.3	9.6	3.7	10	5.9	4.7	10 E 0	9.5	9.3	4.1 0	9.2 E?	7	6.4 E	7.1
BARIUM	123	162	119	166	155	116 X	139	132	141	131 E	133	137 E	149	131
BERYLLIUM	c	c	c	c	0.73 [1]	0.35 B	0.5 U	0.3 [1]	0.4 [1]	0.71 [1]	0.5 ?	0.74 [1]	0.58 U	1.1 U
CADMIUM	c	c	c	c	1	0.6	2 U	1.2	0.62	0.75 [1]	1 U	1.1	1.0	1.4
CALCIUM	57100	69500	55700	70800	61000	63200	66400	64000 E	65000	62000 E	58400	62800	55600 ? X	59200
CHROMIUM	12	24	11	25	23	11 0	14	14	18	11 0	13.4	19 E	21	30 X
COBALT	4.9	10	0.00	11	8.2 [1]	6.6 ?	6.7 [1]	6.9 [1]	6.4	8.4 [1]	7.9 B	9.2	7.2 [1]	7.8 [1]
COPPER	29	43	27	44	35 E	32	40	40	37	34.6 E	34.2	37	32	35
IRON	15700	21000	15100	21500	19200	16900	17000	16900	18400	13000 E X	16300	16700	17700	18200
LEAD	79	106	76	109	119 X	110 X	96	99	93	92.4	87.3 ?	102	78 E 0	100 0
MAGNESIUM	24200	27200	23800	27500	24900	26200	27000	25200	27500 0	25200	23800 0	24900	23800 0	25600 E
MANGANESE	513	674	496	692	574	594	640	636 E	565	570 E	521	558	548	575
MERCURY	c	c	c	c	0.1 U	0.02 U	0.1 U	0.2	0.05	0.07 U	0.03	0.04	0.4	0.1 U
NICKEL	14	26	13	27	20 E	17.4	20	18	21	16.1	18.9 ?	22	19	23
POTASSIUM	1350	2930	1180	3100	4240 E X	1610	1730 [1]	1534	2170	1070 X	1290 0	2370	2250	1890
SELENIUM	c	c	c	c	0.22 [1]	0.2 U	25 U	1 U	0.31 [1]	0.19 U	0.4 U?	0.30 [1]	1.1	0.4 U
SILVER	c	c	c	c	0.91 U	0.4 U	2 U	2 U	0.57 [1]	0.62 U	1 U	1.1 [1]	5.0	1.0 U
SODIUM	d	d	d	d	276 [1]E	177 B	545 U	261 U	104	148 [1]	511 B	218 [1]	258 [1]	151 [1]
THALLIUM	c	c	c	c	0.28 [1]	0.4 U	5 U	2 U	0.47 [1]	0.19 U	0.4 U?	0.14 U	0.99 [1]SA	0.4 U
VANADIUM	14	40	12	43	39	10.6	20 [1]	18	30	22.6 E	20.0 ?	28 E	27	26
ZINC	106	127	104	130	124	96.6 X	117	96 A X	114	112 E	101 X	115	118	120
TOTAL OUT (ACTION LIMIT)					3	4	0	1	0	3	1	0	1	1
TOTAL OUT (WARNING LIMIT)					0	1	2	0	1	2	3	0	2	1
TOTAL OUT (IDENTIFICATION)					0	0	0	0	0	0	0	0	0	0
TOTAL OUT (FALSE POSITIVE)					0	0	0	0	0	0	0	0	0	0

12/22/1987

001 FY 88 INORGANIC, CASE NO. 0123

SOIL SAMPLE (MG/KG)

ELEMENT NAME	90 % CI 0 b		95 % CI 10 b			
	LOWER	UPPER	LOWER	UPPER	Z1	Z2
ALUMINUM	9140	16700	8320	17500	14100	12200
ANTIMONY	c	c	c	c	89	12 U
ARSENIC	4.3	9.6	3.7	10	5	6.6
BARIUM	123	162	119	166	140	143
BERYLLIUM	c	c	c	c	0.81 U	0.6 U
CADMIUM	c	c	c	c	0.83 U	1 U
CALCIUM	57100	69500	55700	70800	59500	69700 0
CHROMIUM	12	24	11	25	20	18 J
COBALT	4.9	10	0.00	11	6.9 U	8.9 U
COPPER	29	43	27	44	40	37
IRON	15700	21000	15100	21500	17900	18200
LEAD	79	106	76	109	95	100
MAGNESIUM	24200	27200	23800	27500	25700	26300
MANGANESE	513	674	496	692	569	612
MERCURY	c	c	c	c	0.25	0.2 U
NICKEL	14	26	13	27	22	21
POTASSIUM	1350	2930	1180	3100	2410	2220
SELENIUM	c	c	c	c	0.35 U	10 U
SILVER	c	c	c	c	1.6 U	2 U
SODIUM	d	d	d	d	244 UE	311 U
THALLIUM	c	c	c	c	0.37 U	10 U*
VANADIUM	14	40	12	43	29	27
ZINC	106	127	104	130	117 E	120

TOTAL OUT (ACTION LIMIT)	0	0
TOTAL OUT (WARNING LIMIT)	0	1
TOTAL OUT (IDENTIFICATION)	0	0
TOTAL OUT (FALSE POSITIVE)	0	1

12/23/87

001 FY 88 INORGANIC, CASE NO. 8123

SOIL SAMPLE (MG/KG)

ELEMENT NAME	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI # b LOWER	95 % CI # b UPPER	P2		M1		M2	
ALUMINUM	9140	16700	8320	17500	17000	B	11244		12500	
ANTIMONY	c	c	c	c	-0.24 U		-2 U		13	
ARSENIC	4.3	9.6	3.7	10	6.8		1.19	X	6.53	
BARIUM	123	162	119	166	160		138.5		155	
BERYLLIUM	c	c	c	c	0.55		0.9		-0.5 U	
CADMIUM	c	c	c	c	0.6		3		-0.5 U	
CALCIUM	57100	69500	55700	70800	66000		54650	B	43000	X
CHROMIUM	12	24	11	25	31	X	17		52	X
COBALT	4.9	10	0	11	8.8		16.5	X	8	
COPPER	29	43	27	44	36		39.5		29.9	
IRON	15700	21000	15100	21500	18000		14585	X	15000	X
LEAD	79	106	76	109	100		132.5	X	84	
MAGNESIUM	24200	27200	23800	27500	10000	X	28270	X	21500	X
MANGANESE	513	674	496	692	580		558		500	B
MERCURY	c	c	c	c	-0.2 U		-0.2 U		-0.1 U	
NICKEL	14	26	13	27	24		37.2	X	17	
POTASSIUM	1350	2930	1180	3100	3400	X	1916		1720	
SELENIUM	c	c	c	c	-0.3 U		-		0.39	
SILVER	c	c	c	c	-0.6 U		1.34		-0.5 U	
SODIUM	d	d	d	d	360		370		190	
THALLIUM	c	c	c	c	-0.24 U		19.75		9	
VANADIUM	14	40	12	43	40		50.5	X	-50 U	X
ZINC	106	127	104	130	120		141.5	X	90	X

TOTAL OUT (ACTION LIMIT)	3	8	6
TOTAL OUT (WARNING LIMIT)	1	1	1
TOTAL OUT (IDENTIFICATION)	0	0	1
TOTAL OUT (FALSE POSITIVE)	0	0	0

b CONFIDENCE INTERVALS (CI) WERE DERIVED FROM LABORATORY SUBMITTED VALUES. OUTLIERS WERE REJECTED USING GRUBB'S TEST. LESS THAN VALUES (<x), U-VALUES, AND NON-SUBMITTED VALUES (-) WERE NOT USED IN THE CALCULATION OF THE CI.
c CI WERE NOT SET SINCE 40 % OR MORE OF THE LABORATORIES SUBMITTED A NON-USABLE VALUE.
d CI NOT USED. SEE SCORING NOTES, PROCEDURE FOR GRADING U-VALUES NO. 4.
A INDICATES AN OUTLIER FROM GRUBB'S TEST. NOT USED IN THE CALCULATION OF THE CI. POINTS DEDUCTED.
B INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS (1)-FLAG.
D INDICATES A DILUTION.
E INDICATES A VALUE ESTIMATED OR NOT REPORTED DUE TO THE PRESENCE OF INTERFERENCES.
S INDICATES VALUE DETERMINED BY THE METHOD OF STANDARD ADDITION.
NR NOT REQUIRED.
U ANALYZED FOR BUT NOT DETECTED.
X VALUE WAS OUTSIDE BOTH THE WARNING AND THE ACTION LIMIT. POINTS DEDUCTED.
0 VALUE WAS OUTSIDE THE WARNING LIMIT ONLY. NO POINTS DEDUCTED.
- VALUE NOT SUBMITTED FOR THIS PARAMETER.
* INDICATES A FALSE POSITIVE BY DIXON'S TEST. POINTS DEDUCTED.
? BEST ESTIMATE OF VALUE AND/OR QUALIFIER. POOR COPY AND/OR ILLEGIBLE VALUE SUBMITTED.
< INDICATES A VALUE LESS THAN THE CRDL OR THE INSTRUMENT DETECTION LIMIT.
(1) INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS B-FLAG.
W WARNING LIMIT (90 PERCENT CI).
AA ACTION LIMIT (95 PERCENT CI).

SCORING NOTES: PROCEDURE FOR GRADING U-VALUES

1. ANY U-VALUE RESPONSE (INSTRUMENT DETECTION LIMIT) > CRDL FOR THE APPROPRIATE DILUTION, EVEN IF IT IS IN THE 95 % CI, CAUSES A POINT DEDUCTION. IF 25 % OR MORE OF THE LABORATORIES REPORT A U-VALUE OVER THE CRDL, NO POINTS ARE DEDUCTED FOR ANY LABORATORY, POSSIBLY INDICATING A MATRIX INTERFERENCE IN THE SAMPLE.

2. IF CRDL < LOWER CI, THEN USE CI AS SET.

3. IF LOWER CI < CRDL AND CRDL < UPPER CI, THEN SET LOWER CI TO ZERO (0).
   NO POINTS DEDUCTED FOR IDENTIFICATION OR QUANTITATION LESS THAN OR EQUAL TO THE CRDL.

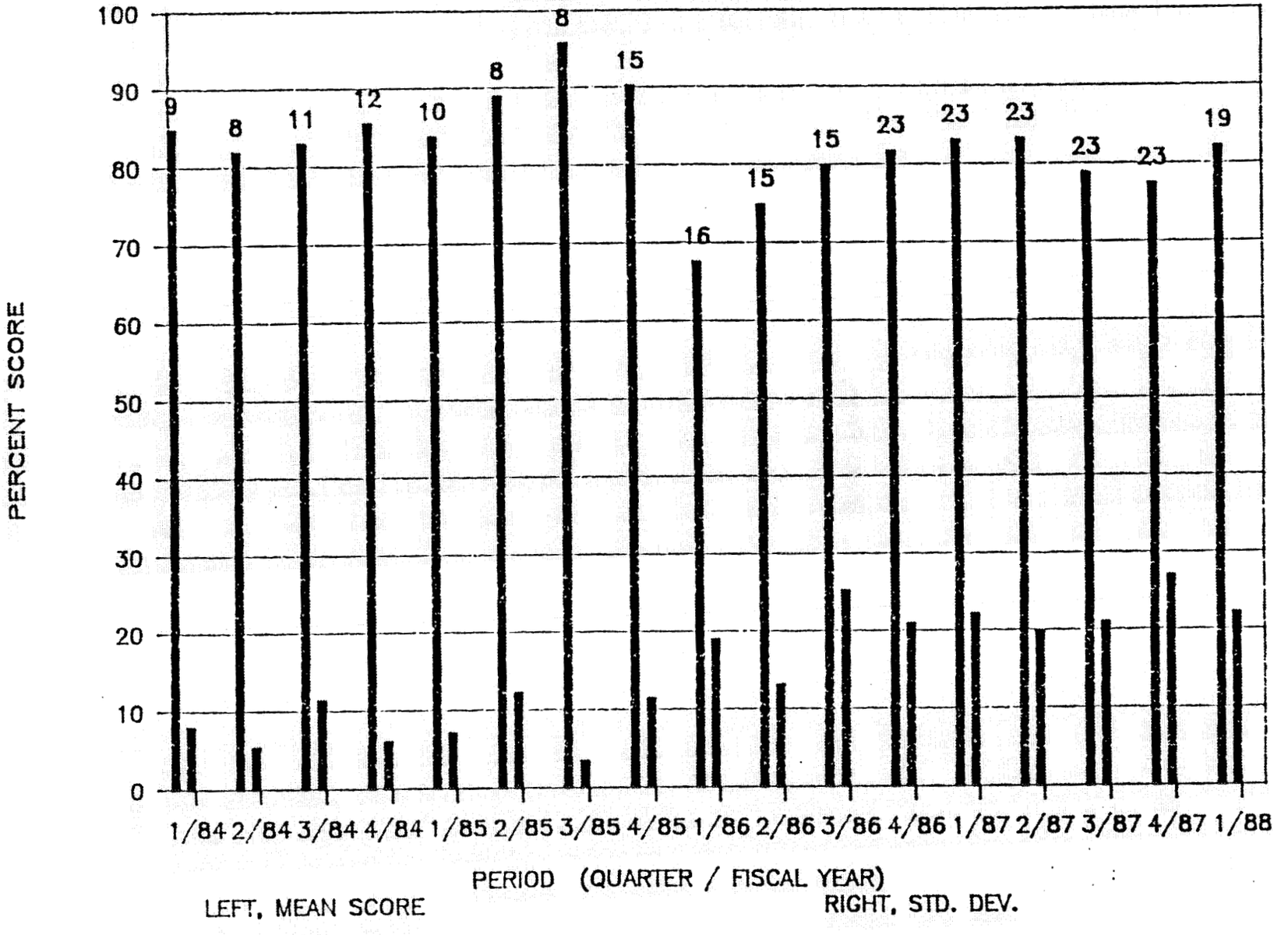
4. IF CRDL > LOWER AND UPPER CI, THEN NO CI USED. PARAMETER DROPPED FROM THE SCORING.
   NO POINTS DEDUCTED FOR IDENTIFICATIONS OR QUANTITATIONS.
   FALSE POSITIVES POSSIBLE.

NOTE THAT ONLY CLP LABORATORIES WERE USED IN THE CALCULATION OF THE CI.

NOTE THAT A U-VALUE FOLLOWED BY X (U X) MEANS THAT POINTS WERE LOST FOR IDENTIFICATION AND QUANTITATION.

CONTRACT LABORATORY PROGRAM

INORGANIC QB TREND CHART



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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 · FTS 545-2100)

NOV 06 1987

NOV 11 1987

Mr. W. R. Laing
Oak Ridge National Laboratory
P.O. Box X MS 127
Bethel Valley Rd.
Oak Ridge, TN 37831-6127

Good Work! Our grade on 4th Quarter PEs was 96.0 vs an average grade of 78 for 23 CLP labs. Bill Laing

Dear Mr. Laing:

For your information and review, enclosed are the results for your participation in the EMSL-LV Fourth Quarter Inorganic Performance Evaluation Study (QB4 FY-87, Case No. 7761). Your laboratory was coded H1. The samples were prepared by the EMSL-LV and consisted of one soil sample and two water samples. The homogeneous soil sample and one of the water samples were spiked with inorganic parameters. The other water sample was a blank. The samples were to be prepared and analyzed by current IFB procedures as per contract. All laboratories received the samples single blind. Enclosed is more general information about the Superfund Performance Evaluation Program.

Thank you for your participation in this study. I trust that this information will be beneficial in your pursuit of excellence as a member of the community of laboratories analyzing hazardous waste samples.

Sincerely,

Larry Butler, Ph.D.
Supervisor
Performance Evaluation Program
Quality Assurance Research Branch
Quality Assurance Methods Development Division

Enclosures

cc: (w/out enclosures)
Mike Hurd, OERR
Carla Dempsey, OERR
William Langley, OERR

General Information About the Superfund
Performance Evaluation Program

Acceptance windows were determined from the actual data submitted by first rejecting outliers by Grubb's Test, and then determining the 90 and 95 percent confidence intervals from the remaining values using the EMSL-LV computer program "FENCER." Further details about acceptance intervals are available in the footnotes to the enclosed spreadsheets. Also in the footnotes to the spreadsheets is the EMSL-LV method for scoring of U-flagged values. This applies only to laboratories which may be reporting false negatives.

This will probably be the last time that Inorganic Quarterly Blinds are scored in this fashion. In the future you will be receiving an inorganic laboratory profile package. Acceptance intervals will be generated using a robust technique called "BiWeight."

For your convenience, enclosed are the contractually required score sheet for your laboratory, a coded summary of scores, a set of coded analytical spread sheets, and a graphical programmatic representation of inorganic hazardous waste laboratory performance versus time. The left bar represents the mean score for each quarter. The number at the top of the left bar is the number of laboratories in each study. The right bar is the standard deviation of scores for each study. Your laboratory will benefit from comparing its score with the programmatic values (left bars).

The EMSL-LV is adhering to the National Program Office guidelines with the following requirement. For each parameter which you failed to correctly identify or quantitate or which you reported as a false positive (parameters not added into this PE sample, but found by your laboratory at concentrations exceeding contract requirements), please document in a letter to your Project Officer and myself within two weeks of receipt of this letter, the source of the problem(s) and the corrective action(s) taken to prevent the problem from occurring in future quarterly blind PE samples.

ROUTINE INORGANIC SCORE SHEET

Laboratory:OAK RIDGE NATIONAL (ORNL) (D) Date:15-Oct-87
Quarter: 4 Fiscal Year: 87

Maximum Number of Points Possible: 100

I. Sample 1, Case:7761 - 0

A. Identification (-5 Points X Number of Missed Identifications 0) ----------

B. Quantitation (Points Lost) - 0.0 ----------

```
---     ---                                  --- 1.5 ---
|       | Total Number of  _   Number          |        |
|       | Elements (  17 )     Missed (    0 )  |        |
| 1 -   | ------------------------------------- |        | X -50
|       |       Total Number of                |        |
|       |       Elements   (     17 )          |        |
---     ---                                  ---     ---
```

C. False Positives/Unmet CRDL's (-2 Points X False Positives and Unmet CRDL's 0) - 0 ----------

II. Sample 2, Case:7761 - 0

A. Identification (-5 Points X Number of Missed Identifications 0) ----------

B. Quantitation (Points Lost) - 3.5 ----------

```
---     ---                                  --- 1.5 ---
|       | Total Number of  _   Number          |        |
|       | Elements (  21 )     Missed (    1 )  |        |
| 1 -   | ------------------------------------- |        | X -50
|       |       Total Number of                |        |
|       |       Elements   (     21 )          |        |
---     ---                                  ---     ---
```

C. False Positives/Unmet CRDL's (-2 Points X False Positives and Unmet CRDL's 0) - 0 ----------

III. Duplicate Precision (Maximum of 10 Points Deducted) (-1 Point X Number of Duplicate Results Outside of Control Limits 0) - 0 ----------

Aqueous: None
Solid: None

IV. Matrix Spikes (Maximum of 10 Points Deducted) (-0.5 Point X Number of Matrix Spikes Outside of Control Limits 1) - 0.5 ----------

Aqueous: None
Solid: Sb

Total Number of Points Deducted: 4.0 Points
Laboratory Point Score: 96.0 Points
Laboratory Percent Score: 96.0 %

CODED SUMMARY OF SCORES
FOURTH QUARTER INORGANIC FY 87 DOE SINGLE BLIND
(QB 4 FY 87, CASE NO. 7761)

CODE	POINT SCORE	% SCORE	NO. OF DAYS LATE
H1	96.0	96.0	0
W1	95.5	95.5	16
D1	81.6	81.6	35
X1	*		
A2	*		

ORNL

* NO DATA SUBMITTED AS OF OCTOBER 23, 1987

10/23/87 Revision
QB 4 FY 87 INORGANIC, CASE NO. 7761

AQUEOUS SAMPLE (ug/L)

PARAMETER	90 % CI B b LOWER	90 % CI B b UPPER	95 % CI B b LOWER	95 % CI B b UPPER	A1	C1	B1	E1	F1	G1	H1	J1	L1	M1	N1	O1	P1
ALUMINUM	1875	2101	1851	2125	1920	1940	2140 X	1930	1900	1939	2010	1880	1900	2050	1990	1850 X	1950
ANTIMONY	0	76	0	82	35.5 []	41 []	-47 U X	72	46.3	61	43 []	46	37.8 B	78 B	67	42	42 []
ARSENIC	41	54	39	55	47	45	49	48 B	39.7 B	43	40 B	44	38 X	48	48	43	49
BARIUM	597	685	588	694	650	622	658	645	630	641	650	614	604	652	621	623	609
BERYLLIUM	0	6.1	0	6.4	5.2	4 []	4.6 []	4.7 []	4.4 []	5	4.8 []	-5 U	2.6 B	4.8 []	6.1 ?	-5 (	2.3 []
CADMIUM	39	51	38	52	45.5	49	47	38 B	40	43	46	46	44.6	46	47	44	46.3
CALCIUM	20686	24644	20258	25063	22800	22500	22100	22500	21200	21188	23600	22600	22100	22000	22600	22000	22600
CHROMIUM	174	201	171	204	194	186	187	188	180	176	196	179	195	188	215 ? A X	162 X	190
COBALT	d		d		26.2 []	25 []	24 []	21 []	20 []	22 []	26 []	-50 U	25.1 B	24 []	24 []	-50 (	39 []
COPPER	127	155	124	158	148	147	139	140	130	138	140	127	134	145	125 B	130	133
IRON	3471	4081	3407	4146	3680	3610	3800	3920	3600	3577	3630	3560	3820	3860	3780 ?	3500	3900
LEAD	152	223	145	230	153	199	203	202 B	200	171	192	182	178	179	257 B ? A X	170	209
MAGNESIUM	6739	8115	6594	8261	7590	7190	7230	7530	7300	7169	7280	7440	6680 B	7450	7680	7100	7730
MANGANESE	784	888	773	898	838	821	838	854	860	799	839	801	821	836	834 ?	790	814
MERCURY	0.64	1.6	0.53	1.7	0.7	1.2	0.8	1	0.5 X	0.55	1.1	1.03	9 X	1.2	1.2	1.5	1.3
NICKEL	d		d		25.2 []	25 []	32 []	21 []	39 []	27 []	30 []	-40 U	32.5 B	31 []	39 []	36	-28 U
POTASSIUM	d		d		1930 []	3100 []	4830 []	2390 []	3100 []	3148	4200 []	3150	2820 B	3050 []	2310 []	-5000 (	3190 []
SELENIUM	84	164	75	173	153 B	114	130 B	120 B	100.4	110	134	120	147	130	124	116	117 B
SILVER	c		c		-7 U	-9 U	-4.5 U	-6 U	-5 U	-3 U	3.2 []	-10 U	-5 U	-4 U	-9 U ?	-5 (	-7.7 U
SODIUM	33173	40314	32418	41070	36200	33900	38500	38000	34500	35994	38000	35900	35000	36600	37200 ?	35000	34500
THALLIUM	c		c		10.6	-10 U E	8.1 []	8 []	8.3	6.6	8.7 []	7	5.3 B	8 []	8.5 []	6	6.8 []
VANADIUM	d		d		28.3 []	28 []	27 []	29 []	26 []	27 []	34 []	-50 U	30.3 B	28	33 []	-50 (	29 []
ZINC	525	611	516	620	582	571	540 E	606 E	540	588	564	551	592	553	554 ?	510 X	559
TOTAL OUT (ACTION LIMIT)					0	0	1	0	1	0	0	0	2	0	2	3	0
TOTAL OUT (WARNING LIMIT)					0	0	0	1	1	0	1	0	1	1	1	0	0
TOTAL OUT (IDENTIFICATION)					0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL OUT (FALSE POSITIVE)					0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL OUT (CRD)					0	1	0	1	3	1	0	0	2	0	0	NA	0
PARAMETERS MISSED						Tl		Pb	Ba, Fe, Zn	Se			Ba, Ag				
PARAMETERS MISSED																	
PARAMETERS MISSED																	
PARAMETERS MISSED																	
TOTAL OUT (DPO)					0	0	0	0	0	0	0	0	0	0	0	NA	0
PARAMETERS MISSED																	
PARAMETERS MISSED																	
PARAMETERS MISSED																	
PARAMETERS MISSED																	

NOTE: A negative value followed by a "U" indicates that the value was not used in the calculation of the CI.

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QB 4 FY 87 INORGANIC, CASE NO. 7761

AQUEOUS SAMPLE (ug/L)

PARAMETER	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI # b LOWER	95 % CI # b UPPER	D1	R1	S1	T1	W1	Y1	C2	D2	E2	G2	I2
ALUMINUM	1875	2101	1851	2125	1880	1960	2070	1740 X	1920	1903	2010 E	1970	1470 A X	NR	1840 X
ANTIMONY	0	76	0	82	41 []	-60 U	50 []	75	52 B	36.5	41 []	45.2 []	-54 U	460 X	28 []
ARSENIC	41	54	39	55	45	52	48	44	42.6	50.5	39	48.1	48	460 X	41
BARIUM	597	685	588	694	645	667	682	620	628	797 X	648 E	660	673	6700 X	566 X
BERYLLIUM	0	6.1	0	6.4	4 []	-5 U	5.2	6	5.1 E	13.8 X	4.7 []	4.52	3 []	45 X	5 []
CADMIUM	39	51	38	52	41	51.5	50	47	44.7	49	43	44.9	39	450 X	42 E
CALCIUM	20686	24644	20268	25063	21200	17990 X	24300	23400	21200	-	X 22500	22900	22000	NR	20600
CHROMIUM	174	201	171	204	204 S	165 X	195	130 X	188	188	193	184	181	1800 X	169 X
COBALT	d		d		16 []	-50 U	24 []	25 (	-21.4 U	40	25 []	16.5	18 []	230 +	18 []
COPPER	127	155	124	158	130	120 X	153	130	133	140	138	130	140	1250 X	127
IRON	3471	4081	3407	4146	3580	3385 X	3960	3810	3640	3743	3760	3780	4010	NR	3400 X
LEAD	152	223	145	230	185	204	203	170	174	204	154	181	209	1820 X	144 S X
MAGNESIUM	6739	8115	6594	8261	7110	6925	8380 X	6700	7010	-	X 7250	7290	7390	NR	7140
MANGANESE	784	868	773	898	796	835	905 X	830	808	858	850	833	855	NR	787
MERCURY	0.64	1.6	0.53	1.7	1.4	1	1.2	2.1 X	1.1	1.27	0.71	7.6 X	1.2	11.5 X	0.9
NICKEL	d		d		44	-40 U	32 []	26	35	27	15 []	22.2	24 []	2.6	-23 U
POTASSIUM	d		d		3880 []	-5000 U	3610 []	3160	3170 B	-	3780	3690	2800 []	NR	3100 []
SELENIUM	84	164	75	173	122 S	120	103	130	119	126	116	125	122	1300 X	120
SILVER	c		c		-0.7 U	-10 U	-5 U	10 (	0.53 B	0.35	-1.5 U	-10 U	-5.6 U	0.3	-5.2 U
SODIUM	33173	40314	32418	41070	33400	34250	39900	37000	34900	-	X 36000	38100	39500	NR	34200
THALLIUM	c		c		-3.9 U	-10 U	-10 U	30 (	7	9.1	7.4 []	7	-10 U	82 +	9 []
VANADIUM	d		d		30 []	-50 U	29 []	75 (	29.1	34.5	28 []	28.6	23 []	260 +	-39 U
ZINC	525	611	516	620	539	490 X	612	550	542	557	562	572	555	5600 X	543

	D1	R1	S1	T1	W1	Y1	C2	D2	E2	G2	I2
TOTAL OUT (ACTION LIMIT)	0	5	2	3	0	5	0	1	1	11	5
TOTAL OUT (WARNING LIMIT)	1	1	1	1	0	0	1	0	0	0	1
TOTAL OUT (IDENTIFICATION)	0	0	0	0	0	3	0	0	0	0	0
TOTAL OUT (FALSE POSITIVE)	0	0	0	0	0	0	0	0	0	1	0
TOTAL OUT (CRD)	2	0	0	NA	2	0	1	0	2	NA	0
PARAMETERS MISSED	Sb, Th				Sb, Se		Ag		Sb, Cd		
PARAMETERS MISSED											
PARAMETERS MISSED											
PARAMETERS MISSED											
TOTAL OUT (RPD)	0	0	0	NA	0	0	0	0	0	NA	0
PARAMETERS MISSED											
PARAMETERS MISSED											
PARAMETERS MISSED											
PARAMETERS MISSED											

NOTE: A negative value followed by a "U" indicates that the value was

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AQUEOUS SAMPLE (ug/L)

PARAMETER	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI # b LOWER	95 % CI # b UPPER	L2	M2	N2	O2	P2	Q2	R2	T2	U2	V2	W2	X3	Y3
ALUMINUM	1875	2101	1851	2125	1570 A X	2040	1900	1860 *	1850 X	2240 X	2000	2010	2030	2050	1820 X	2030	1930
ANTIMONY	0	76	0	82	-60 U	39	70	-40 U	49 []	57 []	-50 U	50 []	47 []	38 []	36	-60 U	28 []
ARSENIC	41	54	39	55	46	49	27.9 X	39 *	52	48	47.2	61 A X	48	47	48	48	73 S ? A X
BARIUM	597	685	588	694	600	672	690	680 E	651	737 X	603	645	644	692 *	606	650	629
BERYLLIUM	0	6.1	0	6.4	-5 U	5	5	3 []	3.9 []	5.2	3 []	5.3	1.1 []	-5 U	4	-3 U	4.5 []
CADMIUM	39	51	38	52	48	45	45	40	42	57 X	46	46	45	43	38	45	47
CALCIUM	20686	24644	20268	25063	23100	22800	14000 X	21700	21100	26500 X	25100 X	23500	21800	22800	19 X	23000	20400 ? *
CHROMIUM	174	201	171	204	176	191	210 X	171 *	186	203 *	198	191	188	185	177	191	184
COBALT	d		d		30 []	21	-50 U	50	23 []	30	24 []	25 []	22 []	-50 U	7	-30 U	20 []
COPPER	127	155	124	158	139	134	134	141	139	161 X	134	144	137	142	128	148	128
IRON	3471	4081	3407	4146	3740	3800	3400 X	3920	3470 *	4330 X	4060	3860	3910	3940	3300 X	3630 E	3500 ?
LEAD	152	223	145	230	150 *	174	190	188	210	186	212	220	180	178	195	170	191
MAGNESIUM	6739	8115	6594	8261	7190	7370	6100 X	7300	7270	8430 X	7750	7660	7160	7730	6.87 X	7200	6730 *
MANGANESE	784	888	773	898	800	826	800	832	811	1220 X	824	852	825	845	773	835	832
MERCURY	0.64	1.6	0.53	1.7	1.2	1	1.2	1.4	0.22 X	-0.1 U X	0.81	1.1	1.3	1.1	1.05	0.7	1.6
NICKEL	d		d		-30 U	24	-50 U	30 []	28 []	30 []	33 []	26 []	29 []	-40 U	-25 U	27 []	28 []
POTASSIUM	d		d		3190 []	3300	3500	3680 *	3300 []A	4010 []	3110 []	3640 []	3420 []	3200 []	2.56	3400 []	3410 []
SELENIUM	84	164	75	173	133 S	125	109	165 S *	125	163	124 S	170 *	112	117	135	130	172 S *
SILVER	c		c		-4 U	-5 U	-50 U	-9 U	-4 U	-4 U	-8 U	-4 U	-6 U	-10 U	-10 U	-10 U	-10 U
SODIUM	33173	40314	32418	41070	36300	37800	36000	35400	36100	41600 X	38100	38700	36100	37700	35.3 X	38700	32800 *
THALLIUM	c		c		-10 U	12	-50 U	-9 U	7.6 []	-7.2 U	-10 U	-10 U	-10 U	5.4 []	7.5	-10 U	-10 U
VANADIUM	d		d		-50 U	31	100	-40 U	28 []	44 []	24 []	30 []	28 []	-50 U	17	28 []	20 [] ?
ZINC	525	611	516	620	539	564	530	552	570	631 X	562	583	564 E	581	502 X	530	591

	L2	M2	N2	O2	P2	Q2	R2	T2	U2	V2	W2	X3	Y3
TOTAL OUT (ACTION LIMIT)	1	0	5	0	2	11	1	1	0	0	6	0	1
TOTAL OUT (WARNING LIMIT)	1	0	1	4	1	1	0	1	0	1	2	0	4
TOTAL OUT (IDENTIFICATION)	0	0	0	0	0	1	0	0	0	0	0	0	0
TOTAL OUT (FALSE POSITIVE)	0	0	0	1	0	0	0	0	0	0	0	0	0
TOTAL OUT (CRD)	1	0	0	2	0	2	5	0	0	0	0	0	2
PARAMETERS MISSED	Fe			As, Cd		As, Hg	Al, Hg						Sb, Au
PARAMETERS MISSED							Ag, Tl						
PARAMETERS MISSED							Zn						
PARAMETERS MISSED													
TOTAL OUT (RPD)	0	0	0	2	0	1	0	0	0	0	0	0	1
PARAMETERS MISSED				Cd, Se		Mn							As
PARAMETERS MISSED													
PARAMETERS MISSED													
PARAMETERS MISSED													

NOTE: A negative value followed by a "U" indicates that the value was not used in the calculation of the CI.

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[redacted] 4 FY 87 INORGANIC, CASE NO. 7761

[redacted]EDUS SAMPLE (ug/L)

PARAMETER	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI # b LOWER	95 % CI # b UPPER	E3	F3	G3	H3	I3
[redacted]UMINUM	1875	2101	1851	2125	1970	2020	1777 A X	1910	2110 *
[redacted]ANTIMONY	0	76	0	82	-50 U	-53 U	40 []	48 []	46 B
[redacted]RSENIC	41	54	39	55	55 *	40 *	49	51	46
[redacted]ARIUM	597	685	588	694	639	661	612	631	691 *
[redacted]ERYLLIUM	0	6.1	0	6.4	3.3 []	4 []	4.4 []	5.5	3.9 B
[redacted]ADMIUM	39	51	38	52	49 E	44	44.8	45	41
[redacted]ALCIUM	20686	24644	20268	25063	22000	23300	21540	23800	23200
[redacted]HROMIUM	174	201	171	204	187	200	175	177	198
[redacted]OBALT	d		d		23 []	-23 U	23 []	25 []	26 B
[redacted]OPPER	127	155	124	158	143 E	141	134	148	150
[redacted]RON	3471	4081	3407	4146	3620	3880	3513	3680	3940
[redacted]EAD	152	223	145	230	184	188	193	161	183
[redacted]AGNESIUM	6739	8115	6594	8261	7290 E	7680	6805	7200	7940 E
[redacted]ANGANESE	784	848	773	858	810	856	769 X	810	866
[redacted]ERCURY	0.64	1.6	0.53	1.7	1.3	1.2	1.3	1.5	1.3
[redacted]ICKEL	d		d		33 []	24 []	35 []	-33 U	37 B
[redacted]OTASSIUM	d		d		3040 []	3260 []	3157 []	1870 []	5000 +
[redacted]ELENIUM	64	164	75	173	76 *	121	113	129	110
[redacted]ILVER	c		c		-9 U	-7 U	-2.8 U	-4.9 U	-7 U
[redacted]ODIUM	33173	40314	32418	41070	34300	37900	34530	36800	38100
[redacted]HALLIUM	c		c		7 []	9.4 [] *	-10 U	6.7 []	7.9 B
[redacted]ANADIUM	d		d		27 []	25 []	27.7 []	27 []	35 B
ZINC	525	611	516	620	585	576 E	532	540	596 E

TOTAL OUT (ACTION LIMIT)	0	0	2	0	0
TOTAL OUT (WARNING LIMIT)	2	1	0	0	2
TOTAL OUT (IDENTIFICATION)	0	0	0	0	0
TOTAL OUT (FALSE POSITIVE)	0	0	0	0	1
TOTAL OUT (CRD)	0	0	0	0	1
PARAMETERS MISSED					Fe
PARAMETERS MISSED					
PARAMETERS MISSED					
PARAMETERS MISSED					
TOTAL OUT (RPD)	0	0	0	0	0
PARAMETERS MISSED					
PARAMETERS MISSED					
PARAMETERS MISSED					
PARAMETERS MISSED					

NOTE: A negative value followed by a "U" indicates that the value was not used in the calculation of

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QB 4 FY 87 INORGANIC, CASE NO. 7761

SOIL SAMPLE (mg/Kg)

PARAMETER	50 % CI # b LOWER	50 % CI # b UPPER	95 % CI # b LOWER	95 % CI # b UPPER	A1	C1	E1	F1	G1	H1	J1	L1	M1	N1	O1	P1	Q1
ALUMINUM	8640	20386	7391	21635	21700 X	17400	11300	12900	10514	12600	19400	7440	11200	14200	14000	9560	13900
ANTIMONY	c		c		23.6	6.7 [] S	58 +	1.3	2.9 []	16	20	9.4 B	-29 U	-24 U	16.5	6 []	-4.8 U
ARSENIC	104	188	95	197	175	149	152	110	153	158	130	71.7 X	155	154	175	168 S	170
BARIUM	150	195	145	200	193	179	164	150	158	159	155	139 X	167	166	163	138 X	186
BERYLLIUM	3.5	4.7	3.4	4.8	4.2	4.2	4.3	3 A X	3.8	3.9	3.6	3.5	4.1	3.8 ?	4	3.2 X	4
CADMIUM	11	21	10	22	18.1	15 E E	16	18	12.9	15	17.5	13.3	13	14 ?	17	18	18
CALCIUM	32348	36328	31923	36745	34300	34700	33800	30500 A X	31520 X	35600	34700	32100 S	32900	34500 ?	33000	34000	34000
CHROMIUM	49	69	47	71	65.1	63	57	58	49.7	57	41 X	49.3	52	59	47 S	51	50
COBALT	27	37	26	39	35	37	35	34	27.2	34	30.2	23 X	30	33 ?	32	36	33
COPPER	1171	1300	1157	1314	1280	1240	1250	1100 A X	1186	1150 X	1190	1100 X	1230	1210	1090 X	1010 X	1180
IRON	20452	26502	19820	27144	24000	26500	24700	21000	18359 X	21200	24011	15700 X	21400	23300 ?	22300	19000 X	23400
LEAD	62	118	56	124	64.2	95	120 S S	79.8	79	90	77.5	76.4	86	97	73	69	94
MAGNESIUM	17949	22685	17445	23193	21100	23200 X	21300	18200	18938	19300	20900	17200 X	18000	20500	20000	20100	20500
MANGANESE	1022	1159	1008	1173	1090	1080	1100	1100	1008	1090	1070	994 X	1060	1100 ?	1015 S	894 X	1100
MERCURY	1.1	2.8	0.88	3	1.01 S	NS X	2	1.5	1.9	1.9	1.87	2.1	2	2.2	2.7	2.1	2.4
NICKEL	25	39	24	41	41.2 X	37 E	30	37	27.2	30	28.9	21.1 E X	29	35 ?	31	30	35 X
POTASSIUM	488	2297	296	2490	2370 S	1840 E E	968 []	1200	1093	1370	2060	704 B	506 []	947 []	1440	697 []	1310 []
SELENIUM	4.6	8.5	4.2	9	-5 U X	6.9 S S	6.1 S	7.1	4.4 S	8.2	12.1 X	2 B X	6.8	5.9	1.7 X	6.4	5.8
SILVER	3.4	8	2.9	8.6	4.6	7.1	6.5	4.2	5.18	7.3	6.2	5	4.6 []	-4.5 U X	-1 [X	6.9	5.1
SODIUM	c		c		-212 U	206 [] []	60 []	-200 U	54 []	74 []	66.3	264 B	56 []	-2060 U ?	-1000 [	-211 U	67 []
THALLIUM	4.5	7.6	4.2	7.9	6.6	5.8 S	6.3 S	5.4	5.6	5.2	6.5	6.8	5.9	7.9 S	5.6	4.8	4.8 []
VANADIUM	30	47	28	48	55 A X	44	36	40	29.5	38	44.2	27.3 X	33	37 ?	40	27 X	34
ZINC	376	458	367	466	442	436	415	390	373	383	427	329 X	370 S	412 ?	375 S	308 X	405
TOTAL OUT (ACTION LIMIT)					4	2	0	3	2	1	2	11	0	1	3	7	1
TOTAL OUT (WARNING LIMIT)					2	0	1	0	0	0	0	2	1	1	2	0	0
TOTAL OUT (IDENTIFICATION)					1	1	0	0	0	0	0	0	0	1	1	0	0
TOTAL OUT (FALSE POSITIVE)					0	0	1	0	0	0	0	0	0	0	0	0	0
TOTAL OUT (CRD)					1	3	4	3	1	1	0	4	1	1	NA	1	1
PARAMETERS MISSED					Pb	Hg, Se, Tl	Sb, Pb, Se, Tl	Be, Hg, Se	Se	Sb		Sb, Se, Ag, Zn	Sb	Sb		Ag	Sb
PARAMETERS MISSED																	
PARAMETERS MISSED																	
PARAMETERS MISSED																	
TOTAL OUT (RPD)					2	1	0	0	0	0	0	1	0	0	NA	0	0
PARAMETERS MISSED					Pb, Ag	Se						As					
PARAMETERS MISSED																	
PARAMETERS MISSED																	
PARAMETERS MISSED																	

NOTE: A negative value followed by a "U" indicates that the value was not used in the calculation of

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OB 4 FY 87 INORGANIC, CASE NO. 7761

SOIL SAMPLE (mg/Kg)

PARAMETER	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI # b LOWER	95 % CI # b UPPER	A1	B1	C1	D1	E1	F1	G1	H1
ALUMINUM	8640	20386	7391	21635	13282	11700	10200	9197	13700	14300	15300	12500
ANTIMONY	c		c		1.19	17	7.9 B	0.8	15	-12 U	-10 U	40 -4.6 U
ARSENIC	104	188	95	197	139.8	128	158	140	109	168	168	174 222 X
BARIUM	150	195	145	200	161.3	163	166	161	166	179	178	186 154
BERYLLIUM	3.5	4.7	3.4	4.8	3.68	3.5	4.9 E X	3.8 X	4 E	3.97	3.8	4.1 1.8 X
CADMIUM	11	21	10	22	14.48	21	13.8	16.2	14	13.1	18	15 14
CALCIUM	32348	36320	31923	36745	21721	X 34200	33000	-	X 31800 X	36000	35500	31600 X
CHROMIUM	49	69	47	71	55.92	52	60	49.2	55	55.2	54	56 52
COBALT	27	37	26	39	33.95	34 E	34.8	24 X	33	32.7	29	35 28
COPPER	1171	1300	1157	1314	1094	X 1250	1190	1259	1190	1250	1260	1100 X 1150 X
IRON	20462	26502	19820	27144	23110	21400 E	23300	22650	21800	23000	25400 E	21300
LEAD	62	118	56	124	90.38	88	88.7	87	66	87.1	83	88 81 S
MAGNESIUM	17949	22689	17445	23193	20373	21200	19300	-	X 19000	21000	20500	19500
MANGANESE	1022	1159	1008	1173	976	X 1070 E	1080	1120	1030	1098	1160 S	1050
MERCURY	1.1	2.8	0.88	3	2.65	2.1	2.2	1.62	2.2	0.959 S	2.4	1.8 2.2
NICKEL	25	39	24	41	37.95	29	30.3	28.7	28	30.4	27	32 26
POTASSIUM	488	2297	296	2490	1453	1060	900 B	-	X 1300	1250	1340	1200
SELENIUM	4.6	8.5	4.2	9	3.94	X 5.7	7 S	6.7	5.2	5.53 S	9.2 S X	8 7.7 S
SILVER	3.4	8	2.9	8.6	5.49	5.4	4.2	4.8	-0.3 U X	2.82 X	4.2	5 6.3
SODIUM	c		c		118	107 C	58.6 B	-	-9 U	-1000 U	-68 U	313
THALLIUM	4.5	7.6	4.2	7.9	5.19	5.3 S	5.4	5.9	4.4 S	5.96	4.9	6.2 7.3
VANADIUM	30	47	28	48	37.95	33	32.8 E	31	31	34.2	37	53 X 36
ZINC	376	458	367	466	371	403	384	411	391	398	424 E	390 387

	A1	B1	C1	D1	E1	F1	G1	H1
TOTAL OUT (ACTION LIMIT)	4	0	1	5	2	1	1	2	4
TOTAL OUT (WARNING LIMIT)	1	0	0	0	1	0	1	0	0
TOTAL OUT (IDENTIFICATION)	0	0	0	3	1	0	0	0	0
TOTAL OUT (FALSE POSITIVE)	0	0	0	0	0	0	0	0	0
TOTAL OUT (CRD	0	2	0	0	2	7	1	NA	12
PARAMETERS MISSED		Sb, Tl			Ag, Zn	Sb, As	Al		Sb, Ba, Be
PARAMETERS MISSED						Ca, Mn			Cd, Cr, Co
PARAMETERS MISSED						Se, Ag			Hg, Ni, Se
PARAMETERS MISSED						Tl			Ag, V, Zn
TOTAL OUT (RPD)	0	3	0	0	0	0	0	NA	10
PARAMETERS MISSED		Al, Hg							Al, As, Cd
PARAMETERS MISSED		Tl							Ca, Cr, Cu
PARAMETERS MISSED									Fe, Mg, Mn
PARAMETERS MISSED									Zn

NOTE: A negative value followed by a "U" indicates that the value was not used in the calculation of

10/23/87 Revision
OU 4 FY 87 INORGANIC, CASE NO. 7761

SOIL SAMPLE (mg/Kg)

PARAMETER	90 % CI B b LOWER	90 % CI B b UPPER	95 % CI B b LOWER	95 % CI B b UPPER	L2	M2	N2	O2	P2	Q2	R2	T2	U2	V2	W2	B3	B3
ALUMINUM	8640	20386	7391	21635	10200	11900	12500	18600	13600	13030	13700	10200	12600	16300	16400	17400	10600 ?
ANTIMONY	c		c		-30 U	8.5	15	-20 U	2.4 []	-11 U	-25 U	20 []	-16 U	10 S	-	-30 U	16
ARSENIC	104	168	95	197	135	167	362 I	124 S	156	184	139	112	118	148	184	164	95 S S
BARIUM	150	195	145	200	152	165	196 S	204 I	172	185	176	158	171	182	176	194	163
BERYLLIUM	3.5	4.7	3.4	4.8	4.5	4	3.2 I	4	3.8	3.4	S 3.52	3.9	4.4	3.8	7 I	4	4.1 ?
CADMIUM	11	21	10	22	15	14	12.6	13	14	21	18.6	14	16	15	16	21	16
CALCIUM	32348	36320	31923	36745	36100	33800	31000 I	32300 S	32800	39100 I	34400	37300 I	34100	35700	16550 I	34100	32000 S
CHROMIUM	49	69	47	71	55	54	58	33 I	55	41 I	59.8	53	60	57	64	72 I	53
COBALT	27	37	26	39	25 I	22 I	32	50 I	33	34	30.6	31	33	36	40 I	32	31
COPPER	1171	1300	1157	1314	1280	1130 I	1098 I	1260 E	1170 S	1250	1240	1220	1230	1270	1170 S	1260	1180
IRON	20462	26502	19820	27144	22700	23200	19200 I	23300	22000	23400	24300	22500	22800	24400	23400	25500	22200
LEAD	62	118	56	124	70	78	82	86 S	81	111	104 S	87	84	84	110	129 I	89
MAGNESIUM	17949	22689	17443	23193	19100	19500	16800 I	22300 E	19800	19000	20200	21300	20200	21800	17600 S	20700	18400
MANGANESE	1022	1159	1008	1173	1020 S	1071	1000 I	1150	1060	1110	1100	1070	1120	1140	1000 I	1130	1060
MERCURY	1.1	2.8	0.88	3	1.7	2.1	1.9	2.6	1.93	1.8	13.4 A I	2	2	1.9	- I	2.5	2.2 ?
NICKEL	23	39	24	41	-15 U I	25	28	35	30	29	36.2	31	32	34	47 I	29	30
POTASSIUM	488	2297	296	2490	1220 []	1020	1120	3660 I	1050	1280 []	1210 []	1120 []	1820 []	1690	- I	1740 []	913 []
SELENIUM	4.6	8.5	4.2	9	7 S	9.6 I	30.1 I	8	13 I	6	6.18 S	4.7 S	5.5 S	5.3 S	4.2 S	8	7.7 S
SILVER	3.4	8	2.9	8.6	-2 U I	6	-5 U I	-4 U I	6.3	-2 U I	-4 U I	6.5 ?	5.2	6.1	- I	7	5.3
SODIUM	c		c		222 []	-200 U	66	986 [] +	47 []	17 []	-120 U	664 [] +	-21 U	-820 U	760	-747 U	-159 U ?
THALLIUM	4.5	7.6	4.2	7.9	5.6 S	5.6	12 I	7	7.3	6.6	6.98	5.6	-5.1 U I	5.2	- I	7.5	5.4
VANADIUM	30	47	28	48	37 S	41	48 S	45	40	43	35.2	35	37	45	- I	47	34
ZINC	376	458	367	466	408	375 S	380	447	390	427	424	381	404	427	426	425	463 E S
TOTAL OUT (ACTION LIMIT)					3	3	10	5	1	3	2	1	1	0	10	2	0
TOTAL OUT (WARNING LIMIT)					1	1	2	1	1	1	0	0	0	0	3	0	3
TOTAL OUT (IDENTIFICATION)					2	0	1	1	0	1	1	0	1	0	5	0	0
TOTAL OUT (FALSE POSITIVE)					0	0	0	1	0	0	0	1	0	0	0	0	0
TOTAL OUT (%R)					5	0	0	2	1	2	1	2	2	2	0	2	2
PARAMETERS MISSED					Sb, Ba			Sb, Co	Sb	Sb, Ag	Sb	Sb, Se	Sb, Se	Sb, Se		Sb, Cd	Sb, Se
PARAMETERS MISSED					Cr, Se												
PARAMETERS MISSED					Zn												
PARAMETERS MISSED																	
TOTAL OUT (RPD)					0	0	0	3	0	0	2	0	0	0	0	0	3
PARAMETERS MISSED								Cd, Cr			Al, Se						Ba, Se
PARAMETERS MISSED								Hg									Tl
PARAMETERS MISSED																	
PARAMETERS MISSED																	

NOTE: A negative value followed by a "U" indicates that the value was not used in the calculation of

10/23/87 Revision
QB 4 FY 87 INORGANIC, CASE NO. 7761

SOIL SAMPLE (mg/Kg)

PARAMETER	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI # b LOWER	95 % CI # b UPPER	E3	F3	G3	H3	I3
ALUMINUM	8640	20386	7391	21635	15200	19400	13232	14400	18800
ANTIMONY	c		c		14	-26 U	24 □	43 E	12 S
ARSENIC	104	188	95	197	161	156	123.2	184	157
BARIUM	150	195	145	200	171	189	169	167	186
BERYLLIUM	3.5	4.7	3.4	4.8	4.3	3.9	4.1	4.8	# 4.1
CADMIUM	11	21	10	22	15	10	# 15.9	15	14
CALCIUM	32348	36320	31923	36745	33400	36200	34975	33200	35300
CHROMIUM	49	69	47	71	56	68	58	54	63
COBALT	27	37	26	39	30 E	29	35	32	35
COPPER	1171	1300	1157	1314	1190	1270	1203	1160	# 1270
IRON	20462	26502	19820	27144	22000	25500	22975	21900	25100
LEAD	62	118	56	124	93 E	81 S	85.9	78	86
MAGNESIUM	17949	22689	17445	23193	20300	21900	19843	19800	21300
MANGANESE	1022	1159	1008	1173	1040	1140	1052	1050	1140
MERCURY	1.1	2.8	0.88	3	2.3	1.8	2.1	2.4	0.8 X
NICKEL	25	39	24	41	30	32	29	30	36
POTASSIUM	488	2297	296	2490	1280	2000 □	1318 □	1060 E	2280
SELENIUM	4.6	8.5	4.2	9	2.5 S A X	6.8	5.8	5	5.7 S
SILVER	3.4	8	2.9	8.6	5	8.3	# 7.6	5.3	7
SODIUM	c		c		-528 U	109 □	64 □ E	75 □	71 B
THALLIUM	4.5	7.6	4.2	7.9	6.6	6.6	5	5.3	5.8
VANADIUM	30	47	28	48	42 E	46	40	32	43
ZINC	376	458	367	466	404	446	412	388	437

	E3	F3	G3	H3	I3
TOTAL OUT (ACTION LIMIT)	1	0	0	0	1
TOTAL OUT (WARNING LIMIT)	0	2	0	2	0
TOTAL OUT (IDENTIFICATION)	0	0	0	0	0
TOTAL OUT (FALSE POSITIVE)	0	0	0	0	0
TOTAL OUT (SD)	3	1	2	1	2
PARAMETERS MISSED	Sb, Cu	Sb	Sb, Se	Sb	Sb, Se
PARAMETERS MISSED	Se				
PARAMETERS MISSED					
PARAMETERS MISSED					
TOTAL OUT (RPD)	0	1	1	0	0
PARAMETERS MISSED		Ag	Se		
PARAMETERS MISSED					
PARAMETERS MISSED					
PARAMETERS MISSED					

NOTE: A negative value followed by a

CLP 4 FY 87 INORGANIC, CASE NO. 7761

b CONFIDENCE INTERVALS (CI) WERE DERIVED FROM LABORATORY SUBMITTED VALUES. OUTLIERS WERE REJECTED USING GRUBB'S TEST. LESS THAN VALUES (<), U-VALUES, AND NON-SUBMITTED VALUES (-) WERE NOT USED IN THE CALCULATION OF THE CI.
c CI WERE NOT SET SINCE 40 % OR MORE OF THE LABORATORIES SUBMITTED A NON-USABLE VALUE.
d CI NOT USED. SEE SCORING NOTES, PROCEDURE FOR GRADING U-VALUES NO. 4.
A INDICATES AN OUTLIER FROM GRUBB'S TEST. NOT USED IN THE CALCULATION OF THE CI. POINTS DEDUCTED.
B INDICATES THAT THE ELEMENT WAS PRESENT IN THE BLANK.
E INDICATES A VALUE ESTIMATED OR NOT REPORTED DUE TO THE PRESENCES OF INTERFERENCE. EXPLANATORY INCLUDED ON THE COVER PAGE.
S INDICATES VALUE DETERMINED BY METHOD OF STANDARD ADDITION.
U ANALYZED FOR BUT NOT DETECTED.
X VALUE WAS OUTSIDE BOTH THE WARNING AND THE ACTION LIMIT. POINTS DEDUCTED.
W VALUE WAS OUTSIDE THE WARNING LIMIT ONLY. NO POINTS DEDUCTED.
NA NOT APPLICABLE OR NOT ANALYZED FOR.
NR NOT REQUIRED.
W WARNING LIMIT (90 PERCENT CI).
AL ACTION LIMIT (95 PERCENT CI).
[] INDICATES AN ESTIMATED VALUE.
* INDICATES A FALSE POSITIVE BY DIXON'S TEST. POINTS DEDUCTED.
< INDICATES A VALUE LESS THAN THE CRDL OR THE INSTRUMENT DETECTION LIMIT.
? BEST ESTIMATE OF VALUE AND/OR QUALIFIER. LABORATORY SUBMITTED AN ILLEGIBLE COPY OF FORM.

SCORING NOTES: PROCEDURE FOR GRADING U-VALUES

1. ANY U-VALUE RESPONSE (LABORATORY DETECTION LIMIT) > CRDL, EVEN IF IT IS IN THE 95 % CI, CAUSES A POINT DEDUCTION. IF 25 % OR MORE OF THE LABORATORIES REPORT A U-VALUE OVER THE CRDL, THEN NO POINTS ARE DEDUCTED FOR ANY LABORATORY. THIS COULD INDICATE A MATRIX INTERFERENCE IN THE SAMPLE.

2. IF CRDL < LOWER CI, THEN USE CI AS SET.

3. IF LOWER CI < CRDL AND CRDL < UPPER CI, THEN SET LOWER CI TO ZERO (0). NO POINTS DEDUCTED FOR IDENTIFICATION OR QUANTITATION LESS THAN OR EQUAL TO THE CRDL.

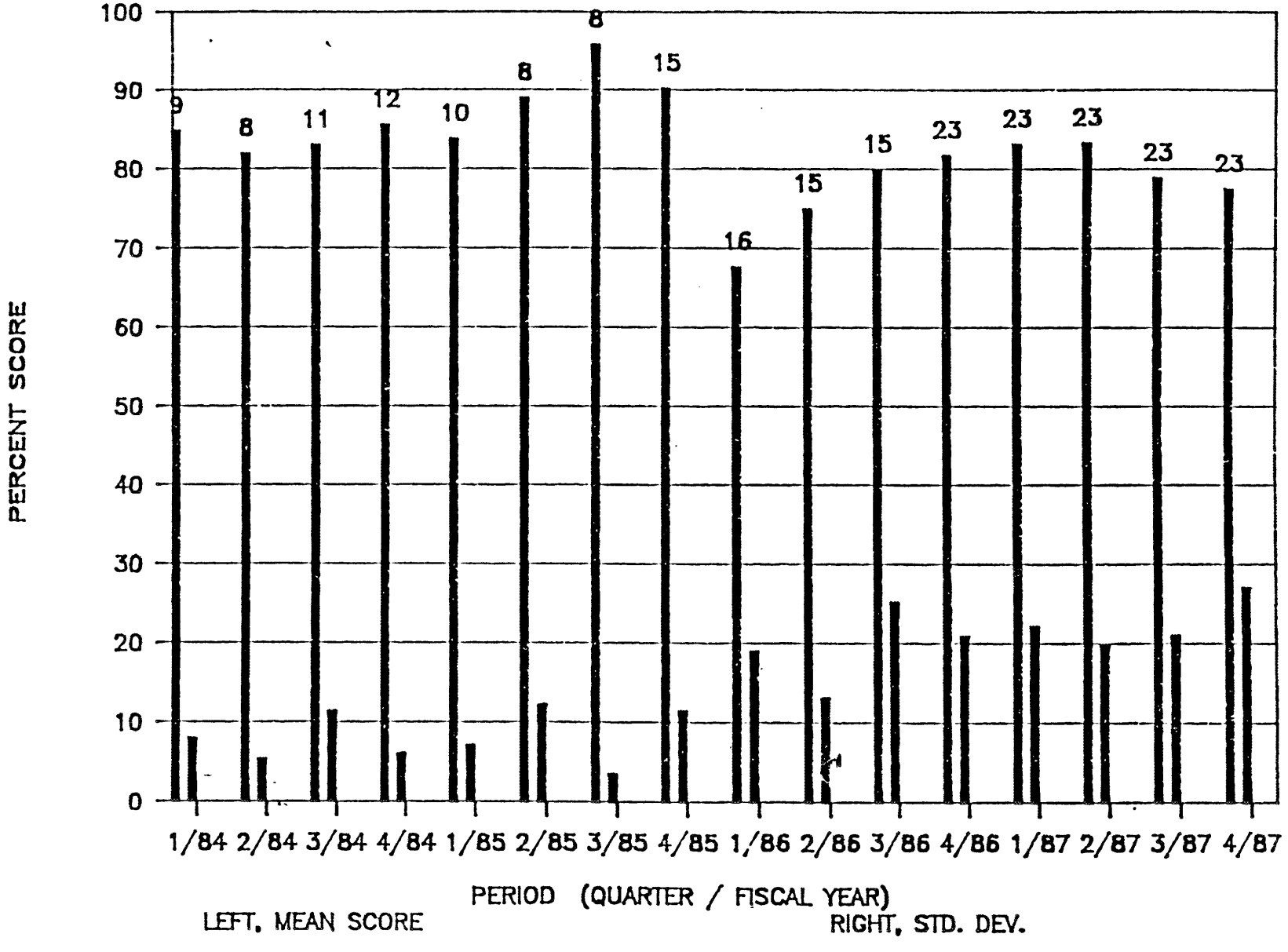
4. IF CRDL > LOWER AND UPPER CI, THEN NO CI USED. ANALYTE DROPPED FROM THE SCORING. NO POINTS DEDUCTED FOR IDENTIFICATIONS OR QUANTITATIONS. FALSE POSITIVES POSSIBLE.

NOTE THAT ONLY CLP LABORATORY VALUES WERE USED IN THE CALCULATION OF THE CI.

NOTE THAT A U-VALUE FOLLOWED BY X (-x U X) MEANS THAT POINTS WERE LOST FOR IDENTIFICATION AND QUANTITATION.

CONTRACT LABORATORY PROGRAM

INORGANIC QB TREND CHART



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 15027, LAS VEGAS, NEVADA 89114-5027 • 702/798-2100 (FTS 545-2100)

AUG 17 1987

Ms. P. L. Howell
Quality Department
Oak Ridge National Laboratory
P.O. Box X, MS 141
Oak Ridge, TN 37831-6141

Dear Ms. Howell:

For your information and review, enclosed are the results for your participation in the EMSL-LV Third Quarter Inorganic Performance Evaluation Study (QB3 FY-87, Case No. 7201). Your laboratory was coded FF. The samples were prepared by the EMSL-LV and consisted of one soil sample and two water samples. The homogeneous soil sample and one of the water samples were spiked with inorganic parameters. The other water sample was a blank. The samples were to be prepared and analyzed by current IFB procedures as per contract. All laboratories received the samples single blind. Enclosed is more general information about the Superfund Performance Evaluation Program.

Thank you for your participation in this study. I trust that this information will be beneficial in your pursuit of excellence as a member of the community of laboratories analyzing hazardous waste samples.

Sincerely,

Larry Butler, Ph.D.
Supervisor
Performance Evaluation Program
Quality Assurance Research Branch
Quality Assurance Methods Development Division

Enclosures

cc: (w/o enclosures)
Mike Hurd, OERR
Carla Dempsey, OERR
William Langley, OERR

General Information About the Superfund
Performance Evaluation Program

Acceptance windows were determined from the actual data submitted by first rejecting outliers by Grubb's Test, and then determining the 90 and 95 percent confidence intervals from the remaining values using the EMSL-LV computer program "FENCER." Further details about acceptance intervals are available in the footnotes to the enclosed spreadsheets. Also in the footnotes to the spreadsheets is the EMSL-LV SOP for scoring of U-flagged values. This U-value SOP is invoked whenever a laboratory reports a spiked parameter as "U," meaning "analyzed for but not detected." Hence, the SOP applies only to laboratories which may be reporting false negatives.

For your convenience, enclosed are the contractually required score sheet for your laboratory, a coded summary of scores, a set of coded analytical spread sheets, and a graphical programmatic representation of inorganic hazardous waste laboratory performance versus time. The left bar represents the mean score for each quarter. The number at the top of the left bar is the number of laboratories in each study. The right bar is the standard deviation of scores for each study. The series of left bars shows a slight gradual improvement in scores since the introduction of the new score sheet at the beginning of FY-86. The right standard deviation bars show no definite trend. Your laboratory will benefit from comparing its score with the programmatic values (left bars).

The EMSL-LV is adhering to the National Program Office guidelines with the following requirement. For each parameter which you failed to correctly identify or quantitate or which you reported as a false positive (parameters not added into this PE sample, but found by your laboratory at concentrations exceeding contract requirements), please document in a letter to your Project Officer and myself within two weeks of receipt of this letter, the source of the problem(s) and the corrective action(s) taken to prevent the problem from occurring in future quarterly blind PE samples.

ROUTINE INORGANIC SCORE SHEET

Laboratory: OAK RIDGE NATIONAL LABORATORY
Quarter: 3

Date: 21-Jul-87
Fiscal Year: 87

Maximum Number of Points Possible: 100

I. Sample 1, Case: 7201

A. Identification (-5 Points X Number of Missed Identifications 1) - 5

B. Quantitation (Points Lost) - 6.4

$$1 - \left[\frac{\text{Total Number of Elements (23)} - \text{Number Missed (2)}}{\text{Total Number of Elements (23)}}\right]^{1.5} \times -50$$

C. False Positives/Unmet CRDL's (-2 Points X False Positives and Unmet CRDL's 0) - 0

II. Sample 2, Case: 7201

A. Identification (-5 Points X Number of Missed Identifications 0) - 0

B. Quantitation (Points Lost) - 0.0

$$1 - \left[\frac{\text{Total Number of Elements (20)} - \text{Number Missed (0)}}{\text{Total Number of Elements (20)}}\right]^{1.5} \times -50$$

C. False Positives/Unmet CRDL's (-2 Points X False Positives and Unmet CRDL's 0) - 0

III. Duplicate Precision (Maximum of 10 Points Deducted)
(-1 Point X Number of Duplicate Results Outside of Control Limits 1) - 1

Aqueous: Pb
Solid: None

IV. Matrix Spikes (Maximum of 10 Points Deducted)
(-0.5 Point X Number of Matrix Spikes Outside of Control Limits 2) - 1.0

Aqueous: Se
Solid: Sb

Total Number of Points Deducted: 13.4 Points
Laboratory Point Score: 86.6 Points
Laboratory Percent Score: 86.6 %

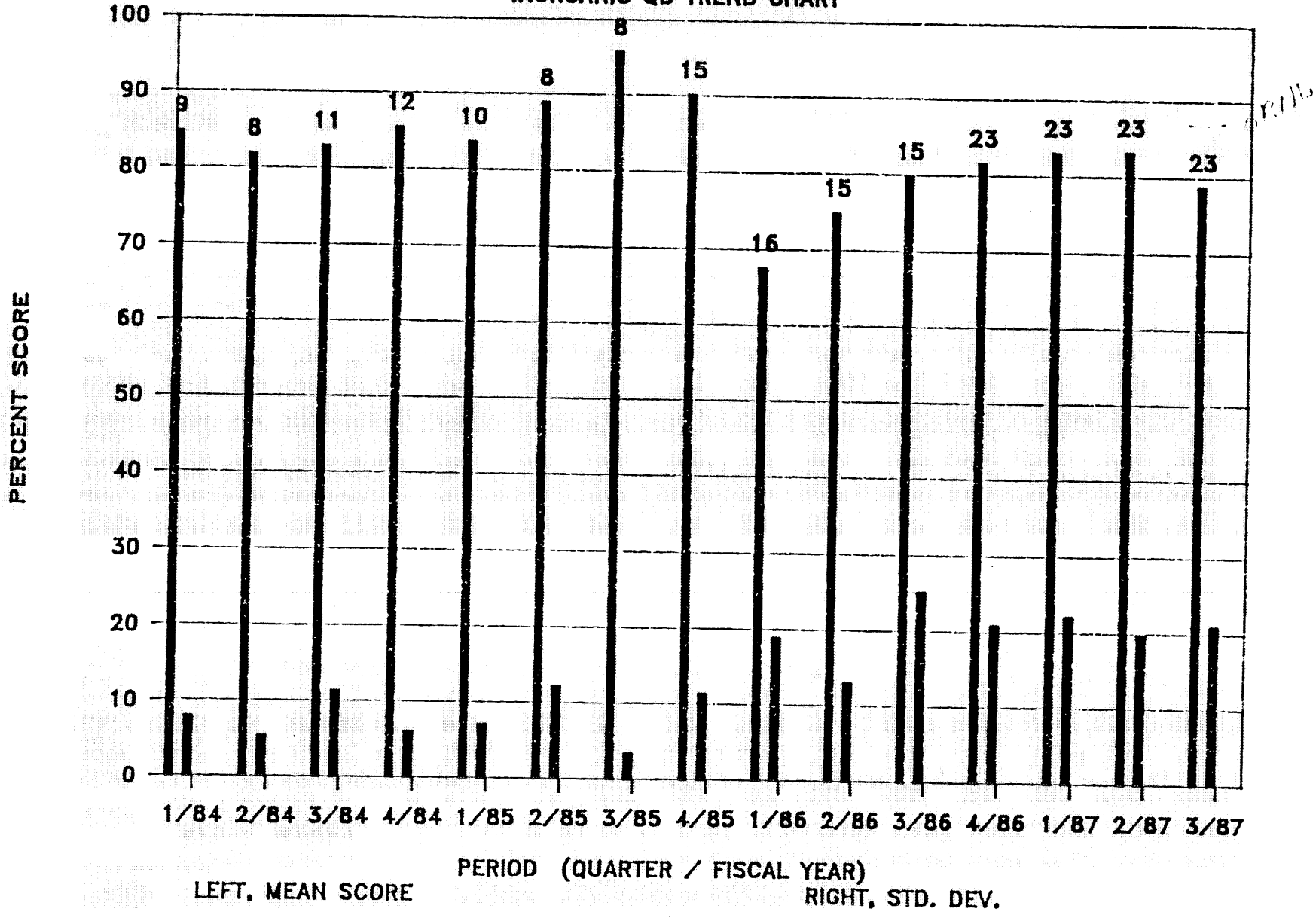
CODED SUMMARY OF SCORES
THIRD QUARTER FY 87 INORGANIC NON-CLP SINGLE BLIND
(QB 3 FY 87, CASE NO. 7201)

CODE	POINT SCORE	% SCORE	TIMELINESS
YY	95.8	95.8	10 DAYS LATE
ZZ	*	*	*
II	*	*	*
G	69.8	69.8	16 DAYS LATE
B	*	*	*
RR	*	*	*
P	*	*	*
Q	*	*	*
BB	*	*	*
UU	*	*	*
TT	*	*	*
C	91.6	91.6	0 DAYS LATE
PP	87.2	87.2	13 DAYS LATE
Y	79.7	79.7	1 DAY LATE
Z	68.0	68.0	15 DAYS LATE
NN	56.7	56.7	6 DAYS LATE
EE	*	*	*
M	*	*	*
KK	98.5	98.5	42 DAYS LATE
V	92.6	92.6	20 DAYS LATE
FF	86.6	86.6	0 DAYS LATE
I	86.5	86.5	0 DAYS LATE
W	*	*	*
K	91.6	91.6	35 DAYS LATE
OO	95.1	95.1	0 DAYS LATE
XX	79.3	79.3	0 DAYS LATE
X	*	*	*
AAA	69.7	69.7	0 DAYS LATE
E	*	*	*
H	64.2	64.2	0 DAYS LATE

* NO DATA SUBMITTED AS OF JULY 16, 1987

CONTRACT LABORATORY PROGRAM

INORGANIC QB TREND CHART



GB 3 FY 87 INORGANIC, CASE NO. 7201
31-Jul-87
09:32 AM
AQUEOUS SAMPLE (uG/L)

PARAMETER	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI ## b LOWER	95 % CI ## b UPPER	A	B	C	D	E	F	G	H	I	J	K
ALUMINIUM	1190	1580	1150	1620	1300		1450	1390		1310	1300	1410	1370	1360	1250
ANTIMONY	148	223	140	231	180		137 X	192		189	120 X	184	218	110 A X	122 X
ARSENIC	31	47	30	49	48 $		32	29 X		35	42	40.2	358 X	39	44
BARIUM	693	824	679	838	810		733	735		735	760	742	730	770	740
BERYLLIUM	24	30	24	30	25		28	27		27	26	26	27	26	25
CADMIUM	19	31	18	33	22		27	28		23	24	26	26	22	24
CALCIUM	6260	7440	6130	7570	9570 X		6820	6440		6480	6300	5088 X	6150 $	5700 A X	6570
CHROMIUM	63	80	61	82	64		72	69		79	64	69	70	70	62 $
COBALT	173	195	171	197	170 X		182	191		184	180	168 X	192	179	184
COPPER	174	200	171	203	190		181	188		186	180	156 X	185	190	181
IRON	1330	1510	1310	1530	1370		1400	1400		1440	1300 X	1308 X	1360 E	1360	1310 $
LEAD	26	48	24	50	39		35	24 $		38	30	43	420 X	39	44
MAGNESIUM	6120	6950	6030	7040	6200		6560	6780		6320	6700	7400 X	6250	6700	6580
MANGANESE	172	200	169	203	194		186	186		193	170 $	180	180	189	188
MERCURY	4.2	7.9	3.8	8.3	6.1		6.5	6.6		6.24	5.9	7.1	5.9	3.6 X	- X
NICKEL	339	388	334	394	350		368	368		368	360	358	334 $	377	348
POTASSIUM	5130	7910	4840	8210	7870		6690	7220		5520	7100	6960	6480	6600	7000
SELENIUM	25	32	24	33	27		31	16 A X		28.7	29	30	289 X	90 A X	25
SILVER	45	284	19	310	231		77	218		234	24 $	14.4 X	280	159	184
SODIUM	5970	7660	5790	7840	8780 X		6900	7050		6690	7200	6612	6580	6600	7010
THALLIUM	54	84	51	88	97 S X		70	59		72.7	- X	64.8	748 S X	75	65
VANADIUM	166	200	163	204	180		196	193		175	180	188	199	162 X	182
ZINC	171	194	169	197	180		179	192		220 A X	210 X	172	184	177	182
TOTAL OUT (ACTION LIMIT)					4		1	2		1	4	6	4	5	2
TOTAL OUT (WARNING LIMIT)					1		0	1		0	2	0	2	0	2
TOTAL OUT (IDENTIFICATION)					0		0	0		0	1	0	0	0	1
TOTAL OUT (FALSE POSITIVE)					0		0	0		0	0	0	0	0	0
TOTAL OUT (%R)					1		1	2		0	0	0	0	2	6
PARAMETERS MISSED					Tl		Ag	As, Se						Hg, Ag	Sb, As Pb, Hg Se, Ag
PARAMETERS MISSED															
TOTAL OUT (RPD)							0	1		0	0	0	1	1	1
PARAMETERS MISSED					1			Ag					Ag	Pb	Pb
PARAMETERS MISSED					Tl										

PARAMETER	90 % CI ** b LOWER	90 % CI ** b UPPER	95 % CI ** b LOWER	95 % CI ** b UPPER	L	M	N	O	P	Q	R	S	T	U	V	W
ALUMINIUM	1190	1580	1150	1620	1460		1490	1560			1440	1490	1360	1400 E	1460	
ANTIMONY	148	223	140	231	179		167	232 X			175	158	218	191 E	165	
ARSENIC	31	47	30	49	40		38	38			37	44	36	42	35 S	
BARIUM	693	824	679	838	772		710	880 A X			752	736	739	743	755	
BERYLLIUM	24	30	24	30	28		22 A X	24			28	26	28	27	29	
CADMIUM	19	31	18	33	28		23	33 $			22	25	29	26	27	
CALCIUM	6260	7440	6130	7570	6900		6680	7370			6670	6640	6720	7090	6520	
CHROMIUM	63	80	61	82	62 $		79	79			71	70	72	73 E	73	
COBALT	173	195	171	197	204 X		188	220 A X			182	180	186	183	173	
COPPER	174	200	171	203	194		186	198			184	186	191	190 E	191 E	
IRON	1330	1510	1310	1530	1510		1350	1490			1400	1420	1410	1420	1400	
LEAD	26	48	24	50	45		38	38 S			35 S	38	36	30	46	
MAGNESIUM	6120	6950	6030	7040	7190 X		6500	6020 X			6340	6570	6540	6510	6480	
MANGANESE	172	200	169	203	198		190	202 $			182	177	185	180	192	
MERCURY	4.2	7.9	3.8	8.3	6.25		6.1	6.7			5.8	6	5	6.5	5.8	
NICKEL	339	388	334	394	402 X		380	360			345	342	369	352	362	
POTASSIUM	5130	7910	4840	8210	6580		6500	8470 X			5600	6680	7030	6240	6650 E	
SELENIUM	25	32	24	33	31		30	30 S			30	30	28	30	34 X	
SILVER	45	284	19	310	-8 U X		197	51			89	164	257	182	37 $	
SODIUM	5970	7660	5790	7840	6900		6100	7590			7330	6890	6860	6930	7090	
THALLIUM	54	84	51	88	60		67	68 S			72 S	72	84 S	49 X	72 S	
VANADIUM	166	200	163	204	201 $		226 A X	200			186	183	185	187	189	
ZINC	171	194	169	197	194		195 $	208 A X			185	172	185	180 E	180 E	
TOTAL OUT (ACTION LIMIT)					4		2	6			0	0	0	1	1	
TOTAL OUT (WARNING LIMIT)					2		1	2			0	0	0	0	1	
TOTAL OUT (IDENTIFICATION)					1		0	0			0	0	0	0	0	
TOTAL OUT (FALSE POSITIVE)					0		0	0			0	0	0	0	0	
TOTAL OUT (XR)					2		2	3			3	0	0	1	1	
PARAMETERS MISSED					Se,Ag		Pb,Ni	Se,Ag,V			Sb,Ag,Tl			Tl	Pb	
PARAMETERS MISSED																
TOTAL OUT (RPD)					0		1	0			1	0	0	1	0	
PARAMETERS MISSED							Pb				Pb			Cr		
PARAMETERS MISSED																

** NOTE: A NEGATIVE VALUE (-X) INDICATES THAT THE VALUE WAS NOT USED IN THE CALCULATION OF THE CI.

31-Jul-87
09:32 AM
AQUEOUS SAMPLE (uG/L)

PARAMETER	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI ## b LOWER	95 % CI ## b UPPER	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	II
ALUMINIUM	1190	1580	1150	1620		1500	1400	1310		1370	1140 X		1410	1390	1180 $	
ANTIMONY	148	223	140	231		217	144 $	175		177	207		170	163	75 A X	
ARSENIC	31	47	30	49		39	34	42 S		41 S	37		36	42.2	63 ASX	
BARIUM	693	824	679	838		750	692 $	741		716	839 X		745	821	823	
BERYLLIUM	24	30	24	30		31 X	28	27		29	27		27	27	24	
CADMIUM	19	31	18	33		26	24	26		25	25		24	17 X	22	
CALCIUM	6260	7440	6130	7570		6970	6890	6510		6390	7480 $		6530	7270	7000	
CHROMIUM	63	80	61	82		69	65	67		69	72		78	66	60 X	
COBALT	173	195	171	197		185	180	161 A X		176	192		186	171 $	154 A X	
COPPER	174	200	171	203		180	196	183		184	182		185	172 $	190	
IRON	1330	1510	1310	1530		1460	1200 X	1430		1370	1540 X		1300 X	1490	1243 A X	
LEAD	26	48	24	50		28	29	46 S		44	29		37	41.4	50 S $	
MAGNESIUM	6120	6950	6030	7040		6300	6720	6340		6470	6800		6460	6930	6500	
MANGANESE	172	200	169	203		185	163 X	178		193 E	185		180	178	192	
MERCURY	4.2	7.9	3.8	8.3		6	30 X	12 A X		5.8	6.2		5.9	8.4 X	6	
NICKEL	339	388	334	394		340	371	336 $		376	368		345	357	312 A X	
POTASSIUM	5130	7910	4840	8210		6100	4250 [)X	6380		5430	6470		-14 U X	6920	7100	
SELENIUM	25	32	24	33		26	32	29		38 ASX	28		30	23.9 X	30	
SILVER	45	284	19	310		13 X	122	139		69	212		254	47	-10 U X	
SODIUM	5970	7660	5790	7840		770 X	7250	6870		6440	7330		6360	7300	6900	
THALLIUM	54	84	51	88		64	20 X	76		74	64 S		66	83 S	61	
VANADIUM	166	200	163	204		190	186	176		172	189		197	178	192	
ZINC	171	194	169	197		190	278 X	182		178	183		186	185	174	
TOTAL OUT (ACTION LIMIT)						3	6	2		1	3		2	3	7	
TOTAL OUT (WARNING LIMIT)						0	2	1		0	1		0	2	2	
TOTAL OUT (IDENTIFICATION)						0	0	0		0	0		1	0	1	
TOTAL OUT (FALSE POSITIVE)						0	0	0		0	0		0	0	0	
TOTAL OUT (%R)					NA		5	4		1	1		1	2	2	
PARAMETERS MISSED							Sb, Mn, Ti,	Sb, As,		As	Al		Se	Se, Tl	As, Pb	
PARAMETERS MISSED							Se, Zn	Pb, Se								
TOTAL OUT (RPD)					NA		2	0		1	0		1	0	2	
PARAMETERS MISSED							Ag, Zn			As			Pb		Cd, Pb	
PARAMETERS MISSED																

QB 3 FY 87 INORGANIC, CASE NO. 7201
31-Jul-87
09:35 AM
AQUEOUS SAMPLE (uG/L)

PARAMETER	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI ## b LOWER	95 % CI ## b UPPER	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU
ALUMINIUM	1190	1580	1150	1620	1400	1420	1380	1350	1230	-	1600	$ 1293 E		1570		
ANTIMONY	148	223	140	231	174	181	185	167	180	172	180	177		162		
ARSENIC	31	47	30	49	50 X	40	47	33 S	37	-	30	$ 41		38		
BARIUM	693	824	679	838	741	782	790	734	640 X	761	710	739		771		
BERYLLIUM	24	30	24	30	28	30	30	23 X	21 X	30 @	26	27.9		30		
CADMIUM	19	31	18	33	26	25	26	23	22	26.8	30	25.6		28		
CALCIUM	6260	7440	6130	7570	6730	6890	6690	6150 $	6140 $	-	7420	6834		6860		
CHROMIUM	63	80	61	82	72	73	72	61 $	59 X	70.4	73	70		76		
COBALT	173	195	171	197	181	186	200 X	170 X	150 X	195	180	184		187		
COPPER	174	200	171	203	179	190	200	178	154 X	195	190	192		177		
IRON	1330	1510	1310	1530	1350	1390	1600 E X	1290 X	1210 X	-	1330	1394		1400		
LEAD	26	48	24	50	39	41	43	32	31	36.1	40	41		37 S		
MAGNESIUM	6120	6950	6030	7040	6310 E	6620	7190 X	6310	5900 X	-	6900	6284		6710		
MANGANESE	172	200	169	203	179	189	196	176	159 X	-	180	177		180		
MERCURY	4.2	7.9	3.8	8.3	6.5	5.7	11 X	4.2	67 X	5	7.4	5.4		5.2		
NICKEL	339	388	334	394	359	377	384	328 X	290 X	384	350	361		372		
POTASSIUM	5130	7910	4840	8210	5100 $	6340	7410	6480	5790	-	6900	6245		6290		
SELENIUM	25	32	24	33	25	30	34 X	28 S	32	24.7 $	30	30		27		
SILVER	45	284	19	310	147	250	-5 U X	37 $	116	72.7	20	$ 244.6		-8.6 U X		
SODIUM	5970	7660	5790	7840	5700 X	7370	7320	6880	6000	-	7600	6648 E		6260		
THALLIUM	54	84	51	88	75	74	49 X	71 S	79	70.1	70	69		71		
VANADIUM	166	200	163	204	180	189	201 $	178	157 X	220 X	180	179.6		177		
ZINC	171	194	169	197	183	196 $	183 E	169 E $	158 X	179	190	186		175		
TOTAL OUT (ACTION LIMIT)					2	0	7	4	12	1	0	0		1		
TOTAL OUT (WARNING LIMIT)					1	1	1	4	1	1	3	0		0		
TOTAL OUT (IDENTIFICATION)					0	0	1	0	0	0	0	0		1		
TOTAL OUT (FALSE POSITIVE)					0	0	0	0	0	0	0	0		0		
TOTAL OUT (%R)					0	0	1	1	0	NA	NA	0		1		
PARAMETERS MISSED							Tl	Ag						Pb		
PARAMETERS MISSED																
TOTAL OUT (RPD)					0	1	0	1	0	NA	NA	0		0		
PARAMETERS MISSED						Ag		Ag								
PARAMETERS MISSED																

GB 3 FY 87 INORGANIC, CASE NO. 7201
31-Jul-87
09:35 AM
AQUEOUS SAMPLE (uG/L)

PARAMETER	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI ## b LOWER	95 % CI ## b UPPER	VV	WW	XX	YY	ZZ	AAA
ALUMINIUM	1190	1580	1150	1620	1440	1450	1100 X	1490		1340
ANTIMONY	148	223	140	231	208	186	183	169		-500 U X
ARSENIC	31	47	30	49	41 S	36	40.3	37		38.8
BARIUM	693	824	679	838	755	783	754	741		740
BERYLLIUM	24	30	24	30	28	29	25	29		26
CADMIUM	19	31	18	33	29	26	20	24		23
CALCIUM	6260	7440	6130	7570	6880	7280 E	6690	6840		6480
CHROMIUM	63	80	61	82	71	76	73	73		65
COBALT	173	195	171	197	186	194	187	190		173
COPPER	174	200	171	203	190	205 X	195	188		178
IRON	1330	1510	1310	1530	1430	1440	1420	1420		1320 $
LEAD	26	48	24	50	30	36 S	48 S	37		40.25
MAGNESIUM	6120	6950	6030	7040	6730	6830	6310	6380		6480
MANGANESE	172	200	169	203	194	200	174	204 X		174
MERCURY	4.2	7.9	3.8	8.3	5.3	7.5	5.7	5.9		6.75
NICKEL	339	388	334	394	373	387	348	365		330 X
POTASSIUM	5130	7910	4840	8210	7190	6960	7360	6480		7060
SELENIUM	25	32	24	33	30	27	28	25		25.6
SILVER	45	284	19	310	180	210	-10 U X	268 $		116
SODIUM	5970	7660	5790	7840	6610	7350	7060	6960		6970
THALLIUM	54	84	51	88	58 S	68	75	69		-300 U X
VANADIUM	166	200	163	204	183	198	150 X	176		177
ZINC	171	194	169	197	183	192	187	180		171
TOTAL OUT (ACTION LIMIT)					0	1	3	1		3
TOTAL OUT (WARNING LIMIT)					0	0	0	1		1
TOTAL OUT (IDENTIFICATION)					0	0	1	0		2
TOTAL OUT (FALSE POSITIVE)					0	0	0	0		0
TOTAL OUT (%R)					1	1	2	0		0
PARAMETERS MISSED					As	Pb	Cu,Tl			
PARAMETERS MISSED										
TOTAL OUT (RPD)					0	0	0	0		0
PARAMETERS MISSED										
PARAMETERS MISSED										

GB 3 FY 87 INORGANIC, CASE NO. 7201
31-Jul-87
09:38 AM
SOIL SAMPLE (mg/Kg)

PARAMETER	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI ## b LOWER	95 % CI ## b UPPER	A	B	C	D	E	F	G	H	I	J	K
ALUMINIUM	6630	16600	5580	17600	20000 X		15600	10400		12500	14 X	1495 X	8240	13300	9920
ANTIMONY	d		d		64		51	-11 U		62.7	26	5.01	36 S	-30 U	56
ARSENIC	179	445	151	474	333		378	302		322 S	- X	384	383	380	312
BARIUM	126	163	123	167	184 X		167 $	143		150	150	118 X	131	150	134
BERYLLIUM	5.8	8.9	5.5	9.2	9 $		7.9	7.5		7.6	8.8	6.78	8.6 E	7	6.8
CADMIUM	17	27	16	28	24		23 E	26		24	22	22.61	21	23	19
CALCIUM	64002	75300	62800	76500	71800		71800	68400		68700	57.8 X	150058 X	65100 E	68500	67200
CHROMIUM	53	73	50	75	15 X		53	36 A X		68	61	44.25 X	75 $	73	59
COBALT	50	64	49	66	64		59	61		59	63	57.03	59	59	58
COPPER	2160	2650	2110	2700	2820 X		2440	2420		2520	2500	2291	2240	2410	2500
IRON	20200	26100	19600	26700	21900		26700 $	22200		21800	24000	22263	20700	23100	19900 $
LEAD	198	392	177	413	292		278	247		304	320	327	371 E	295	384
MAGNESIUM	37100	45200	36200	46100	46300 X		44200	43000		42000	32 X	46217 X	41400	42800	40100
MANGANESE	3360	4280	3270	4380	3880		4230	3850		3630	4000	3463	3620	3820	3960
MERCURY	3.2	5.4	2.9	5.7	3.8		4.5	5		0.54 A X	4.8	5.015	4.9	3.5	- X
NICKEL	22	55	18	58	50		38	37		46	40	40.32	32	32	37
POTASSIUM	765	1500	686	1580	3120 X		1650 X	1120 []		1240	1.1 X	1242	882	1300 []	1090
SELENIUM	8.3	18	7.3	19	12		11	11		14.7 S	- X	11.4	14 S	14	11
SILVER	5.4	13	4.6	13	11		11	5 [] $		9	10	9.53	12	9	7.6
SODIUM	c		c		-1490 U		437 []	74 []		-708 U	0.18	260	521 E	-750 U	216
THALLIUM	10	16	9.8	17	15 S		13	13		13.5	- X	11.21	14 S	14	13
VANADIUM	d		d		64 +		49	47		50.8	50	38.35	59 E	41	41
ZINC	306	422	294	434	450 X		374	383		371	39 X	363	336	369	356
TOTAL OUT (ACTION LIMIT)					7		1	1		1	8	5	0	0	1
TOTAL OUT (WARNING LIMIT)					1		2	1		0	0	0	1	0	1
TOTAL OUT (IDENTIFICATION)					0		0	0		0	3	0	0	0	1
TOTAL OUT (FALSE POSITIVE)					1		0	0		0	0	0	0	0	0
TOTAL OUT (%R)					3		2	4		1	0	0	0	1	2
PARAMETERS MISSED					Sb,As,Pb		Sb,Co	Sb,Se		Pb				Se	Sb,Hg
PARAMETERS MISSED								Tl,Ag							
TOTAL OUT (RPD)					2		0	1		1	0	0	0	0	0
PARAMETERS MISSED					Cr,Se			Se		Pb					
PARAMETERS MISSED															

** NOTE: A NEGATIVE VALUE (-) INDICATES THAT THE VALUE WAS NOT USED IN THE CALCULATION OF THE CI

GB 3 FY 87 INORGANIC, CASE NO. 7201
31-Jul-87
09:38 AM
SOIL SAMPLE (mg/Kg)

PARAMETER	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI ## b LOWER	95 % CI ## b UPPER	L	M	N	O	P	Q	R	S	T	U	V	W
ALUMINIUM	6630	16600	5580	17600	14500		11100	11200			10100	13400	13500	18600 X	14400	
ANTIMONY	d		d		31		118 +	32			21	29	-12 U	52 E	14	
ARSENIC	179	445	151	474	376		1840 A X	366			222	310	321	374	330	
BARIUM	126	163	123	167	160		134	165 *			139	142	148	163	140	
BERYLLIUM	5.8	8.9	5.5	9.2	8.6		6.4	5.5 *			7.6	7.1	7.7	8.9 E	7.5 E	
CADMIUM	17	27	16	28	22		94 A X	27			20	20	19	22 E	21 E	
CALCIUM	64002	75300	62800	76500	74500		65900	77000 X			68100	69300	68600	70400	66400	
CHROMIUM	53	73	50	75	75 *		55	63			60	61	62	68	62	
COBALT	50	64	49	66	70 X		48 X	60			56	58	55	58 E	53	
COPPER	2160	2650	2110	2700	2670 *		2280	2620			2380	2460	2570	2440	2410	
IRON	20200	26100	19600	26700	25300		22000	24900			22900	22400	23100	25200	21400	
LEAD	198	392	177	413	298		1434 A X	305			286	323	265	322	340	
MAGNESIUM	37100	45200	36200	46100	41000		37700	37600			39900	41300	41900	44100	37400	
MANGANESE	3360	4280	3270	4380	4220		3460	4400 X			3630	3670	3840	3670	3690	
MERCURY	3.2	5.4	2.9	5.7	2.85 X		3.5	4.7			5.1	4.6	3.4	4.1	4.1	
NICKEL	22	55	18	58	47		28	55			32	39	34	40 E	36	
POTASSIUM	765	1500	686	1580	1460		1010	1320 []			1110	1350 []	1410	2380 A X	1660 E X	
SELENIUM	8.3	18	7.3	19	13		16 S	15 S			11 S	13	14	16	8.5 S	
SILVER	5.4	13	4.6	13	9.4		12	11			8.1	8	13	9.9	5.6	
SODIUM	c		c		512 []		-212 U	165 []			218 []	189 []	142 []	439 []	283 []E	
THALLIUM	10	16	9.8	17	12		14	14			10	12	16	13	14	
VANADIUM	d		d		51		-46 U	42			39	49	43	47	44	
ZINC	306	422	294	434	430 *		312 E	419			341	371	389	373 E	339 E	
TOTAL OUT (ACTION LIMIT)					2		4	2			0	0	0	2	1	
TOTAL OUT (WARNING LIMIT)					3		0	2			0	0	0	0	0	
TOTAL OUT (IDENTIFICATION)					0		0	0			0	0	0	0	0	
TOTAL OUT (FALSE POSITIVE)					0		1	0			0	0	0	0	0	
TOTAL OUT (%R)					2		1	2			2	1	2	1	0	
PARAMETERS MISSED					Ag,Sb		Sb	Sb,Be			Sb,Cr	Sb	Sb,As	Sb		
PARAMETERS MISSED																
TOTAL OUT (RPD)					1		2	0			1	0	0	2	0	
PARAMETERS MISSED					Ag		Pb,Ag				Sb			Ag,Sb		
PARAMETERS MISSED																

GB 3 FY 87 INORGANIC, CASE NO. 7201
31-Jul-87
09:38 AM
SOIL SAMPLE (mg/Kg)

PARAMETER	90 % CI a b LOWER	90 % CI a b UPPER	95 % CI a b LOWER	95 % CI a b UPPER	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	II
ALUMINIUM	6630	16600	5580	17600		12400	11000	12600		10800	13800 E		12300	12500	9760	
ANTIMONY	d		d			45	14	36		36	12		17	-25 U	21	
ARSENIC	179	445	151	474		463	$ 257	396		807 SAX	274 S		380	351	333	
BARIUM	126	163	123	167		137	128	149		139	156		135 E	153	137.8	
BERYLLIUM	5.8	8.9	5.5	9.2		7	7.2	8.1		8.6	7.1		6.8 E	7.01	5.6	$
CADMIUM	17	27	16	28		21	20	25		22	22		21	17	19	
CALCIUM	64002	75300	62800	76500		73000	71000	71100		68300	74500		70000	73700	64540 E	
CHROMIUM	53	73	50	75		61	62	68		69	64		66 E	61.1	51.2	$
COBALT	50	64	49	66		53	48 X	57		59	60		58	52.6	51.4	
COPPER	2160	2650	2110	2700		2480	2500	2430		2640	2410 E		2350	2270	2287.6	
IRON	20200	26100	19600	26700		29300	X 17800 X	24500		24000	26100		19800	$ 24300	19680	$
LEAD	198	392	177	413		335	324	397 S	$	313 S	185	$	288	268	241.4	
MAGNESIUM	37100	45200	36200	46100		44700	42800	42000		43600	44800		38400	42200	37140	
MANGANESE	3360	4280	3270	4380		4760	X 3680	4180		4200	3990 E		3650	3720	3524	
MERCURY	3.2	5.4	2.9	5.7		5.1	5.2	8.6 H	X	3.7	4.2		3.8	4.8	3.2	
NICKEL	22	55	18	58		42	29	58	$	43	38		34	47.6	38.2	
POTASSIUM	765	1500	686	1580		1320	705 [] $	1100 []		985 []	1020		1180	1280 []	200 A	X
SELENIUM	8.3	18	7.3	19		5.2	X 12	12 S		7	X 13 S		16	15.1	14.6 S	
SILVER	5.4	13	4.6	13		11	6.5	7.1		9	8.4		13 E	6.51	10	
SODIUM	c		c			350	171 []	785 []		-196 U	154 []		176 []E	105 []	-300 U	
THALLIUM	10	16	9.8	17		12.5	13	16		10 S	12 S		12	14.5	14 S	
VANADIUM	d		d			42	50	38		40	39		48 E	38.6	37.6	
ZINC	306	422	294	434		357	320	351		430	$ 341		357	355	380.2	
TOTAL OUT (ACTION LIMIT)						3	2	1		2	0		0	0	1	
TOTAL OUT (WARNING LIMIT)						1	1	2		1	1		1	0	3	
TOTAL OUT (IDENTIFICATION)						0	0	0		0	0		0	0	0	
TOTAL OUT (FALSE POSITIVE)						0	0	0		0	0		0	0	0	
TOTAL OUT (XR)						NA	2	4		2	1		1	3	2	
PARAMETERS MISSED							Sb,Ag	Sb,Co		Sb,Se	Sb		Sb	Sb,Cr,Pb	Ag,Tl	
PARAMETERS MISSED								Se,Zn								
TOTAL OUT (RPD)						NA	1	1		2	0		0	1	2	
PARAMETERS MISSED							Al	Pb		As,Se				Al	Ag,As	
PARAMETERS MISSED																

QB 3 FY 87 INORGANIC, CASE NO. 7201
02:28 PM
30-Jul-87
SOIL SAMPLE (mg/Kg)

PARAMETER	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI ## b LOWER	95 % CI ## b UPPER	JJ	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT
ALUMINIUM	6630	16600	5580	17600	6200 $	13400	12000	11600	11600		9200	8384		14700	
ANTIMONY	d		d		23	1.6	35	-5.6 U	47		30	32		56	
ARSENIC	179	445	151	474	148 X	334	416	321	357		370	321.2		413	
BARIUM	126	163	123	167	124 $	152	324 X	137	140		140	133		150	
BERYLLIUM	5.8	8.9	5.5	9.2	7.4	8	7.5	6.7	6.8		5.29 X	7		8.2	
CADMIUM	17	27	16	28	21	20	25	21	19		20	21		21	
CALCIUM	64002	75300	62800	76500	64900	70400	62300 X	64800	76000 $		66000	68232		72300	
CHROMIUM	53	73	50	75	56	64	63	70	60		49 X	60		71	
COBALT	50	64	49	66	30 EAX	58	59	55	52		59	57		65 $	
COPPER	2160	2650	2110	2700	2090 X	2340	2510	2220	2330		2400	2339		2350	
IRON	20200	26100	19600	26700	11600 A X	25000	22600	20300	22400		21300	20657		24700	
LEAD	198	392	177	413	249	293	300	214 S	327		280	287		288	
MAGNESIUM	37100	45200	36200	46100	39500	42200	43400	38600	47200 X		41000	39035		41400	
MANGANESE	3360	4280	3270	4380	3560	4030	3710	3680	3900		3500	3566		3950	
MERCURY	3.2	5.4	2.9	5.7	4.7	3.5	4.3	13 X	2.6 X		0.26 X	4.8		4.1	
NICKEL	22	55	18	58	17 X	39	37	34	34		30	33		39	
POTASSIUM	765	1500	686	1580	742 [] $	1420	1370	1350	1090		840	812 []		1470 []	
SELENIUM	8.3	18	7.3	19	-2.5 UEX	13	18	13	9.3		13	13		17 S	
SILVER	5.4	13	4.6	13	6.5	9.9	12	3.9	9.1		7.1	10.1		-4.3 U X	
SODIUM	c		c		-60 U	203	649 []	541 []	188		2000 +	209 []E		-2200 U	
THALLIUM	10	16	3.8	17	15	13	20 S X	13	14		11	12		14	
VANADIUM	d		d		35 E	47	44	49	42		42	39.4		48	
ZINC	306	422	294	434	268 X	361	419	347	342		360	347		370	
TOTAL OUT (ACTION LIMIT)					7	0	3	1	2		3	0		1	
TOTAL OUT (WARNING LIMIT)					3	0	0	0	1		0	0		1	
TOTAL OUT (IDENTIFICATION)					1	0	0	0	0		0	0		1	
TOTAL OUT (FALSE POSITIVE)					0	0	0	0	0		1	0		0	
TOTAL OUT (XR)					2	1	2	3	5		NA	3		2	
PARAMETERS MISSED					Sb, Se	Sb	Ag, Tl	Co, Cu, Mn	Sb, Cu, Pb Mn, Zn			Sb, Se Zn		Sb, Se	
TOTAL OUT (RPD)					0	0	3	2	0		NA	0		0	
PARAMETERS MISSED							Sb, Ba, Ag	Cd, Pb							

QB 3 FY 87 INORGANIC, CASE NO. 7201
02:28 PM
30-Jul-87
SOIL SAMPLE (mg/Kg)

PARAMETER	90 % CI # b LOWER	90 % CI # b UPPER	95 % CI ## b LOWER	95 % CI ## b UPPER	UU	VV	WW	XX	YY	ZZ	AAA
ALUMINIUM	6630	16600	5580	17600		8290	9210	8360	13600		14092.87
ANTIMONY	d		d			38	35	8	9.0		-49.97 U
ARSENIC	179	445	151	474		307	170 $	308	386		375.81
BARIUM	126	163	123	167		139 E	139	135	142		127.94
BERYLLIUM	5.8	8.9	5.5	9.2		7.8	7.6	7	7.7		6.79
CADMIUM	17	27	16	28		24	18	21	20		14.69 X
CALCIUM	64002	75300	62800	76500		69300	71400	75900	$ 69300		71053.05
CHROMIUM	53	73	50	75		61	62	57	66		53.77
COBALT	50	64	49	66		56	61	51	61		49.28 $
COPPER	2160	2650	2110	2700		2270	2510	2460	2360		2598.69
IRON	20200	26100	19600	26700		22300	22500	20800	22100 E		24164.76
LEAD	198	392	177	413		422 S X	312 S	360 S	302		325.84
MAGNESIUM	37100	45200	36200	46100		39200	43000	4340 X	39600		43877.79
MANGANESE	3360	4280	3270	4380		4030	3970	4250	4020 E		4037.96
MERCURY	3.2	5.4	2.9	5.7		4.8	5	4	4.1		4.71
NICKEL	22	55	18	58		35	38	30	41		10.49 X
POTASSIUM	765	1500	686	1580		1080 []	946 []	969	1040		1239.37
SELENIUM	8.3	18	7.3	19		14 S	7.4 S $	10	10		13.89
SILVER	5.4	13	4.6	13		11	9.5	6	13		10.19
SODIUM	c		c			251 []	-449 U	713	184		46.88
THALLIUM	10	16	9.8	17		14 S	13 S	12	12		34.98 X
VANADIUM	d		d			42	43	36	43		34.18
ZINC	306	422	294	434		360	369 E	351	380		335.83
TOTAL OUT (ACTION LIMIT)						1	0	1	0		3
TOTAL OUT (WARNING LIMIT)						0	2	1	0		1
TOTAL OUT (IDENTIFICATION)						0	0	0	0		0
TOTAL OUT (FALSE POSITIVE)						0	0	0	0		0
TOTAL OUT (%R)						2	2	1	2		0
PARAMETERS MISSED						Sb, Se	Sb, Se	Ag	Ag, Sb		
PARAMETERS MISSED											
TOTAL OUT (RPD)						1	0	1	0		0
PARAMETERS MISSED						Sb		Ag			
PARAMETERS MISSED											

QB 3 FY 87 INORGANIC. CASE NO. 7201

b CONFIDENCE INTERVALS (CI) WERE DERIVED FROM CLP LABORATORIES THAT SUBMITTED VALUES. OUTLIERS WERE REJECTED USING GRUBB'S TEST. NON-SUBMITTED VALUES (-) AND U-VALUES WERE NOT USED IN THE CALCULATION OF THE CI.
c CI WERE NOT SET SINCE 40 PERCENT OR MORE OF THE LABORATORIES SUBMITTED A NON-USABLE VALUE.
d CI NOT USED. SEE SCORING NOTE NO. 2.
A INDICATES AN OUTLIER FROM GRUBB'S TEST. IT WAS NOT USED IN THE CALCULATION OF THE CI. POINTS DEDUCTED.
E INDICATES A VALUE ESTIMATED OR NOT REPORTED DUE TO THE PRESENCES OF INTERFERENCE. EXPLANATORY INCLUDED ON THE COVER PAGE.
S INDICATES VALUE DETERMINED BY METHOD OF STANDARD ADDITION.
U ANALYZED FOR BUT NOT DETECTED.
X VALUE WAS OUTSIDE BOTH THE WARNING AND THE ACTION LIMIT. POINTS DEDUCTED.
$ VALUE WAS OUTSIDE THE WARNING LIMIT ONLY. NO POINTS DEDUCTED.
NA NOT APPLICABLE OR NOT ANALYZED.
NR NOT REQUIRED.
@ WARNING LIMIT (90 PERCENT CI).
ACTION LIMIT (95 PERCENT CI).
() INDICATES AN ESTIMATED VALUE.
- VALUE WAS NOT SUBMITTED FOR THIS PARAMETER.
+ INDICATES A FALSE POSITIVE BY DIXON'S TEST. POINTS DEDUCTED.

SCORING NOTES:

1. ANY U-VALUE RESPONSE (LABORATORY DETECTION LIMIT)) CRDL, EVEN IF IT IS IN THE 95 % CI, CAUSES A POINT DEDUCTION. IF 25 % OR MORE OF THE LABORATORIES REPORT A U-VALUE OVER THE CRDL, THEN NO POINTS ARE DEDUCTED FOR ANY LABORATORY. THIS COULD INDICATE A MATRIX INTERFERENCE IN THE SAMPLE.

2. IF CRDL) LOWER AND UPPER CI, THEN NO CI USED. ANALYTE DROPPED FROM THE SCORING. POINTS WERE NOT DEDUCTED FOR IDENTIFICATION OR QUANTITATION. FALSE POSITIVES POSSIBLE.

3. NON-CLP LABORATORIES, DOE LABORATORIES AND REFERENCE LABORATORIES WERE NOT USED IN THE CALCULATION OF THE CI. IN ADDITION, LATE SUBMISSION FROM CLP LABORATORIES WERE NOT USED IN CREATING THE CI.

4. A NEGATIVE VALUE (-x) INDICATES THAT THE VALUE WAS REPORTED AS A U-VALUES.

5. A U-VALUE FOLLOWED BY X (-x U X) MEANS THAT POINTS WERE LOST FOR IDENTIFICATION AND QUANTITATION.

MARTIN MARIETTA

Internal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

August 24, 1987

Marion Ferguson, EAL Group Leader
Joe Stewart, CAPA Group Leader

Contract Lab Performance Evaluation QB3 FY-87, Case No. 7201

Earlier this week, I sent you a copy of the results report on the QB 3 FY-87 performance evaluation set for trace metals analysis. On the summary score sheet, problem parameters were noted in the margin by the section where points were deducted.

Please note which errors occurred in your area and respond with a corrective action (reason) by August 31, 1987 to me. The EPA report also goes to Karen Knight and her first inquiry will be for a corrective action report. I will send a report to her via R. Fitts on Sept. 1.

Thank you for your cooperation.

PLH

P. L. Howell, ACD Quality Assurance Specialist

PLH:lp

cc: B. R. Clark
R. B. Fitts
W. R. Laing

Internal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

August 26, 1987

P. L. Howell

Contract Lab Performance Evaluation OB3 FY-87 Case No. 7201

Potassium was analyzed on the EPA water sample (EAL sample I.D. No. 870519-180) in Case No. 7201 using flame atomic absorption (AA). The value obtained was 6.2 μg/ml (as shown in the raw data package). This number was transferred to the worksheet as 6.2 μg/l. Since this value was less than the IDL for K (14 μg/l), the value for K was reported on form I as 14 U.

Marion Ferguson

N. M. Ferguson

NMF:lp

cc: W. R. Laing

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

FEB 07 1989

Mr. William R. Laing
Oak Ridge National Laboratory
P. O. Box 2008, 45005 MS-127
Oak Ridge, TN 37831

Dear Mr. Laing:

The results of the participation of your laboratory in the Environmental Monitoring Systems Laboratory-Las Vegas (EMSL-LV) first quarter Organic Performance Evaluation Study (QB1, FY89 Organic) are enclosed. This includes copies of the statistical information on the numbers of laboratories in the program that had difficulties with specific analytes.

For scores of less than 100 for each quarterly blind performance evaluation sample, the Department of Energy (DOE) Environmental Survey requires that the laboratory provide a formal response which would describe any changes or corrective actions that have been taken to improve analytical performance and eliminate deficiencies. That response will become a part of the quality assurance record for analytical work completed by the laboratory for sites in the DOE environmental survey. In order to meet delivery times for data document publication, please send your corrective action responses to Vincent Fayne at DOE Headquarters with copies sent to me at the EMSL-LV within 15 days of receipt of this letter.

This office will be glad to furnish any counsel and further information regarding this work.

Distribution: FEB 13 1989
Reply needed for Organic group by Feb. 22.

Ch
Qualit

Enclosures

cc: (w/Enclosures)
Vincent Fayne, DOE HQ
Alan Crockett, INEL

Distribution:
Shults
Guerin
Caton (reply)
Maskarinec
Fleming
Harmon
M. Edwards
R. Edwards
L. Wachter
Holladay
Howell
Fitts

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ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 89

LABORATORY: Oak Ridge National (TN)
PERFORMANCE: UNACCEPTABLE - Response Explaining Deficiency(ies) Required
RANK: Above = 51 Same = 2 Below = 10

% SCORE: 60.6
REPORT DATE: 12/22/8
MATRIX: WATER

COMPOUND	CONFIDENCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM #LABS NOT-ID	DATA #LABS ID-CPD	TOTAL #LABS
TCL VOLATILE										
VINYL CHLORIDE	74	140	64	150	130		1	0	9	9
ACETONE	NU	NU	NU	NU	98		0	1	8	9
1,1-DICHLOROETHENE	23	36	21	37	29		2	0	9	9
1,2-DICHLOROETHENE (TOTAL)	75	110	69	120	82		1	0	9	9
1,1,1-TRICHLOROETHANE	60	87	56	91	62		0	0	9	9
TRICHLOROETHENE	39	52	38	54	40		0	1	8	9
DIBROMOCHLOROMETHANE	15	23	14	24	18		2	0	9	9
2-PENTANONE,4-METHYL-	20	37	17	40	30		1	0	9	9
TETRACHLOROETHENE	40	55	38	57	43		1	0	9	9
ETHYL BENZENE	40	53	39	55	40		1	0	9	9
TCL SEMIVOLATILE										
2-CHLOROPHENOL	21	35	19	42	28		0	2	7	9
1,3-DICHLOROBENZENE	NU	NU	NU	NU	10 U		0	9	0	9
1,4-DICHLOROBENZENE	37	68	33	73	28	X	5	0	9	9
BENZYL ALCOHOL	47	91	41	110	10 U	&	2	5	4	9
1,2-DICHLOROBENZENE	20	36	18	44	16	X	5	0	9	9
4-METHYLPHENOL	24	39	22	47	31		1	1	8	9
HEXACHLOROETHANE	27	59	22	76	17	X	5	0	9	9
2,4-DIMETHYLPHENOL	33	83	25	110	68		1	0	9	9
BIS(2-CHLOROETHOXY)METHANE	30	49	28	51	43		2	0	9	9
2,4-DICHLOROPHENOL	58	88	54	100	79		2	0	9	9
1,2,4-TRICHLOROBENZENE	20	35	18	43	16	X	5	0	9	9
HEXACHLOROBUTADIENE	27	56	23	71	14	X	7	0	9	9
HEXACHLOROCYCLOPENTADIENE	NU	NU	NU	NU	10 U		0	5	4	9
2,4,6-TRICHLOROPHENOL	23	37	21	45	31		2	0	9	9
2-CHLORONAPHTHALENE	27	45	24	55	32		1	0	9	9
2,6-DINITROTOLUENE	50	82	45	87	69		1	0	9	9
ACENAPHTHENE	30	47	27	56	38		0	0	9	9
FLUORENE	64	96	59	100	83		1	0	9	9
N-NITROSODIPHENYLAMINE	41	73	36	90	62		1	0	9	9
HEXACHLOROBENZENE	44	96	36	100	54		2	0	9	9
PENTACHLOROPHENOL	NU	NU	NU	NU	59		0	0	9	9
ANTHRACENE	30	49	27	52	42		1	0	9	9
3,3'-DICHLOROBENZIDINE	NU	NU	NU	NU	20 U		0	9	0	9
BENZO(B)FLUORANTHENE	34	70	29	88	49		2	0	9	9
BENZO(A)PYRENE	44	92	37	120	65		2	0	9	9
INDENO(1,2,3-CD)PYRENE	41	93	34	100	65		3	0	9	9
DIBENZ(A,H)ANTHRACENE	40	97	31	100	65		3	0	9	9
TCL PESTICIDES										
ALPHA-BHC	NU	NU	NU	NU	0.05 U		0	7	2	9
BETA-BHC	NU	NU	NU	NU	0.05 U		0	9	0	9
DELTA-BHC	NU	NU	NU	NU	0.05 U		0	8	1	9
GAMMA-BHC (LINDANE)	NU	NU	NU	NU	0.05 U		0	8	1	9
HEPTACHLOR	0.080	0.19	0.064	0.24	0.06	S	0	1	8	9
ALDRIN	0.15	0.39	0.11	0.42	0.14		1	1	8	9
HEPTACHLOR EPOXIDE	0.13	0.28	0.100	0.30	0.2		1	0	9	9
ENDOSULFAN I	NU	NU	NU	NU	0.05 U		0	1	8	9
4,4'-DDE	0.31	0.63	0.26	0.67	0.24	S	2	0	9	9
ENDOSULFAN II	NU	NU	NU	NU	0.1 U		0	2	7	9
ENDRIN KETONE	0.26	0.62	0.21	0.67	0.33		0	1	8	9
NON-TCL VOLATILE										
METHANE,IODO-					130			0	9	9

ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 89

LABORATORY: Oak Ridge National (TN)
PERFORMANCE: UNACCEPTABLE - Response Explaining Deficiency(ies) Required
RANK: Above = 51 Same = 2 Below = 10

% SCORE: 60.6
REPORT DATE: 12/22/88
MATRIX: WATER

COMPOUND	CONFIDENCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
METHANE,DIBROMO-					0			1	8	9
BENZENE,T-BUTYL-					0			1	8	9
ETHER,2-CHLORO-ETHYL-VINYL					61			1	8	9
METHANE,TRICHLORO-FLUORO-					120			0	9	9
NON-TCL SEMIVOLATILE										
BENZOPHENONE					0			2	7	9
CARBAZOLE					110			4	5	9
TCL VOLATILE (Contaminants)										
METHYLENE CHLORIDE					2			3	6	9
NON-TCL VOLATILE (Contaminants)										
UNKNOWN,HALOGENATED					150	C		8	1	9
UNKNOWN BENZENE DERIVATIVE					180	C		8	1	9
NON-TCL SEMIVOLATILE (Contaminants)										
UNKNOWN					30	C		3	6	9
UNKNOWN					8			4	5	9

OF TCL COMPOUNDS NOT-IDENTIFIED: 1
OF TCL COMPOUNDS MIS-QUANTIFIED: 5
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 3
OF NON-TCL CONTAMINANTS: 3

ORGANIC PERFORMANCE EVALUATION MATERIAL SCORING PROCEDURE

OVERVIEW:

An integral responsibility of the Contract Laboratory Program's (CLP) quality assurance program is the monitoring of the CLP contractor's continuing ability to produce acceptable analytical data. To assist in this process, the EMSL-LV, under the direction of the CLP National Program Office (NPO), prepares and ships Performance Evaluation Materials (PEM) each quarter to all contract laboratories. Contractors are required to analyze the PEM and return data packages within the contract-required turn-around time. The PEM results are evaluated and summarized by the EMSL-LV. The EMSL-LV forwards the PEM results to the NPO and the Deputy Project Officers (DPO). The NPO, in conjunction with the DPO, determines the appropriate remedial action(s) when the PEM results are unacceptable.

NOTE: If determined that unusual problems occurred with either the PEM or the scoring procedures, the CLP National Program Office reserves the right to adjust scores for any PEM study.

COMPOUNDS ADDED TO THE PEM:

Compounds added to the PEM are classified into two different groups:

1) Target Compound List (TCL) Compounds -- Compounds included on the Target Compound List in Exhibit C of the contract Statement-of-Work. The EMSL-LV adds TCL compounds to matrices that mimic the type of samples analyzed by the CLP. Points are deducted when a TCL compound is not identified, when a TCL compound is mis-quantified, or when a TCL compound that has not been added to the matrix is identified by the contractor (See, "Scoring Procedures Used for Classifying a TCL Compound as a TCL Contaminant").

2) Non-TCL Compounds (non-TCL), also referred to as Tentatively Identified Compounds (TIC) -- Compounds which are not included on the Target Compound List in Exhibit C of the contract Statement-of-Work, but are contaminants found in the environment. A contractor identifies the compounds using a forward library search routine which compares the sample compound spectra against spectra in the National Bureau of Standards (NBS) Mass Spectral Library. The EMSL-LV adds TIC compounds to matrices that mimic the type of samples analyzed by the CLP. Points are deducted when a TIC compound is not identified or when a TIC compound that has not been added to the matrix is identified by the contractor (See, "Scoring Procedures Used for Classifying a Non-TCL Compound as a Non-TCL Contaminant").

GENERAL SCORING PROCEDURE COMMENTS:

The following comments apply to the scoring procedure discussed in this enclosure.

For the TCL and TIC identification scoring procedures, the NPO reserves the right to delete compounds from the study if a large percentage of the contractors do not identify the compounds.

Confidence intervals (CI) for TCL compounds are derived from the CLP contractor-submitted values, using statistical procedures. When determining the CI for a TCL compound, if the lower CI limit is less than the Contract Required Quantitation Limit (CRQL) for the compound, the lower CI limit is set to the CRQL. If the upper CI limit is less than the CRQL for the compound, the compound is not included in the scoring procedure. For information concerning the statistical procedures used to develop the CI for the CLP PEM program, contact Larry Butler, at the EMSL-LV.

For the TCL and TIC contaminant classification procedures, the NPO will not deduct points if the NPO determines that the contaminant was a breakdown product from the compounds added to the PEM or that the matrix used to prepare the PEM contained the contaminant.

SCORING ALGORITHMS:

The following algorithms are used to score the full-organic and the volatiles (VOA)-only PEM:

Algorithm 1 (Full-organic PEM):

$$\text{Score} = 100 - \left[\left[\frac{150 * (2A + B + C)}{X} \right] + \left[2.2 * (D + E) \right] \right]$$

Algorithm 2 (VOA-only PEM):

$$\text{Score} = 100 - \left[\left[\frac{100 * (2A + B + C)}{X} \right] + \left[2.2 * (D + E) \right] \right]$$

Where:

X = The number of TCL compounds, added to the PEM, which were included and scored in the PEM.

A = The number of TCL compounds, added to the PEM, which the contractor did not identify.

B = The number of TCL compounds, added to the PEM, which the contractor did not correctly quantify (value is not within the action CI).

C = The number of TCL compounds, not added to the PEM (contaminants), which the contractor identified.

D = The number of non-TCL (TIC) compounds, added to the PEM, which the contractor did not identify.

E = The number of TIC contaminants which the contractor identified.

The TIC term, [2.2 * (D + E)], is limited to a maximum deduction of 11 points.

SCORING PROCEDURES USED WHEN A CONTRACTOR DOES NOT IDENTIFY A TCL COMPOUND:

The following scoring procedures are used when a contractor does not identify a TCL compound added to the PEM:

1) If a contractor reports the CRQL (e.g., 10 U) for a TCL compound, and the CRQL is less than the lower limit of the action CI (e.g., 40 to 100), points are deducted.

2) If a contractor reports a detection limit value (e.g., 50 U) for a TCL compound, greater than the compound's CRQL (e.g., 20), and the contractor's detection limit value is included within or is greater than the limits of the action CI (e.g., 40 to 100), points are deducted.

SCORING PROCEDURES USED WHEN A CONTRACTOR DOES NOT IDENTIFY A NON-TCL COMPOUND:

The following scoring procedures are used when a contractor does not identify a TIC compound added to the PEM:

1) If a contractor does not identify a TIC compound added to the PEM, points are deducted.

2) For those TIC compounds which have similar mass spectra, if a contractor reports an isomer of the compound, points are not deducted.

SCORING PROCEDURE USED WHEN A CONTRACTOR DOES NOT CORRECTLY QUANTIFY A TCL COMPOUND:

The following scoring procedure is used when a contractor does not correctly quantify a TCL compound added to the PEM:

1) If a contractor reports a value for a TCL compound, not within the limits of the action CI, points are deducted.

SCORING PROCEDURES USED FOR CLASSIFYING A TCL COMPOUND AS A TCL CONTAMINANT:

A TCL contaminant is defined as an identification of a TCL compound that was not added to the PEM and was not in the matrix material used to prepare the PEM. The following scoring procedures are used when a contractor identifies a TCL contaminant.

1) If the TCL contaminant's concentration is reported as greater than the limit for the TCL compound, points are deducted. For the common solvents and the phthalate esters, the limit is defined as five times the compound's CRQL. For all other TCL compounds, the limit is defined as the compound's CRQL.

2) Note: Identification of TCL compounds added to the PEM will be classified as TCL contaminants when a) a CI was not calculated for the compound and b) the contractor reported an unusually high concentration of the compound.

SCORING PROCEDURES USED FOR CLASSIFYING A NON-TCL COMPOUND AS A NON-TCL CONTAMINANT:

A TIC contaminant is defined as an identification of a TIC compound that was not added to the PEM and was not in the matrix material used to prepare the PEM. The following scoring procedures are used when a contractor identifies a TIC contaminant.

1) If the TIC contaminant's concentration is reported as greater than the limit, points are deducted. For the TIC contaminants, the limits are: VOA water, 5 ppb; VOA soil, 5 ppb; semivolatiles (BNA) water, 10 ppb, and BNA soil, 330 ppb, at low concentrations.

2) Note: The TIC compounds added to the PEM are scored for identification only, regardless of reported concentration.

DESCRIPTION OF THE INDIVIDUAL LABORATORY SUMMARY REPORT

OVERVIEW:

The Individual Laboratory Summary Report (ILSR) summarizes the information from the CLP's quarterly PEM study. The report is comprised of two parts: contractor data summary and program data summary. Information from an individual CLP contractor is summarized in the contractor data summary. Information from all CLP contractors is summarized in the program data summary.

EXPLANATION OF ILSR HEADER INFORMATION:

Contractor Data Summary:

Header	Definition
LABORATORY	The contractor's name and location (state)
PERFORMANCE	A contractor's performance is classified into one of three categories. ACCEPTABLE, No Reponse Required: Score greater than or equal to 90 percent. ACCEPTABLE, Response Explaining Deficiency(ies) Required: Score greater than or equal to 70 percent and less than 90 percent. UNACCEPTABLE, Response Explaining Deficiency(ies) Required: Score less than 70 percent.
RANK	Ranking of CLP contractors' scores. Above = : Number of contractors whose scores were greater than that contractor's score. Same = : Number of contractors whose scores were equal to that contractor's score. Below = : Number of contractors whose scores were less than that contractor's score.
% SCORE	Percent score calculated using either the full-organic or the VOA-only PEM algorithm.
REPORT DATE	The date that the ILSR was printed. Format (month/day/year).
MATRIX	PEM matrix.

Contractor Data Summary (cont.):

Header	Definition
COMPOUND	The name of the compound. Compounds are categorized into 12 categories. TCL VOLATILE: All TCL VOA compounds added to the PEM are listed. TCL SEMIVOLATILE: All TCL BNA compounds added to the PEM are listed. TCL PESTICIDE: All TCL pesticide (PES) compounds added to the PEM are listed. NON-TCL VOLATILE: All TIC VOA compounds added to the PEM are listed. NON-TCL SEMIVOLATILE: All TIC BNA compounds added to the PEM are listed. TCL VOLATILE (Contaminants): All TCL VOA contaminants are listed. (For the definition of a TCL contaminant, see "Scoring Procedures Used for Classifying a TCL Compound as a TCL Contaminant".) TCL SEMIVOLATILE (Contaminants): All TCL BNA contaminants are listed. TCL PESTICIDE (Contaminants): All TCL PES contaminants are listed. NON-TCL VOLATILE (Contaminants): All TIC VOA contaminants are listed. (For the definition of a TIC contaminant, see "Scoring Procedures Used for Classifying a Non-TCL Compound as a Non-TCL Contaminant".) NON-TCL SEMIVOLATILE (Contaminants): All TIC BNA contaminants are listed.

Contractor Data Summary (cont.):

Header	Definition
CONFIDENCE INTERVALS	Confidence intervals (CI) calculated for each TCL compound using the statistical procedure. WARNING: Warning limits - LOWER: The lower CI limit. UPPER: The upper CI limit. ACTION: Action limits - LOWER: The lower CI limit. UPPER: The upper CI limit.
LABORATORY DATA	Contractor-reported values and EMSL-LV qualifiers. CONC: Contractor-reported concentration. Q: Qualifier codes.
# OF TCL COMPOUNDS NOT-IDENTIFIED	The number of TCL compounds the contractor did not identify in the PEM -- points deducted.
# OF TCL COMPOUNDS MIS-QUANTIFIED	The number of TCL compounds the contractor did not correctly quantify -- points deducted.
# OF TCL CONTAMINANTS	The number of TCL contaminants the contractor identified -- points deducted.
# OF NON-TCL COMPOUNDS NOT-IDENTIFIED	The number of TIC compounds the contractor did not identify -- points deducted.
# OF NON-TCL CONTAMINANTS	The number of TIC contaminants the contractor identified -- points deducted.

Program Summary Data:

Header	Definition
# LABS MIS-QUANT:	The number of CLP contractors who did not correctly quantify a TCL compound added to the PEM.
# LABS NOT-ID:	The number of CLP contractors who did not identify a TCL or TIC compound added to the PEM.

Contractor Data Summary (cont.):

Header	Definition
# LABS ID-CPD:	The number of CLP contractors who identified a TCL or TIC compound in the PEM.
TOTAL # LABS:	The number of CLP contractors who analyzed the PEM.
ILSR CODES:	The following codes are used on the ILSR.

U -- Compound analyzed for but not detected.

& -- Compound not identified -- points deducted

X -- Compound identified but the reported value is not within of the action limit -- points deducted.

3 -- The reported value for the compound is not within the warning limit but is within the action limit -- points not deducted.

C -- Contaminant -- points deducted.

CO -- Contaminant which may have been introduced during preparation of the PEM or during shipment -- points not deducted.

NS -- Data required but not submitted -- points deducted.

NR -- Data not required.

NU -- Data not used; insufficient amount of usable data for scoring submitted by the contractors.

Note: These instructions are for advisory purposes only. If any apparent conflict exists between these instructions and the Contract, follow the contract.

INSTRUCTIONS: First Quarter Organic Performance Evaluation Sample Set (QB1,FY89) Superfund Contract Laboratory Program

A) Sample Description -

Enclosed is the First Quarter Organic Performance Evaluation (PE) sample set (QB1,FY89). The set a consists of water samples.

The water samples consist of four (4) 80-ounce BNAP bottles and six (6) 40-ml VOA vials. All organic sample materials MUST be kept cold. Following examination of these materials, they MUST be transferred to a refrigerator for storage at four (4) degrees Centigrade. Do not allow freezing to occur. Note that three (3) of the BNAP bottles are marked "Sample," and one (1) is marked "Blank." Likewise, four (4) of the VOA vials are marked "Sample," and two (2) are marked "Blank." Sample containers, in each category (semi-volatile or volatile), contain identical samples from the same batch aliquoted into either 80-ounce bottles for semi-volatiles/pesticide or 40-ml vials for volatiles. This means that all three (3) semi-volatile/pesticide sample bottles are identical, and that all four (4) of the volatile sample vials are identical. Likewise, the volatiles blank containers are identical.

The volatile organic analysis materials (40-ml vials) MUST NOT be opened until the analysis is to occur as the analytes may be lost if a headspace is created in the vial. The semi-volatile/pesticide analysis materials (80-ounce bottles) must be shaken thoroughly prior to extraction.

If you hold a VOA only contract, and do not hold a full organics contract, then this PE set applies only to VOA analyses.

B) Breakage and Missing items -

Upon examining the enclosed materials, any broken or missing items must be reported to Dr. Larry Butler at the EMSL-LV at (702) 798-2114 or FTS: 545-2114.

C) Standards -

You must provide your own working standards and calibration solutions and demonstrate traceability to QAMB standards. EPA supplies standards for purposes of traceability only, and cannot supply you with working standards. Your laboratory must obtain its own QAMB standards for the purposes of traceability. Contact the QAMB to make those arrangements.

D) Analysis Requirements and Modifications to Protocol -

The samples and blanks are to be processed as described in the Statement of Work contained in your current Contract. Forms needed for data reporting are in your Contract. Forms must be filled out completely in the exact order and format provided as

required by your Contract. No modifications to your Contract are intended by these instructions unless specifically mentioned above. The EMSL-LV is performing method checks for the CLP. We request, but cannot require, that you identify the method used in the final concentration step (either N_2 Blowdown or Micro KD) in your case narrative.

E) Deadlines and Data Shipping Addressees -

The complete data package for this PE analysis is required in its entirety to be delivered to the EMSL-LV by the contractually required deadline. This includes, but may not necessarily be limited to, all Contract requirements for the use of EPA forms submitted in the required order, all QA/QC, and the delivery of raw data. Please study your Contract carefully before submitting the complete data package to:

Dr. Larry Butler, Supervisor
Performance Evaluation Program
Quality Assurance Research Branch (QAB)
Quality Assurance and Methods Development Division (QAD)
Environmental Protection Agency
P.O. Box 93478
Las Vegas, NV 89193-3478

The above address is for U. S. Mail. Those laboratories wishing to use private carriers for overnight delivery must use the street address below:

Dr. Larry Butler, Supervisor
Performance Evaluation Program
Quality Assurance Research Branch (QAB)
Quality Assurance and Methods Development Division (QAD)
Environmental Protection Agency
944 E. Harmon
Las Vegas, NV 89119

Other addressees must also receive data packages as required by Contract.

Note that Saturday delivery is not necessary since no personnel are on duty to receive such packages. Packages marked for Saturday Delivery will not be received until the following Monday or business day.

(EMSL-LV FILE: QB1089IN)

MARTIN MARIETTA

Internal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

February 24, 1989

W. R. Laing, 4500S, MS-6127

RESPONSE TO SCORE ON FIRST QUARTER PE SAMPLE ORGANIC ANALYSIS SECTION

The score on the first quarter Performance Evaluation Sample for the organics was 60.6 - unacceptable, response required. We have reviewed the individual elements of the score, and the original package, in an attempt to identify the problems which might have contributed to the score and to prevent similar occurrences in the future.

Of the four primary elements of the scoring: volatiles, semivolatiles, PCB/Pesticides, and Tentatively Identified Compounds (TIC's), the points lost were in the semivolatile analysis and in the identification of the TIC's. No points were lost for either volatiles or pesticides, although two warnings were incurred in the pesticide analysis. We believe that these warnings were the result of a misunderstanding on our part as to the appropriate concentration to report on this fraction. We have been reporting the lowest value of concentration found, regardless of the column on which this value was determined. We have corrected this problem, and will now report the value determined on the column for which peak symmetry is best (i.e. peak purity is optimum). Had we done this for the previous sample, the results would have been in the acceptable range.

With respect to the TIC's, all three of the compounds for which points were lost were identified in the sample. In all three cases, the correct compound was identified and quantified; however, we reported the compounds generically, rather than specifically. We therefore lost points for not identifying the specific compound and then lost additional points because the compound identified generically was scored as a laboratory-introduced contaminant. In the future, we will adopt a less conservative approach and will report the compound as identified based on the best fit obtained from the library matched spectrum. In the case of benzophenone we intended to report specifically but failed to indicate this on the Form I of the sample data summary package. This was an error of review which we can only correct by more careful review of the package. We anticipate that these errors will not occur again.

The other area in which points were lost is in the quantitation/identification of the semivolatile organics. Because most of the values for which points were lost were biased low, we have thoroughly examined our sample preparation laboratory in an effort to determine if any of the prescribed protocols were not being followed. Scott Fleming has determined that in at least two areas, improvement can be made. We are not currently using boiling chips in the final volume reduction, and we are not currently performing the final volume reduction using micro-KD evaporators. We are in the process or have now corrected these possible problems, and expect to improve recovery of the semivolatile organics immediately.

In reviewing the data packages from the previous PE sample, we looked for possible errors in the individual areas of calibration, standard preparation, etc. While we cannot rule out error in these areas, it is clear that this was not the primary reason for the loss of points. The only common problem with the semivolatile organic compounds for which points were lost appears to be in the primary dilution of the standard. All misquantified compounds originated from a single ampule of primary standard, which could have been in

error originally or could have been diluted improperly. The only way that such an error could have been detected would have been by comparison with an independent standard. We have now begun to validate our calibration standards against EPA reference standards. We would have done this earlier if we had had the appropriate mixtures.

M. P. Maskarinec

M. P. Maskarinec, 4500S, MS-6120 (6-6690)

MPM/llc

cc: J. E. Caton
G. S. Fleming
M. R. Guerin
L. J. Watcher

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

OCT 28 1988

Mr. William R. Laing
Oak Ridge National Laboratory
P. O. Box 2008, 45005 MS-127
Oak Ridge, TN 37831

Dear Mr. Laing:

The results of the participation of your laboratory in the EMSL-LV fourth quarter organic performance evaluation study (QB4, FY88, ORGANIC) are enclosed. Includes are copies of the analysis reports for organics in water samples as well as statistical information on the numbers of laboratories that had difficulties with specific analytes.

The score for your laboratory was 73%. The DOE environmental survey requires a formal response from each laboratory, describing any changes or actions taken to identify and correct any deficiencies and to improve laboratory performance. That response will become part of the quality assurance record for analytical work done by your laboratory for sites in the DOE environmental survey. In order to meet schedule times for data document publication, corrective action responses should be sent within 15 days of receipt of this letter.

This office will be glad to furnish any counsel and further information regarding this work.

Sincerely,

Harold A. Vincent

Harold A. Vincent
Chemist, Quality Assurance Research Branch
Quality Assurance and Methods Development Division

Enclosures

cc:
Vincent Fayne, DOE HQ
Alan Crockett, INEL

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ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 88

LABORATORY: Oak Ridge National (TN)
PERFORMANCE: ACCEPTABLE - Response Explaining Deficiency(ies) Required
RANK: Above = 58 Same = 0 Below = 11

% SCORE: 73.
REPORT DATE: 18/
MATRIX: WAT

COMPOUND	CONFIDENCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QUANT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TO #L
TCL VOLATILE										
METHYLENE CHLORIDE	NU	NU	NU	NU	168		0	0	90	
ACETONE	NU	NU	NU	NU	46		0	13	77	
CARBON DISULFIDE	93	160	83	170	161	$	11	0	90	
1,1-DICHLOROETHENE	110	170	99	180	173	$	9	0	90	
1,1-DICHLOROETHANE	120	170	120	180	169		5	0	90	
1,2-DICHLOROETHENE (TOTAL)	110	160	99	160	153		8	0	90	
CHLOROFORM	120	160	110	170	149		8	0	90	
1,2-DICHLOROETHANE	130	170	120	180	136		4	0	90	
2-BUTANONE	16	120	10	170	10 U	$	3	25	65	
1,1,1-TRICHLOROETHANE	110	170	100	180	148		9	0	90	
CARBON TETRACHLORIDE	57	110	49	140	86		2	0	90	
VINYL ACETATE	NU	NU	NU	NU	10 U		1	82	8	
BROMODICHLOROMETHANE	130	170	120	180	144		3	0	90	
1,2-DICHLOROPROPANE	140	190	130	190	170		5	0	90	
CIS-1,3-DICHLOROPROPENE	23	45	20	57	79	X	8	7	83	
TRICHLOROETHENE	120	170	110	180	153		4	0	90	
DIBROMOCHLOROMETHANE	130	180	120	190	134		4	0	90	
1,1,2-TRICHLOROETHANE	130	170	120	180	129	$	7	0	90	
BENZENE	120	160	110	170	150		1	0	90	
BROMOFORM	120	180	110	190	131		3	0	90	
2-PENTANONE,4-METHYL-	61	150	48	160	76		10	1	89	
2-HEXANONE	20	100	10	140	41		1	8	82	
TETRACHLOROETHENE	92	130	87	150	124		5	1	89	
TOLUENE	120	150	110	160	144		4	0	90	
1,1,2,2-TETRACHLOROETHANE	110	160	100	170	107	$	7	1	89	
CHLOROBENZENE	120	160	120	170	144		7	0	90	
ETHYL BENZENE	84	140	75	150	106		4	0	90	
STYRENE	77	130	69	160	90		3	0	90	
XYLENES (TOTAL)	110	150	100	160	124		8	0	90	
TCL SEMIVOLATILE										
PHENOL	15	72	10	100	31		0	1	89	
BIS(2-CHLOROETHYL)ETHER	23	38	21	45	33		4	2	88	
1,4-DICHLOROBENZENE	22	37	20	45	29		5	1	89	
1,2-DICHLOROBENZENE	23	38	21	45	30		5	1	89	
2-METHYLPHENOL	32	87	25	120	10 U	&	2	4	86	
BIS(2-CHLOROISOPROPYL)ETHER	42	72	38	88	60		3	0	90	
N-NITROSO-DI-N-PROPYLAMINE	28	45	26	54	43		4	0	90	
HEXACHLOROETHANE	17	32	15	40	20		4	2	88	
NITROBENZENE	13	22	12	23	17		12	2	88	
ISOPHORONE	11	18	10	22	14		2	2	88	
2-NITROPHENOL	85	140	77	160	110		7	0	90	
BENZOIC ACID	NU	NU	NU	NU	50 U		0	50	40	
BIS(2-CHLOROETHOXY)METHANE	37	57	34	60	62	X	11	0	90	
1,2,4-TRICHLOROBENZENE	10	16	10	19	11		7	2	88	
NAPHTHALENE	11	19	10	23	13		3	1	89	
4-CHLOROANILINE	97	230	78	250	140		14	2	88	
2-METHYLNAPHTHALENE	49	87	44	110	66		4	0	90	
2,4,6-TRICHLOROPHENOL	44	72	39	76	53		5	1	89	
2-NITROANILINE	130	210	120	230	50 U	&	8	1	89	
DIMETHYL PHTHALATE	NU	NU	NU	NU	51		0	13	77	
3-NITROANILINE	110	260	91	280	160		10	0	90	
2,4-DINITROPHENOL	100	250	82	270	170		8	3	87	
4-NITROPHENOL	50	190	50	210	87		1	4	86	
DIBENZOFURAN	120	180	110	220	140		6	0	90	
2,4-DINITROTOLUENE	17	64	10	89	26		3	11	79	

ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 88

LABORATORY: Oak Ridge National (TN)
PERFORMANCE: ACCEPTABLE - Response Explaining Deficiency(ies) Required
RANK: Above = 58 Same = 0 Below = 11

% SCORE: 73.0
REPORT DATE: 10/1
MATRIX: WATE

COMPOUND	CONFIDENCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QUANT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOT #LA
DIETHYLPHTHALATE	15	83	10	120	71		0	11	79	90
4-CHLOROPHENYL PHENYL ETHER	65	99	60	100	80		7	0	90	9
FLUORENE	68	96	64	110	77		8	0	90	9
4-NITROANILINE	62	140	51	140	120		13	1	89	90
4,6-DINITRO-2-METHYLPHENOL	54	110	50	120	96		3	1	89	90
4-BROMOPHENYL PHENYL ETHER	31	46	29	54	39		9	0	90	9
HEXACHLOROBENZENE	25	46	22	56	39		8	1	89	9
DI-N-BUTYLPHTHALATE	12	80	10	120	61		0	4	86	9
FLUORANTHENE	31	51	28	54	41		7	0	90	90
PYRENE	28	48	25	51	43		10	0	90	90
BUTYL BENZYL PHTHALATE	NU	NU	NU	NU	36		0	22	68	9
BENZO(A)ANTHRACENE	52	110	44	120	91		3	0	90	9
CHRYSENE	14	33	11	35	25		13	0	90	90
BIS(2-ETHYLHEXYL)PHTHALATE	18	91	10	120	77		4	1	89	90
DI-N-OCTYL PHTHALATE	22	92	12	100	80		7	1	89	9
BENZO(K)FLUORANTHENE	37	100	27	110	100		5	5	85	9
DIBENZ(A,H)ANTHRACENE	36	120	24	130	86		2	0	90	9
BENZO(G,H,I)PERYLENE	38	120	26	130	94		6	0	90	90
TCL PESTICIDES										
ALPHA-BHC	NU	NU	NU	NU	0.05	U	0	63	27	90
BETA-BHC	NU	NU	NU	NU	0.14		1	54	36	90
DELTA-BHC	NU	NU	NU	NU	0.14		0	50	40	9
GAMMA-BHC (LINDANE)	NU	NU	NU	NU	0.1		0	37	53	9
HEPTACHLOR	0.068	0.25	0.05	0.35	0.12		4	12	78	9
ALDRIN	0.16	0.51	0.11	0.57	0.31		13	1	89	90
HEPTACHLOR EPOXIDE	0.12	0.37	0.087	0.40	0.22		6	4	86	90
ENDOSULFAN I	NU	NU	NU	NU	0.05	U	0	78	12	9
DIELDRIN	0.30	0.70	0.24	0.76	0.49		6	0	90	9
ENDRIN	0.21	0.45	0.17	0.49	0.33		7	4	86	90
4,4'-DDD	2.8	5.5	2.5	5.9	4.8		12	2	88	90
ENDOSULFAN SULFATE	NU	NU	NU	NU	12		0	42	48	9
4,4'-DDT	1.2	3.4	0.85	3.8	2.3		11	3	87	9
METHOXYCHLOR	NU	NU	NU	NU	2.8		0	19	71	9
GAMMA-CHLORDANE	0.80	2.1	0.62	2.2	4.8	X	5	5	85	90
NON-TCL VOLATILE										
ETHER,2-CHLORO-ETHYL-VINYL					0	&		20	70	90
METHANE,TRICHLORO-FLUORO-					0	&		10	80	90
NON-TCL SEMIVOLATILE										
MALATHION					0			90	0	90
BENZOPHENONE					76			19	71	90
BENZIDINE					0			50	40	9
TCL VOLATILE (Contaminants)										
TRANS-1,3-DICHLOROPROPENE					37	C		77	13	90
TCL SEMIVOLATILE (Contaminants)										
BENZYL ALCOHOL					10	C0		24	66	90
TCL PESTICIDES (Contaminants)										
ENDOSULFAN II					0.1			88	2	90

ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 88

LABORATORY: Oak Ridge National (TN)
PERFORMANCE: ACCEPTABLE - Response Explaining Deficiency(ies) Required
RANK: Above = 58 Same = 0 Below = 11

% SCORE: 73.6
REPORT DATE: 10/1
MATRIX: WATE

COMPOUND	CONFIDENCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QUANT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOT #LA
ENDRIN KETONE					10	C		89	1	9
NON-TCL VOLATILE (Contaminants)										
UNKNOWN										
UNKNOWN					16	C0		70	20	9
UNKNOWN					6	C		81	9	9
					2			88	2	9
NON-TCL SEMIVOLATILE (Contaminants)										
UNKNOWN HYDROCARBON										
UNKNOWN					3			83	7	9
UNKNOWN					29	C0		65	25	9
UNKNOWN					3			76	14	9
UNKNOWN					6			82	8	9
UNKNOWN					5			85	5	9
UNKNOWN					30	C		85	5	9
UNKNOWN					2			86	4	9
UNKNOWN					6			88	2	9
BENZENAMINE,DIMETHYL- ISOMER					10			88	2	9
					10			89	1	9

OF TCL COMPOUNDS NOT-IDENTIFIED: 2
OF TCL COMPOUNDS MIS-QUANTIFIED: 3
OF TCL CONTAMINANTS: 2

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 2
OF NON-TCL CONTAMINANTS: 2

ORGANIC PERFORMANCE EVALUATION MATERIAL SCORING PROCEDURE

OVERVIEW:

An integral responsibility of the Contract Laboratory Program's (CLP) quality assurance program is the monitoring of CLP contractor's continuing ability to produce acceptable analytical data. To assist this process, the EMSL-LV, under the direction of CLP National Program Office (NPO), prepares and sends Performance Evaluation Materials (PEM) quarterly to all contract laboratories within the program. Contractors are required to analyze the PEM and return the data package within the contract required turnaround time. The PEM results are evaluated and summarized by the EMSL-LV. The EMSL-LV forwards the PEM results to the NPO and the Deputy Project Officers (DPO). The NPO, in conjunction with the DPO, determines the the appropriate remedial actions when the PEM results are unacceptable.

NOTE: If it has been determined that there were unusual problems with the PEM themselves or the scoring procedure, the CLP National Program Office reserves the right to adjust scores for any PEM study.

COMPOUNDS ADDED TO THE PEM:

Compounds added to the PEM are classified into two different groups:

1) Target Compound List (TCL) Compounds -- Compounds included on the Target Compound List in Exhibit C of the contract Statement-of-Work. The EMSL-LV adds TCL compounds to matrices that mimic the type of samples analyzed by the CLP. Points are deducted when a TCL compound is not identified, when a TCL compound is misquantified, or when a TCL compound that has not been added to the matrix is identified by the contractor (See, "Scoring Procedure for Classifying a TCL Compound as a Contaminant").

2) Non-Target List Compounds (non-TCL), also referred to as Tentatively Identified Compounds (TIC) -- Compounds which are not included on the Target Compound List in Exhibit C of the contract Statement of Work, but are contaminants found in the environment. A contractor identifies the compounds using a forward library search routine which compares the sample compound spectra against spectra in the National Bureau of Standards (NBS) Mass Spectral Library. The EMSL-LV adds non-TCL compounds to matrices that mimic the type of samples analyzed bv the CLP. Points are deducted when a non-TCL compound is not correctly identified, or when a non-TCL compound that has not been added to the matrix is identified by a contractor (See, "Scoring Procedures Used for Classifying a Non-TCL Compound as a Contaminant").

GENERAL SCORING PROCEDURE COMMENTS:

The following comments apply to the scoring procedure discussed in this enclosure:

For the TCL and non-TCL identification scoring procedures, the NPO reserves the rights to delete compounds from the study if a large percentage of the contractors do not identify the compounds.

Confidence intervals (CI) for TCL compounds are derived from the CLP contractors who submitted values, using statistical procedures. When determining the CI for a TCL compound, if the lower CI limit is less than the CRQL for the compound, then the lower CI limit is set to the CRQL. Also, when determining the CI, if both the upper and lower CI limit are less than the CRQL for the compound, then the compound is not included in the scoring procedure. For information concerning the statistical procedure used to develop CI for the CLP PEM program, contact Larry Butler, at the EMSL-LV.

For the TCL and non-TCL contaminant classification procedures, the NPO will not deduct points if the NPO determines that the contaminant was a breakdown product from compounds added to the PEM or that the matrix used to prepare the PEM contained the contaminant.

SCORING ALGORITHM:

The following algorithms are used to score the full organic and VOA only PEM:

Algorithm 1 (full Organic PEM):

$$\text{Score} = 100 - \left[\frac{150 * (2A + B + C)}{X} + 2.2 * (D + E) \right]$$

Algorithm 2 (VOA only PEM):

$$\text{Score} = 100 - \left[\frac{100 * (2A + B + C)}{X} + 2.2 * (D + E) \right]$$

Where:

X = The number of TCL compounds included and scored in the PEM.

A = The number of TCL compounds which the contractor did not identify.

B = The number of TCL compounds which the contractor did not correctly quantify (value is not within the confidence intervals).

C = The number of TCL contaminants which the contractor identified.

D = The number of non-TCL (TIC) compounds which the contractor did not identify.

E = The number of non-TCL (TIC) contaminants which the contractor identified.

The non-TCL (TIC) term, [(2.2 * (D + E))], is limited to a maximum of 11 points.

SCORING PROCEDURES USED WHEN A CONTRACTOR DOES NOT IDENTIFY A TCL COMPOUND:

The following scoring procedures are used when a contractor does not identify a TCL compound which was added to the PEM:

1) If the contractor reports the CRQL (e.g., 10 U) for a TCL compound, and the CRQL is less than the 90% confidence interval (e.g., 40 to 100), then points are deducted.

2) If a contractor reports a detection limit value (e.g., 50 U) for a TCL compound greater than the compound's CRQL (e.g. 20 U); and the contractor's detection limit value is included within or is greater than the 90% confidence interval (e.g., 40 to 100), then points are deducted.

SCORING PROCEDURES USED WHEN A CONTRACTOR DOES NOT IDENTIFY A NON-TCL COMPOUND:

The following scoring procedures are used when a contractor does not identify a non-TCL compound which was added to the PEM:

1) If contractors does not identify a non-TCL compound, then points are deducted.

2) For those compounds which have similar mass spectra, if a contractor reports an isomer of the non-TCL compound, then no points are deducted.

SCORING PROCEDURE USED WHEN A CONTRACTOR DOES NOT CORRECTLY QUANTIFY A TCL COMPOUND:

The following scoring procedure is used when a contractor does not correctly quantify a TCL compound which was added to the PEM:

1) If a contractor reports a value for a TCL compound which is outside the confidence interval, then points are deducted.

SCORING PROCEDURES USED FOR CLASSIFYING A TCL COMPOUND AS A TCL CONTAMINANT:

A TCL contaminant is defined as an identification of a TCL compound that was not included in the PEM and was not in the matrix material used to prepare the PEM. The following scoring procedure is used when a contractor identifies a TCL contaminant:

1) If the TCL contaminant's concentration is identified as being greater than the action limit for the TCL compound, then points are lost. For the common solvents and the phthalate esters, the action limit is defined as five times the compound's CRQL. For all other TCL compounds, the action limit is defined as the TCL compound's CRQL.

2) Note: Misidentification of spiked TCLs will be classified as contaminants (or false positives) whenever a) no window was set for the spiked compound and b) the contractor identifies an unusually large (outlier) amount of the compound.

SCORING PROCEDURES USED FOR CLASSIFYING A NON-TCL COMPOUNDS AS A NON-TCL CONTAMINANT:

A non-TCL contaminant is defined as an identification of a non-TCL compound that was not included in the PEM and was not in the matrix material used to prepare the PEM. The following scoring procedure is used when a contractor identifies a non-TCL contaminant:

1) If the non-TCL contaminant's concentration is identified as being greater than the action limits, then points are lost. For the non-TCL contaminants, the action limits are: VOA water, 5 ppb; VOA soil, 5 ppb; semivolatiles water, 10 ppb; and semivolatile soil, 330 ppb.

2) Note: Misidentification of spiked non-TCLs will be classified as contaminants (or false positives) whenever the contractor identifies an unusually large (outlier) amount of the compound.

DESCRIPTION OF THE INDIVIDUAL LABORATORY SUMMARY REPORT

OVERVIEW:

The Individual Laboratory Summary Report (ILSR) summarizes the information from the CLP's quarterly Performance Evaluation Material (PEM) Studies. The report is comprised of two parts: contractor data summary and program data summary. Information from an individual CLP contractor is summarized in the contract summary. Information from all CLP contractors is summarized in the program data summary.

EXPLANATION OF ILSR HEADER INFORMATION:

The following is a description of ILSR header information:

Contractor Data Summary:

Header	Definition
LABORATORY	The contractor's name and location (state).
PERFORMANCE	A contractor's performance is classified into one of three categories. ACCEPTABLE, NO RESPONSE REQUIRED: Score greater than or equal to 90 percent. ACCEPTABLE, RESPONSE EXPLAINING DEFICIENCY(IES) REQUIRED: Score greater than or equal to 70 percent and less than 90 percent. UNACCEPTABLE, RESPONSE EXPLAINING DEFICIENCY(IES) REQUIRED: Score less than 70 percent.
RANK	Ranking of CLP Contractors' scores. ABOVE: Number of contractors who had a score greater than the contractor's score. SAME: Number of contractors who had the same score as the contractor's score. BELOW: Number of contractors who had a score less than the contractor's score.
% SCORE	Percent score calculated using either the full organic PEM algorithm or the VOA only PEM algorithm.
REPORT DATE	The date that the ILSR was printed. Format (month/day/year)
MATRIX	PEM matrix

Contractor Data Summary (cont):

Header	Definition
COMPOUND NAME	The name of the compound. Compounds are categorized into 12 categories. TCL VOLATILE: All TCL volatile compounds included in the PEM are listed. TCL SEMIVOLATILE: All TCL semivolatile compounds included in the PEM are listed. TCL PESTICIDE: All TCL Pesticide compounds included in the PEM are listed. NON-TCL VOLATILE: All non-TCL volatile compounds included in the PEM are listed. NON-TCL SEMIVOLATILE: All non-TCL semivolatile compounds included in the PEM are listed. TCL VOLATILE (Contaminants): All TCL volatile compounds which were not included in the PEM or in the matrix material used to prepare the PEM but were identified by the contractor. TCL SEMIVOLATILE (Contaminants): All TCL semivolatile compounds which were not included in the PEM or in the matrix material used to prepare the PEM but were identified by the contractor. TCL PESTICIDE (Contaminants): All TCL pesticide compounds which were not included in the PEM or in the matrix material used to prepare the PEM but were identified by the contractor. NON-TCL VOLATILE (Contaminants): All non-TCL volatile compounds which were not included in the PEM or in the matrix material used to prepare the PEM but were identified by the contractor. NON-TCL SEMIVOLATILE (Contaminants): All non-TCL semivolatile compounds which were not included in the PEM or in the matrix material used to prepare the PEM but were identified by the contractor.
90% CI	90 percent confidence intervals (CI) calculated for each TCL compound using the statistical procedure. LOWER: The lower confidence interval limit. UPPER: The upper confidence interval limit.

Contractor Data Summary (cont):

Header	Definition
LABORATORY DATA	Contractor-reported values and EMSL-LV qualifiers. CONC: Contractor-reported concentration value. Q: Qualifier Codes
# OF TCL COMPOUNDS NOT IDENTIFIED	The number of TCL compounds the contractor did not identify in the PEM--points lost.
# OF TCL COMPOUNDS MISQUANTIFIED	The number of TCL compounds the contractor did not correctly quantify--points lost.
# OF TCL CONTAMINANTS	The number of TCL contaminants the contractor identified--points lost.
# OF NON-TCL COMPOUNDS NOT IDENTIFIED	The number of non-TCL compounds the contractor did not identify--points lost.
# of NON-TCL CONTAMINANTS	The number of non-TCL contaminants the contractor identified--points lost.

Program Data Summary:

Header	Definition
# LABS NOT ID:	The number of CLP contractors who did not identify a TCL or non-TCL compound included in the PEM.
# LABS MISS QUAN:	The number of CLP contractors who did not correctly quantify a TCL compound included in the PEM.
# LABS ID CONT:	The number of CLP contractors who identified a TCL or non-TCL contaminant in the PEM.
TOTAL # LABS:	The number of CLP contractors who analyzed the PEM.

ILSR CODES:

The following codes are used on the ILSR:

U -- Compound analyzed for but not detected.

& -- Compound not identified - points lost.

X -- Compound identified but the reported value is not within the 90% confidence interval--points lost.

ILSR CODES (Cont.):

$ -- Compound identified but the reported value is within the warning limit--no points lost.

C -- Contaminant--points lost.

CO -- Contaminant which may have been introduced during preparation of the PEM or during shipment--no points lost.

NS -- Data required but not submitted.

NR -- Data not required.

NU -- Data not used; insufficient amount of usable data submitted by the contractors to score the data.

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MARTIN MARIETTA

Internal Correspondence

JAN 17 1989

MARTIN MARIETTA ENERGY SYSTEMS, INC.

January 17, 1989

Distribution

Laboratory Summary Report

Attached is the laboratory summary report for organics for the QB4, FY88 soil sample which, for some reason, was left out of the original report. The grade on the soil sample is 100, a top score for the 70 labs participating. You did a great job on this sample!

I have not received the report on QB1, FY89 but expect it within the next two weeks. I will also receive the QB2, FY89 samples before February 1st.

W. R. Laing

WRL:sdc

Distribution:

D. A. Bostick
J. E. Caton
R. B. Fitts
M. R. Guerin
P. L. Howell
S. K. Holladay
M. P. Maskarinec
W. D. Shults

JAN 17 1989

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 · FTS 545-2100)

JAN 06 1989

William R. Laing
Oak Ridge National Laboratory
P. O. Box 2008, 45005 MS-127
Oak Ridge, TN 37831

Dear Mr. Laing:

When the Individual Laboratory Summary Report (ILSR) for the EMSL-LV fourth quarter Organic Performance Evaluation study , (QB4, FY88, ORGANIC) was sent, information was made available only for analyses of the water matrix sample. The ILSR for the QB4 soil matrix sample is enclosed.

The score of 100 by the ORNL, X-10 laboratory for the soil matrix sample is very good. No response to this portion of the performance evaluation is required for the DOE environmental survey.

This office will be glad to furnish further information regarding this work upon request.

Sincerely,

Harold A. Vincent

Harold A. Vincent,
Chemist, Quality Assurance Research Branch
Quality Assurance and Methods Development Division

Enclosures

cc: (w/Enclosure)
Vincent Fayne, DOE HQ
Alan Crockett, INEL

bcc: (w/o Enclosures)
Jimmy Petty, QAB

16 X

ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 4 FY 88

LABORATORY: Oak Ridge National (TN)
PERFORMANCE: ACCEPTABLE - No Response Required
RANK: Above = 0 Same = 12 Below = 57

% SCORE: 100
REPORT DATE: 10/11/
MATRIX: SOIL

COMPOUND	CONFIDENCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QUANT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
TCL VOLATILE										
ETHYL BENZENE	NU	NU	NU	NU	5		0	43	36	79
TCL SEMIVOLATILE										
1,2-DICHLOROBENZENE	NU	NU	NU	NU	330	U	0	67	12	79
2,4-DICHLOROPHENOL	870	2000	700	2600	1200		2	1	78	79
2,4,6-TRICHLOROPHENOL	1300	2700	1100	3400	1400		4	3	76	79
2-CHLORONAPHTHALENE	1000	2800	740	3800	1400		2	1	78	79
ACENAPHTHYLENE	350	780	330	1000	440		0	1	78	79
ACENAPHTHENE	1200	2600	960	3300	1500		4	1	78	79
FLUORENE	2000	4100	1700	5200	2200		5	1	78	79
4-BROMOPHENYL PHENYL ETHER	2300	4400	2000	5400	2700		4	1	78	79
3,3'-DICHLOROBENZIDINE	NU	NU	NU	NU	660	U	0	67	12	79
BENZO(B)FLUORANTHENE	930	1700	810	2200	880	*	7	4	75	79
TCL VOLATILE (Contaminants)										
METHYLENE CHLORIDE					19	CB		10	69	79
ACETONE					15			21	58	79
TCL SEMIVOLATILE (Contaminants)										
DIBENZOFURAN					14			69	10	79
DIETHYLPHTHALATE					49	CB		71	8	79
DI-N-BUTYLPHTHALATE					71	CB		51	28	79
BIS(2-ETHYLHEXYL)PHTHALATE					63	CB		34	45	79
TCL PESTICIDES (Contaminants)										
GAMMA-BHC (LINDANE)					2.0			48	31	79
HEPTACHLOR EPOXIDE					0.5			78	1	79
NON-TCL SEMIVOLATILE (Contaminants)										
UNKNOWN HYDROCARBON					270	CB		65	14	79
UNKNOWN					14000	CB		35	44	79
UNKNOWN					120	CB		45	34	79
UNKNOWN					370	CB		55	24	79
UNKNOWN					250	CB		62	17	79
UNKNOWN					130			68	11	79
UNKNOWN					150			72	7	79

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 0
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 0
OF NON-TCL CONTAMINANTS: 0

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BCC: Halladay
Hawell
Caton

OAK RIDGE NATIONAL LABORATORY
OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2008
OAK RIDGE, TENNESSEE 37831

November 22, 1988

Vincent Fayne
USDOE
Forrestal Bldg, EH-24
Independence Ave., SW
Washington, DC 20585

Harold Vincent
EMSL-LV
P. O. Box 93478
Las Vegas, NV 89193-3478

Gentlemen:

Attached is our reply to the last organic performance evaluation samples, QB4FY88. We have completed the QB1FY89 samples and they were mailed to EPA this week.

Sincerely,

W. R. Laing
Section Head
Analytical Chemistry

cc: R. B. Fitts
W. D. Shults

November 15, 1988

W. R. Laing, 4500S, MS-6127

Response to Score for Organic Analyses for 4th Quarter (FY 1988) PE Samples

Our score for the 4th quarter organic performance evaluation study, (QB4, FY88), was 73%. Although the overall score was disappointing, I believe these results showed a marked improvement in our pesticide analysis. For the previous PE Sample (QB3, FY88) we misquantitated two of the three pesticides included in the scoring. For this sample eight pesticides were included in the scoring and our laboratory identified all eight and misquantitated only one (alpha-chlordane). We believe that this misquantitation was caused by a chromatographic interferance which caused the evaluated area to be quite large. However, such an error should not be repeated because of increased staff training, (see below) and the use of data from different columns. To this end we now have four different columns available to resolve ambiguities which may result from pesticide chromatograms. Previously all work was carried out utilizing one packed column, (SP-2250/2401) and one capilliary column, (DB-5). Now two packed columns, (SP-2100 and the SP-2250/2401) are available as well as two capilliary columns, (the DB-5 plus a DB-608 megabore). Thus with complex pesticide samples one or more of these columns are likely to move a target pesticide away from most interferences.

The second mistake made on the pesticide analysis for QB4 was the identification of endrin ketone which was not present. This error was made because of new and inexperienced personnel who had assigned the wrong retention time window to endrin ketone. This error was recognized by the laboratory, (too late, of course), and it should not be repeated.

The components of the score for this sample were somewhat different from previous PE results because an unusually high number of points, (10.6), was lost on volatiles. The reason for this may have been due to the incorporation of new personnel into the GC/MS Laboratory. Only two of the points were lost for misquantitation with the remainder being lost for not identifying two non-TCLs and for identifying 1 TCL contaminant and 1 non-TCL contaminant. More experinece and the training listed below should do much to minimize such mistakes.

The semivolatiles lost 12.3 points with most of this loss (8.1) caused by not identifying two TICs, (2-methylphenol and 2-nitroaniline). Because surrogate and spike recoveries were good and 39 other semivolatile compounds were correctly identified, we must assume that these two compounds were

selectively lost in preparation. Steps have been taken to instruct the preparation technicians to be more careful with samples as they approach dryness and to protect samples from light if they are to be on the bench for extended periods of time.

Our staff has both grown and changed over the last few months. Therefore, it is relatively inexperienced and there is an increased emphasis on training. During the fourth quarter of FY1988 the following training was provided:

1. One Pesticide/PCB chemist was sent to a one-week course dealing with gas chromatography (Harold McNair, ACS, Blacksburg, VA).

2. Two persons from the GC/MS Laboratory were sent to a three-day course dealing with mass spectral interpretation (Michael Gross, [U. Nebraska], at Tennessee Eastman).

3. Two persons (one from GC/MS and one from GC) attended a one-day seminar on gas chromatographic instrumentation presented by a vendor (Hewlett-Packard).

This emphasis on training represents a continuation of the training reported in our response to QB3, FY88; it should serve as an ongoing upgrade of our staff capabilities.

John Caton

John Caton, 4500S, MS-6120 (4-4861)

JEC:llc

cc: M. R. Guerin
M. P. Maskarinec

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

AUG 0 8 1988

Mr. William Laing
Oak Ridge National Laboratory
P.O. Box 2008, 4500s, MS-127
Oak Ridge, TN 37831

Dear Mr. Laing:

The Individual Laboratory Summary Report (ILSR) summarizing the results of the participation of your laboratory in the EMSL-LV third quarter organic performance evaluation study (QB3, FY88) is enclosed. In addition, general information concerning the scoring procedure used for QB3 is included.

The score for your laboratory at 78.7 is in the CLP category of acceptable but with a response required regarding any explanations of deficiencies and the changes or actions taken to correct those deficiencies. (Score is less than 90 but 70 or above).

This office will be glad to furnish any counsel and further information regarding this work.

Sincerely,

Harold A. Vincent

Harold A. Vincent
Chemist
Quality Assurance Research Branch, QAD

Enclosures

cc:
D. Karen Knight, DOE HQ

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ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 88

LABORATORY: Oak Ridge National (TN)
PERFORMANCE: ACCEPTABLE - Response Explaining Deficiency(ies) Required
RANK: Above = 42 Same = 0 Below = 24

% SCORE: 78.7
REPORT DATE: 07/07/
MATRIX: WATER

COMPOUND	CONFIDENCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS NOT-ID	PROGRAM DATA #LABS MIS-QUANT	#LABS CONTAM	TOTAL #LABS
TCL VOLATILE										
METHYLENE CHLORIDE	NU	NU	NU	NU	180		0	0	0	66
ACETONE	78	190	62	200	130		1	9	0	66
CARBON DISULFIDE	110	200	100	210	160		0	13	0	66
1,1-DICHLOROETHENE	110	180	100	180	160		0	7	0	66
1,1-DICHLOROETHANE	130	170	120	180	150		1	6	0	66
1,2-DICHLOROETHENE (TOTAL)	110	170	100	180	160		1	3	0	66
CHLOROFORM	120	160	120	170	150		0	7	0	66
1,2-DICHLOROETHANE	130	170	120	170	140		0	4	0	66
2-BUTANONE	85	190	70	200	160		4	5	0	66
1,1,1-TRICHLOROETHANE	120	170	120	180	150		0	7	0	66
CARBON TETRACHLORIDE	110	170	98	180	160		0	5	0	66
VINYL ACETATE	NU	NU	NU	NU	10	U	0	0	0	66
BROMODICHLOROMETHANE	130	170	120	180	150		0	2	0	66
1,2-DICHLOROPROPANE	140	180	140	180	170		0	9	0	66
CIS-1,3-DICHLOROPROPENE	76	140	67	170	190	X	12	5	0	66
TRICHLOROETHENE	120	170	120	170	170		0	8	0	66
DIBROMOCHLOROMETHANE	140	180	130	190	160		0	9	0	66
1,1,2-TRICHLOROETHANE	130	170	120	170	150		0	5	0	66
BENZENE	120	160	120	160	150		0	8	0	66
TRANS-1,3-DICHLOROPROPENE	NU	NU	NU	NU	98		0	0	1	66
BROMOFORM	130	190	120	200	160		0	5	0	66
2-PENTANONE,4-METHYL-	92	160	82	170	140		1	7	0	66
2-HEXANONE	63	140	52	150	130		1	6	0	66
TETRACHLOROETHENE	100	140	94	160	140		1	5	0	66
TOLUENE	120	160	120	160	160		0	7	0	66
1,1,2,2-TETRACHLOROETHANE	110	160	110	170	140		1	5	0	66
CHLOROBENZENE	130	160	120	170	160		0	3	0	66
ETHYL BENZENE	100	140	97	160	150	$	0	3	0	66
STYRENE	86	150	77	150	150		0	4	0	66
XYLENES (TOTAL)	120	160	110	170	170	$	1	8	0	66
TCL SEMIVOLATILE										
PHENOL	10	42	10	61	7		0	0	0	66
2-CHLOROPHENOL	24	45	21	56	36		0	6	0	66
BENZYL ALCOHOL	NU	NU	NU	NU	20	U	0	0	0	66
2-METHYLPHENOL	22	40	19	50	32		1	6	0	66
4-METHYLPHENOL	20	42	17	53	31		3	4	0	66
2-NITROPHENOL	22	45	19	58	34		0	6	0	66
2,4-DIMETHYLPHENOL	16	38	13	50	26		0	3	0	66
2,4-DICHLOROPHENOL	26	48	23	51	44		1	5	0	66
4-CHLORO-3-METHYL PHENOL	27	48	24	52	38		1	6	0	66
2,4,5-TRICHLOROPHENOL	100	200	89	210	180		1	5	0	66
2-CHLORONAPHTHALENE	25	45	22	55	25		0	4	0	66
3-NITROANILINE	50	120	50	130	100	U	0	4	0	66
4-NITROPHENOL	NU	NU	NU	NU	14		0	0	0	66
4,6-DINITRO-2-METHYLPHENOL	81	160	69	180	170	$	3	7	0	66
N-NITROSODIPHENYLAMINE	52	120	42	140	94		0	5	0	66
HEXACHLOROBENZENE	22	48	18	52	83	X	2	9	0	66
PENTACHLOROPHENOL	NU	NU	NU	NU	51		0	0	0	66
DI-N-BUTYLPHTHALATE	NU	NU	NU	NU	20	U	0	0	0	66
FLUORANTHENE	NU	NU	NU	NU	11		0	0	0	66
BENZO(A)ANTHRACENE	NU	NU	NU	NU	8		0	0	0	66
BENZO(B)FLUORANTHENE	34	110	24	150	110		0	2	0	66
BENZO(K)FLUORANTHENE	40	110	30	120	99		2	3	0	66
BENZO(A)PYRENE	40	110	30	150	99		0	1	0	66
INDENO(1,2,3-CD)PYRENE	28	100	18	140	110	$	1	0	0	66

ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 3 FY 88

LABORATORY: Oak Ridge National (TN)
PERFORMANCE: ACCEPTABLE - Response Explaining Deficiency(ies) Required
RANK: Above = 42 Same = 0 Below = 24

% SCORE: 78.7
REPORT DATE: 07/07/
MATRIX: WATER

COMPOUND	CONFIDENCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS NOT-ID	PROGRAM DATA #LABS MIS-QUANT	#LABS CONTAM	TOTAL #LABS
DIBENZ(A,H)ANTHRACENE	NU	NU	NU	NU	19		0	0	0	66
BENZO(G,H,I)PERYLENE	NU	NU	NU	NU	21		0	0	0	66
TCL PESTICIDES										
ALPHA-BHC	NU	NU	NU	NU	0.05	U	0	0	1	66
DELTA-BHC	NU	NU	NU	NU	0.05	U	0	0	1	66
HEPTACHLOR EPOXIDE	0.100	0.29	0.071	0.32	0.17		10	4	6	66
4,4'-DDE	NU	NU	NU	NU	0.1	U	0	0	2	66
ENDOSULFAN II	NU	NU	NU	NU	0.1	U	0	0	6	66
METHOXYCHLOR	NU	NU	NU	NU	0.52		0	0	0	66
ALPHA-CHLORDANE	0.82	2.8	0.54	3.1	19	X	7	2	0	66
GAMMA-CHLORDANE	0.53	1.5	0.5	1.7	9.4	X	1	6	0	66
AROCLOR-1016	NU	NU	NU	NU	0.5	U	0	0	0	66
AROCLOR-1260	NU	NU	NU	NU	3		0	0	1	66
NON-TCL VOLATILE										
ETHER,2-CHLORO-ETHYL-VINYL					55		15	0	0	66
METHANE,TRICHLORO-FLUORO-					0	&	13	0	0	66
NON-TCL SEMIVOLATILE										
BENZOPHENONE					130		9	0	0	66
META-PICOLINE					19		0	0	0	66
TCL SEMIVOLATILE (Contaminants)										
BIS(2-ETHYLHEXYL)PHTHALATE					2	C0	0	0	1	66
NON-TCL SEMIVOLATILE (Contaminants)										
PHENOL,DICHLORO-METHOXY-					3		0	0	0	66
HEXANONE,METHYL-					64	C	0	0	0	66
PESTICIDE					14	C	0	0	0	66
NON-TCL SEMIVOLATILE (Contaminants)										
UNKNOWN					3		0	0	12	66
UNKNOWN					5		0	0	11	66
UNKNOWN					4		0	0	7	66
UNKNOWN					19	C	0	0	3	66

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 4
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 1
OF NON-TCL CONTAMINANTS: 3

ORGANIC PERFORMANCE EVALUATION MATERIAL SCORING PROCEDURE

OVERVIEW:

An integral responsibility of the Contract Laboratory Program's (CLP) quality assurance program is the monitoring of CLP contractor's continuing ability to produce acceptable analytical data. To assist this process, the EMSL-LV, under the direction of CLP National Program Office (NPO), prepares and sends Performance Evaluation Materials (PEM) quarterly to all contract laboratories within the program. Contractors are required to analyze the PEM and return the data package within the contract required turnaround time. The PEM results are evaluated and summarized by the EMSL-LV. The EMSL-LV forwards the PEM results to the NPO and the Deputy Project Officers (DPO). The NPO, in conjunction with the DPO, determines the the appropriate remedial actions when the PEM results are unacceptable.

NOTE: If it has been determined that there were unusual problems with the PEM themselves or the scoring procedure, the CLP National Program Office reserves the right to adjust scores for any PEM study.

COMPOUNDS ADDED TO THE PEM:

Compounds added to the PEM are classified into two different groups:

1) Target Compound List (TCL) Compounds -- Compounds included on the Target Compound List in Exhibit C of the contract Statement-of-Work. The EMSL-LV adds TCL compounds to matrices that mimic the type of samples analyzed by the CLP. Points are deducted when a TCL compound is not identified, when a TCL compound is misquantified, or when a TCL compound that has not been added to the matrix is identified by the contractor (See, "Scoring Procedure for Classifying a TCL Compound as a Contaminant").

2) Non-Target List Compounds (non-TCL), also referred to as Tentatively Identified Compounds (TIC) -- Compounds which are not included on the Target Compound List in Exhibit C of the contract Statement of Work, but are contaminants found in the environment. A contractor identifies the compounds using a forward library search routine which compares the sample compound spectra against spectra in the National Bureau of Standards (NBS) Mass Spectral Library. The EMSL-LV adds non-TCL compounds to matrices that mimic the type of samples analyzed bv the CLP. Points are deducted when a non-TCL compound is not correctly identified, or when a non-TCL compound that has not been added to the matrix is identified by a contractor (See, "Scoring Procedures Used for Classifying a Non-TCL Compound as a Contaminant").

GENERAL SCORING PROCEDURE COMMENTS:

The following comments apply to the scoring procedure discussed in this enclosure:

For the TCL and non-TCL identification scoring procedures, the NPO reserves the rights to delete compounds from the study if a large percentage of the contractors do not identify the compounds.

Confidence intervals (CI) for TCL compounds are derived from the CLP contractors who submitted values, using statistical procedures. When determining the CI for a TCL compound, if the lower CI limit is less than the CRQL for the compound, then the lower CI limit is set to the CRQL. Also, when determining the CI, if both the upper and lower CI limit are less than the CRQL for the compound, then the compound is not included in the scoring procedure. For information concerning the statistical procedure used to develop CI for the CLP PEM program, contact Larry Butler, at the EMSL-LV.

For the TCL and non-TCL contaminant classification procedures, the NPO will not deduct points if the NPO determines that the contaminant was a breakdown product from compounds added to the PEM or that the matrix used to prepare the PEM contained the contaminant.

SCORING ALGORITHM:

The following algorithms are used to score the full organic and VOA only PEM:

Algorithm 1 (full Organic PEM):

$$\text{Score} = 100 - \left[\frac{150 * (2A + B + C)}{X} + 2.2 * (D + E) \right]$$

Algorithm 2 (VOA only PEM):

$$\text{Score} = 100 - \left[\frac{100 * (2A + B + C)}{X} + 2.2 * (D + E) \right]$$

Where:

X = The number of TCL compounds included and scored in the PEM.

A = The number of TCL compounds which the contractor did not identify.

B = The number of TCL compounds which the contractor did not correctly quantify (value is not within the confidence intervals).

C = The number of TCL contaminants which the contractor identified.

D = The number of non-TCL (TIC) compounds which the contractor did not identify.

E = The number of non-TCL (TIC) contaminants which the contractor identified.

The non-TCL (TIC) term, [(2.2 * (D + E))], is limited to a maximum of 11 points.

SCORING PROCEDURES USED WHEN A CONTRACTOR DOES NOT IDENTIFY A TCL COMPOUND:

The following scoring procedures are used when a contractor does not identify a TCL compound which was added to the PEM:

1) If the contractor reports the CRQL (e.g., 10 U) for a TCL compound, and the CRQL is less than the 90% confidence interval (e.g., 40 to 100), then points are deducted.

2) If a contractor reports a detection limit value (e.g., 50 U) for a TCL compound greater than the compound's CRQL (e.g. 20 U); and the contractor's detection limit value is included within or is greater than the 90% confidence interval (e.g., 40 to 100), then points are deducted.

SCORING PROCEDURES USED WHEN A CONTRACTOR DOES NOT IDENTIFY A NON-TCL COMPOUND:

The following scoring procedures are used when a contractor does not identify a non-TCL compound which was added to the PEM:

1) If contractors does not identify a non-TCL compound, then points are deducted.

2) For those compounds which have similar mass spectra, if a contractor reports an isomer of the non-TCL compound, then no points are deducted.

SCORING PROCEDURE USED WHEN A CONTRACTOR DOES NOT CORRECTLY QUANTIFY A TCL COMPOUND:

The following scoring procedure is used when a contractor does not correctly quantify a TCL compound which was added to the PEM:

1) If a contractor reports a value for a TCL compound which is outside the confidence interval, then points are deducted.

SCORING PROCEDURES USED FOR CLASSIFYING A TCL COMPOUND AS A TCL CONTAMINANT:

A TCL contaminant is defined as an identification of a TCL compound that was not included in the PEM and was not in the matrix material used to prepare the PEM. The following scoring procedure is used when a contractor identifies a TCL contaminant:

1) If the TCL contaminant's concentration is identified as being greater than the action limit for the TCL compound, then points are lost. For the common solvents and the phthalate esters, the action limit is defined as five times the compound's CRQL. For all other TCL compounds, the action limit is defined as the TCL compound's CRQL.

2) Note: Misidentification of spiked TCLs will be classified as contaminants (or false positives) whenever a) no window was set for the spiked compound and b) the contractor identifies an unusually large (outlier) amount of the compound.

SCORING PROCEDURES USED FOR CLASSIFYING A NON-TCL COMPOUNDS AS A NON-TCL CONTAMINANT:

A non-TCL contaminant is defined as an identification of a non-TCL compound that was not included in the PEM and was not in the matrix material used to prepare the PEM. The following scoring procedure is used when a contractor identifies a non-TCL contaminant:

1) If the non-TCL contaminant's concentration is identified as being greater than the action limits, then points are lost. For the non-TCL contaminants, the action limits are: VOA water, 5 ppb; VOA soil, 5 ppb; semivolatiles water, 10 ppb; and semivolatile soil, 330 ppb.

2) Note: Misidentification of spiked non-TCLs will be classified as contaminants (or false positives) whenever the contractor identifies an unusually large (outlier) amount of the compound.

DESCRIPTION OF THE INDIVIDUAL LABORATORY SUMMARY REPORT

OVERVIEW:

The Individual Laboratory Summary Report (ILSR) summarizes the information from the CLP's quarterly Performance Evaluation Material (PEM) Studies. The report is comprised of two parts: contractor data summary and program data summary. Information from an individual CLP contractor is summarized in the contract summary. Information from all CLP contractors is summarized in the program data summary.

EXPLANATION OF ILSR HEADER INFORMATION:

The following is a description of ILSR header information:

Contractor Data Summary:

Header	Definition
LABORATORY	The contractor's name and location (state).
PERFORMANCE	A contractor's performance is classified into one of three categories. ACCEPTABLE, NO RESPONSE REQUIRED: Score greater than or equal to 90 percent. ACCEPTABLE, RESPONSE EXPLAINING DEFICIENCY(IES) REQUIRED: Score greater than or equal to 70 percent and less than 90 percent. UNACCEPTABLE, RESPONSE EXPLAINING DEFICIENCY(IES) REQUIRED: Score less than 70 percent.
RANK	Ranking of CLP Contractors' scores. ABOVE: Number of contractors who had a score greater than the contractor's score. SAME: Number of contractors who had the same score as the contractor's score. BELOW: Number of contractors who had a score less than the contractor's score.
% SCORE	Percent score calculated using either the full organic PEM algorithm or the VOA only PEM algorithm.
REPORT DATE	The date that the ILSR was printed. Format (month/day/year)
MATRIX	PEM matrix

Contractor Data Summary (cont):

Header	Definition
COMPOUND NAME	The name of the compound. Compounds are categorized into 12 categories. TCL VOLATILE: All TCL volatile compounds included in the PEM are listed. TCL SEMIVOLATILE: All TCL semivolatile compounds included in the PEM are listed. TCL PESTICIDE: All TCL Pesticide compounds included in the PEM are listed. NON-TCL VOLATILE: All non-TCL volatile compounds included in the PEM are listed. NON-TCL SEMIVOLATILE: All non-TCL semivolatile compounds included in the PEM are listed. TCL VOLATILE (Contaminants): All TCL volatile compounds which were not included in the PEM or in the matrix material used to prepare the PEM but were identified by the contractor. TCL SEMIVOLATILE (Contaminants): All TCL semivolatile compounds which were not included in the PEM or in the matrix material used to prepare the PEM but were identified by the contractor. TCL PESTICIDE (Contaminants): All TCL pesticide compounds which were not included in the PEM or in the matrix material used to prepare the PEM but were identified by the contractor. NON-TCL VOLATILE (Contaminants): All non-TCL volatile compounds which were not included in the PEM or in the matrix material used to prepare the PEM but were identified by the contractor. NON-TCL SEMIVOLATILE (Contaminants): All non-TCL semivolatile compounds which were not included in the PEM or in the matrix material used to prepare the PEM but were identified by the contractor.
90% CI	90 percent confidence intervals (CI) calculated for each TCL compound using the statistical procedure. LOWER: The lower confidence interval limit. UPPER: The upper confidence interval limit.

Contractor Data Summary (cont):

Header	Definition
LABORATORY DATA	Contractor-reported values and EMSL-LV qualifiers. CONC: Contractor-reported concentration value. Q: Qualifier Codes
# OF TCL COMPOUNDS NOT IDENTIFIED	The number of TCL compounds the contractor did not identify in the PEM--points lost.
# OF TCL COMPOUNDS MISQUANTIFIED	The number of TCL compounds the contractor did not correctly quantify--points lost.
# OF TCL CONTAMINANTS	The number of TCL contaminants the contractor identified--points lost.
# OF NON-TCL COMPOUNDS NOT IDENTIFIED	The number of non-TCL compounds the contractor did not identify--points lost.
# of NON-TCL CONTAMINANTS	The number of non-TCL contaminants the contractor identified--points lost.

Program Data Summary:

Header	Definition
# LABS NOT ID:	The number of CLP contractors who did not identify a TCL or non-TCL compound included in the PEM.
# LABS MISS QUAN:	The number of CLP contractors who did not correctly quantify a TCL compound included in the PEM.
# LABS ID CONT:	The number of CLP contractors who identified a TCL or non-TCL contaminant in the PEM.
TOTAL # LABS:	The number of CLP contractors who analyzed the PEM.

ILSR CODES:

The following codes are used on the ILSR:

U -- Compound analyzed for but not detected.

& -- Compound not identified - points lost.

X -- Compound identified but the reported value is not within the 90% confidence interval--points lost.

ILSR CODES (Cont.):

$ -- Compound identified but the reported value is within the warning limit--no points lost.

C -- Contaminant--points lost.

CO -- Contaminant which may have been introduced during preparation of the PEM or during shipment--no points lost.

NS -- Data required but not submitted.

NR -- Data not required.

NU -- Data not used; insufficient amount of usable data submitted by the contractors to score the data.

OAK RIDGE NATIONAL LABORATORY
OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2008
OAK RIDGE, TENNESSEE 37831

November 4, 1988

Vincent Fayne
USDOE
Forrestal Bldg, EH-24
Independence Ave., SW
Washington, DC 20585

Harold Vincent
EMSL-LV
P. O. Box 93478
Las Vegas, NV 89193-3478

Gentlemen:

Attached is the ORNL response to the QB3 organic performance evaluation report. Please contact John Caton (615/574-4861) if you have any questions.

Sincerely,

W. R. Laing
ACD Task Leader

WRL:lp

attachment

cc: R. B. Fitts
W. D. Shults

MARTIN MARIETTA

Internal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

November 2, 1988

W. R. Laing, 4500S, MS-6127

Response to Score for Organic Analyses for 3rd Quarter (FY 1988) PE Samples

Our score for the 3rd quarter organic performance evaluation study (QB3, FY88), was 78.7. Points were deducted because 4 TCL compounds (2 pesticides, 1 volatile, and 1 semivolatile) were mis-quantified (12.5 points); one non-TCL compound was not identified (2.2 points); and 3 non-TCL contaminants were found in the prepared sample (6.6 points). Corrective actions will include the following:

1. Purchase and installation of a high temperature oven to remove all traces of chromatographable organics from preparation glassware. The three contaminants coupled with the fact that all mis-quantified compounds were high indicates "too much" has been recovered. Some parts of the preparation glassware such as continuous extractors, snider columns, etc., contain parts which can be washed only by soaking and rinsing. Therefore, trace residuals might remain especially if the equipment had previously been used for highly contaminated samples; (and we had just completed preparation of a series of samples containing high levels of chlorocarbons immediately preceding receipt of the third quarter PE).

2. Personnel will receive more training. This training will include continuing emphasis on the care, handling, and preparation of both samples and standards. In addition, two staff members were sent to training courses concerning the use and operation of gas chromatograph/mass spectrometers.

3. Special emphasis will be placed on upgrading the capabilities of the pesticide analysis effort. There have been some significant personnel changes in this area. Emphasis will be on careful training; and for the near future, some of the automatic data handling capabilities will be abandoned so that the newer personnel in this effort will gain a better understanding of data interpretation and calculations.

John E. Caton

John E. Caton, 4500S, MS-6120 (4-4861)

JEC:llc

cc: M. R. Guerin
M. P. Maskarinec

MAY 16 1988 Pam

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

Mr. John E. Caton
Oak Ridge Nat. Lab
Bldg 4500-S, MS-120
Bethel Valley Rd.
Oak Ridge, TN 37831-6120

Dear Mr. Caton:

For your information and review the results for your participation in the EMSL-LV Second Quarter Organic Performance Evaluation Study (QB2, FY 88) are included here. Enclosed is general information about the Superfund Performance Evaluation Program. The PE portion of the Laboratory Profile Package, called the "Individual Laboratory Summary Report" (ILSR) was described in your letter reports last quarter. Other general information about the PE program is explained on the following pages.

The samples consisted of aqueous materials spiked with Target Compound List (TCL) and non-TCL pollutants at environmentally representative levels. Samples for all laboratories were from the same homogeneous batch. Each sample set was to be prepared and analyzed by current contractually required procedures.

The EMSL-LV thanks you for your participation in this study and wishes to congratulate the laboratories for an overall fine performance. We trust that this information is vital to you as a member of the community of laboratories analyzing hazardous waste samples for Superfund.

Sincerely,

Larry Butler, Ph.D.
Supervisor, Performance Evaluation Program
Quality Assurance Research Branch
Quality Assurance and Methods Development Division

Enclosure

cc: (w/enclosure)
Carla Dempsey, OERR
Joan Fisk, OERR
Emile Boulos, OERR
Angelo Carasea, OERR
Howard Fribush, OERR

Enclosure

The sample set consisted of aqueous materials spiked with base/neutral/acid/pesticide (BNAP) Target Compound List (TCL) and non-TCL compounds diluted in water to environmentally representative levels (full-volume organics). This included three (3) 80-ounce bottles of semi-volatiles and pesticides; one (1) 80-ounce bottle filled with blank water for BNAP blank analyses; four (4) 40-mL vials filled with water spiked with volatile organics; and two (2) 40-mL vials filled with blank water for volatiles blank analysis. The sample set was to be prepared and analyzed by current contractually required procedures.

All analytical results, calibrations, quality control procedures, and reporting and deliverable requirements were to be submitted by the participating laboratories by contract as a regular case.

EMSL-LV PE Reports - The entire format for EMSL-LV PE reports has been revised. Identification, Quantification, and Contamination (formerly called false positives) are now scored by by an algorithm contained in your laboratory's "Individual Laboratory Summary Report" (ILSR).

Confidence Intervals (CI) were derived from the laboratory submitted values using the statistical procedure BIWEIGHT which does not generate outliers. Instead values are weighted as to their position, relative to the mean. No values are discarded. Other details are included in your ILSR. The confidence interval calculation and the scoring algorithm are intrinsic parts of the ILSRs.

Also in the footnotes to the study is the EMSL-LV method for the scoring of U-flagged values. This U-value scoring procedure has not changed from earlier PE studies.

For your convenience, attached are the ILSR for your laboratory, footnotes, and a graphical programmatic representation of scores. The bar graph shows the mean laboratory performance plotted versus time. The left bar for each quarter represents the mean score, whereas the right bar for the same quarter is the standard deviation of the scores. The numbers on top of the left bar are the numbers of laboratories in each study. Please compare your score with the programmatic mean.

The EMSL-LV is recommending the following scoring categories, which are a National Program Office directive:

1. 100 to 90 percent - "Acceptable Performance, No corrective action necessary;"

2. 90 to 70 percent - "Acceptable Performance, Corrective Action Necessary;"

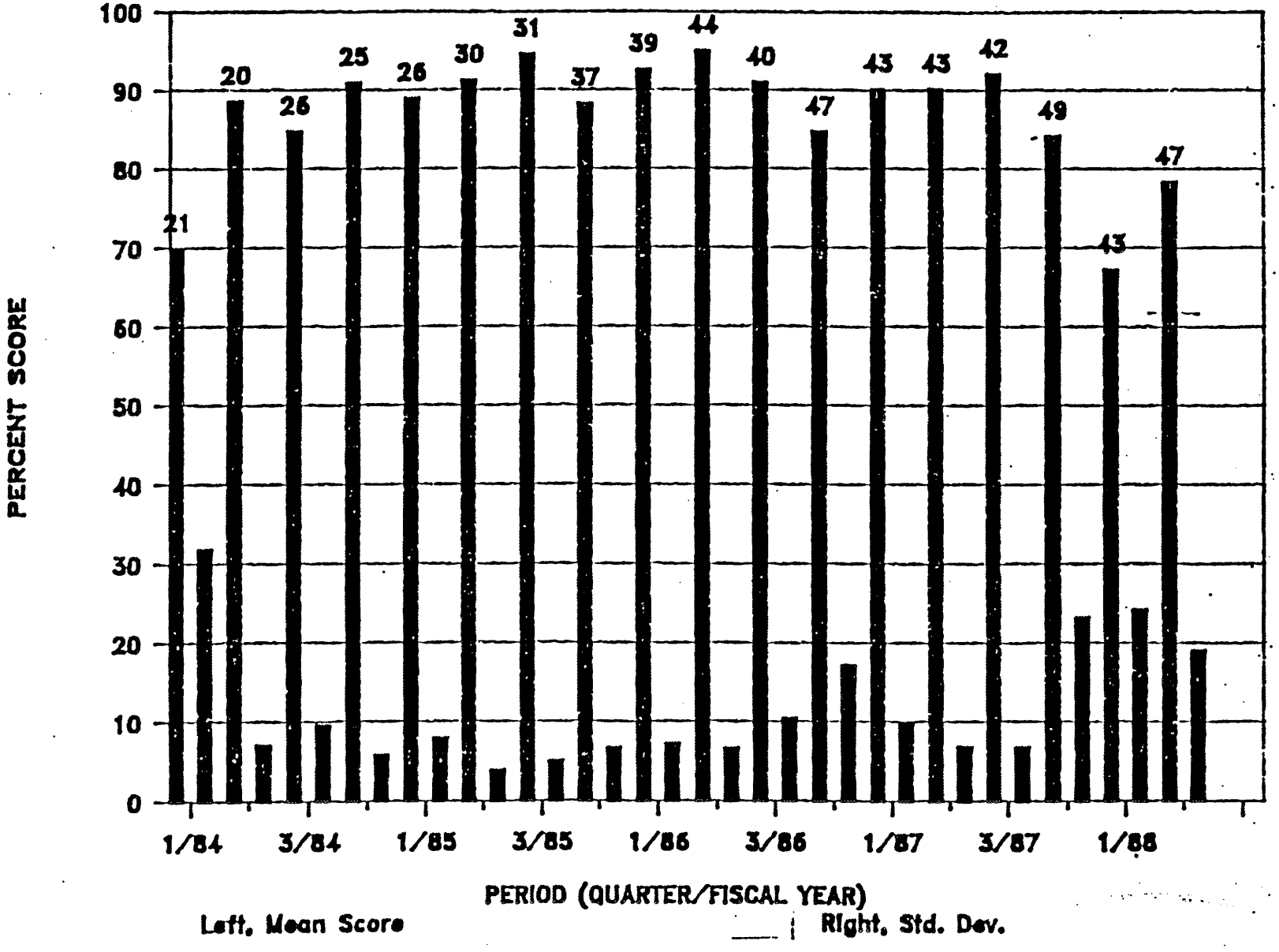
3. 70 percent or lower - "Unacceptable Performance, Corrective Action Mandatory."

The Analytical Operations Branch of the Office of Emergency and Remedial Response also requires that all laboratories who fail to correctly identify or quantify two or more parameters or compounds or who have blank contamination (false positives) exceeding the contract requirements document the corrective action they plan to undertake. These laboratories must document in a letter to their Project Officer, Deputy Project Officer, and myself within two weeks of receipt of the results of this study, the source of the problem(s) and the corrective action(s) the laboratory plans to implement to prevent the problem(s) from occurring in future Quarterly Blind PE samples.

The government reserves the right to fairly and equably adjust scores for any PE study, should the National Program Office determine that there were unusual problems with the PE samples themselves or the scoring procedure. Determinations made by the National Program Office are final.

CONTRACT LABORATORY PROGRAM

ORGANIC QB TREND CHART



QB 2 FY 88 ORGANIC, CASE NOS. 8783 AND 8784

TCL:

b CONFIDENCE INTERVALS (CI) WERE DERIVED FROM LABORATORY SUBMITTED VALUES. LESS THAN VALUES (<x), J-VALUES, U-VALUES, B-VALUES, AND NON-SUBMITTED VALUES (-) WERE NOT USED IN THE CALCULATION OF THE CI.
c CI WERE NOT SET SINCE 40 % OR MORE OF THE LABORATORIES SUBMITTED A NON-USABLE VALUE.
B INDICATES THAT THE COMPOUND WAS FOUND IN THE BLANK.
D INDICATES A DILUTION.
E COMPOUND EXCEEDS CALIBRATION RANGE OF INSTRUMENT.
J ESTIMATED VALUE LESS THAN THE CRQL.
NA NOT APPLICABLE OR NOT ANALYZED FOR.
NR NOT REQUIRED.
NS NOT SUBMITTED.
U ANALYZED FOR BUT NOT DETECTED.
X VALUE WAS OUTSIDE BOTH THE WARNING AND THE ACTION LIMIT. POINTS DEDUCTED FOR QUANTITATION ONLY.
& POINTS DEDUCTED FOR IDENTIFICATION ONLY.
$ VALUE WAS OUTSIDE THE WARNING LIMIT ONLY. NO POINTS DEDUCTED.
- VALUE NOT SUBMITTED FOR THIS COMPOUND.
+ INDICATES A TCL CONTAMINANT DETERMINED BY GRUBB'S TEST FOR COMPOUNDS WITH NO CI SET BASED ON "c" CRITERIA.
? BEST ESTIMATE OF VALUE AND/OR QUALIFIER. POOR OR ILLEGIBLE COPY SUBMITTED.
WARNING LIMIT (80 PERCENT CI).
ACTION LIMIT (90 PERCENT CI).

NON-TCL / TIC:

NA NOT APPLICABLE. POINTS WERE NOT DEDUCTED SINCE 40 PERCENT OF THE LABORATORIES DID NOT IDENTIFY THIS COMPOUND.
- NOT IDENTIFIED.
ND NOT DETECTED. POINTS DEDUCTED.
F INDICATES A CONTAMINANT. POINTS DEDUCTED.
X INDICATES THAT THE DATA WERE MANUALLY MANIPULATED BY THE ANALYST.
A ALDOL CONDENSATION PRODUCT.

SCORING NOTES: PROCEDURE FOR GRADING U-VALUES

1. ANY U-VALUE RESPONSE (LABORATORY DETECTION LIMIT) > CRQL, EVEN IF IT IS IN THE 90 % CI, CAUSES A POINT DEDUCTION. IF 25 % OR MORE OF THE LABORATORIES REPORT A U-VALUE OVER THE CRQL, THEN NO POINTS ARE DEDUCTED FOR ANY LABORATORY. THIS COULD INDICATE A MATRIX INTERFERENCE IN THE SAMPLE.

2. IF CRQL < LOWER CI, THEN USE CI AS SET.

3. IF LOWER CI < CRQL AND CRQL < UPPER CI, THEN SET LOWER CI TO ZERO (0). NO POINTS DEDUCTED FOR IDENTIFICATION OR QUANTITATION LESS THAN OR EQUAL TO THE CRDL.

4. IF CRQL > LOWER AND UPPER CI, THEN NO CI USED. ANALYTE DROPPED FROM THE SCORING. NO POINTS DEDUCTED FOR IDENTIFICATIONS OR QUANTITATIONS. CONTAMINANTS POSSIBLE.

NOTE THAT ONLY CLP LABORATORIES WERE USED IN THE CALCULATION OF THE CI.

NOTE THAT A U-VALUE FOLLOWED BY AN AMPERSAND (&) (U &) MEANS THAT POINTS WERE LOST FOR IDENTIFICATION ONLY.

NOTE THAT FOR NON-TCL/TIC A DASH FOLLOWED BY A "ND" (- ND) INDICATES THAT POINTS WERE DEDUCTED FOR IDENTIFICATION ONLY.

6

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ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 88

LABORATORY: Oak Ridge National (TN)
PERFORMANCE: UNACCEPTABLE - Corrective Actions Mandatory
RANK: Above = 44 Same = 0 Below = 7

% SCORE: 62.3
REPORT DATE: 4/5/19
MATRIX: WATER

COMPOUND	90 % CI LOWER	90 % CI UPPER	LABORATORY DATA CONC	Q	#LABS NOT-ID	PROGRAM DATA #LABS MIS-QUANT	#LABS CONTAM	TOTAL #LABS
TCL VOLATILE								
BROMOMETHANE	64	240	195		0	2	0	51
METHYLENE CHLORIDE	c	c	79		0	0	0	51
1,1-DICHLOROETHANE	34	55	38		0	3	0	51
2-BUTANONE	38	170	67		3	7	0	51
BROMODICHLOROMETHANE	59	80	63		0	3	0	51
1,1,2-TRICHLOROETHANE	54	76	60		0	8	0	51
BENZENE	12	17	14		1	5	0	51
2-HEXANONE	48	200	84		1	3	0	51
TOLUENE	18	30	20		0	2	0	51
CHLOROBENZENE	85	110	92		0	3	0	51
STYRENE	80	110	90		0	6	0	51
XYLENES (TOTAL)	120	180	131		0	5	0	51
TCL SEMIVOLATILE								
2-CHLOROPHENOL	23	52	30		0	5	0	51
N-NITROSO-DI-N-PROPYLAMINE	45	84	55		0	6	0	51
ISOPHORONE	65	140	66	s	0	5	0	51
2,4-DIMETHYLPHENOL	10	53	21	J	0	2	0	51
BENZOIC ACID	56	200	166		0	7	0	51
HEXACHLOROBUTADIENE	61	160	62	s	0	2	0	51
2-METHYLNAPHTHALENE	20	55	24		0	3	0	51
2,4,6-TRICHLOROPHENOL	55	100	70		0	8	0	51
2-NITROANILINE	50	100	53		0	2	0	51
ACENAPHTHYLENE	59	100	62	s	0	8	0	51
ACENAPHTHENE	61	100	59	X	0	4	0	51
2,4-DINITROPHENOL	81	260	170		3	7	0	51
DIBENZOFURAN	96	160	92	X	0	6	0	51
4-NITROPHENOL	50	200	160		0	1	0	51
FLUORENE	64	100	58	X	0	4	0	51
DIETHYLPHTHALATE	c	c	22	U	0	0	0	51
PENTACHLOROPHENOL	74	230	150		0	6	0	51
PHENANTHRENE	62	100	58	X	0	5	0	51
ANTHRACENE	57	100	55	X	0	4	0	51
PYRENE	42	110	39	X	0	6	0	51
BUTYL BENZYL PHTHALATE	c	c	22	U	0	0	0	51
BENZO(A)ANTHRACENE	31	100	27	X	0	2	0	51
DI-N-OCTYL PHTHALATE	10	100	6	J s	0	2	0	51
DIBENZ(A,H)ANTHRACENE	17	140	17	J s	0	2	0	51
TCL PESTICIDES								
HEPTACHLOR	0.05	0.43	0.47	X	0	8	0	51
ALDRIN	0.14	0.53	0.15	s	18	5	0	51
ENDRIN	0.16	0.48	0.32		2	11	0	51
TOXAPHENE	c	c	1	U	0	0	1	51
NON-TCL SEMIVOLATILE								
BENZOPHENONE			56		0	0	0	51
DISULFOTON			20	J	0	0	0	51
CHLORPYRIFOS			10	J	0	0	0	51
2-NITRO-P-CRESOL			36		0	0	0	51
TCL SEMIVOLATILE (Contaminants)								
BENZYL ALCOHOL			8	J	0	0	0	51

ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 88

LABORATORY: Oak Ridge National (TN)
PERFORMANCE: UNACCEPTABLE - Corrective Actions Mandatory
RANK: Above = 44 Same = 0 Below = 7

% SCORE: 62.3
REPORT DATE: 4/5/1988
MATRIX: WATER

COMPOUND	90 % CI LOWER	90 % CI UPPER	LABORATORY DATA CONC	Q	#LABS NOT-ID	PROGRAM DATA #LABS MIS-QUANT	#LABS CONTAM	TOTAL #LABS
BIS(2-ETHYLHEXYL)PHTHALATE			12	JB	0	0	1	51
NON-TCL SEMIVOLATILE (Contaminants)								
2-HEXANONE,5-METHYL-			42	B	0	0	0	51
UNKNOWN			12	JF	0	0	19	51
UNKNOWN			32	F	0	0	10	51

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 8
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 0
OF NON-TCL CONTAMINANTS: 2

OAK RIDGE NATIONAL LABORATORY
OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37831

May 18, 1988

Harold Vincent
EMSL-LV
P. O. Box 93478
Las Vegas, NV 89193-3478

Dear Harold:

Attached is the letter from Mike Guerin on corrective actions resulting from the QBII performance evaluation sample report. The QBIII sample is almost completed and will be sent to you soon.

Sincerely,

W. R. Laing
ACD Task Leader

WRL:lp

cc: Karen Knight
R. B. Fitts

MARTIN MARIETTA

nternal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

May 17, 1988

W. R. Laing

Corrective Action Re OB2 FY88 Performance Evaluation Sample

We are taking the following steps as corrective actions.

1. No DOE Site Survey Samples are currently being analyzed for PCB-pesticides, VOA, or SVO. Samples for these analyses will not be accepted without approval of the ORNL Program Office.

2. The current quarterly Performance Evaluation Sample is being analyzed.

3. Weekly internal quality control samples are being analyzed for PCB-pesticides, VOA, and SVO analytes.

The results will be documented and will be used to design remedial action experiments if the results are found suspect.

M. R. Guerin, 4500-S, MS 120 (4-4862)

MRG:pmt

cc: J. E. Caton
R. M. Edwards
G. S. Fleming
S. H. Harmon
J. A. Hayden
G. M. Henderson
C. A. Treese

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

DEC 16 1987

Mr. William R. Laing
Oak Ridge National Laboratory
Building 4500 S. MS-131
Oak Ridge, TN 37831-6107

Dear Bill:

The results of the analyses for the water pollution sample, WP-019, are complete. Comparison sheets are enclosed showing the true values, acceptance limit ranges, warning limit ranges, and the values your laboratory obtained. Values for analytes present in the samples in determined quantities, but not generally determined in this DOE exercise, are also included. These latter values may be ignored or used for whatever purpose your laboratory can find.

Most of the analytical determinations done by the participating DOE laboratories were good. Your laboratory did extremely well and completed determinations for many of the optional analytes. Not all were perfect, and we can still learn from this performance evaluation exercise. Determinations by the ORNL laboratory of the metals on sample vials 1 & 2 were very good. Values your laboratory measured for metals on vials 3 & 4 were off from the true values by a factor of 2 in each case. Values for total dissolved solids were high in each case and should be investigated. Values for non-filterable residue were slightly high, but do not seem to pose a serious problem.

I congratulate you and your laboratory on doing a fine job in this exercise and hope we can continue to rely on your laboratory furnishing the DOE environmental survey with high-quality analytical information.

Sincerely,

Harold A. Vincent

Harold A. Vincent
Chemist, Quality Assurance Research Branch
Quality Assurance and Methods Development Division

Enclosure

cc:(w/o enclosure)
D. Karen Knight, DOE HQ

LABORATORY: ORNL
SUMMARY OF DOE SURVEY - LABORATORY SUPPORT (WP019)

Parameter	Sample Number	True Value	Reported Value	Acceptance Limits	Warning Limits
pH Units	3	4.00	3.97	3.93 - 4.09	3.95 - 4.07
	4	9.19	9.18	8.86 - 9.40	8.93 - 9.33
Spec. Cond.	1	659	675	592. - 732.	610. - 714.
	2	272	279	245. - 302.	252. - 295.
Total Diss. Sol.	1	399	489**	325. - 482.	344. - 462.
	2	158	286**	95.9 - 217.	111. - 202.
Total Hardness	1	159.5	163	151. - 174.	154. - 172.
	2	73.5	74.6	65.1 - 82.9	67.3 - 80.7
Total Alkalinity	1	55.0	56.0	49.0 - 60.4	50.4 - 59.0
	2	7.49	6.50	4.71 - 11.6	5.57 - 10.8
Chloride	1	113	117	106. - 128.	108. - 125.
	2	52.1	52.8	47.1 - 57.1	48.3 - 55.9
Flouride	1	2.01	1.97	1.74 - 2.23	1.80 - 2.17
	2	0.247	0.285	.155 - .337	.178 - .314
Sulfate	1	74.0	73.3	60.7 - 85.5	63.8 - 82.4
	2	33.0	31.6	24.5 - 39.4	26.3 - 37.5
Ammonia ^{-}N	1	0.800	0.823	.538 - 1.09	.605 - 1.03
	2	3.00	3.19	2.33 - 3.58	2.48 - 3.43
Nitrate ^{-}N	1	0.500	0.496	.383 - .614	.411 - .586
	2	2.00	2.15	1.59 - 2.38	1.68 - 2.28
Ortho ^{-}P	1	0.080	0.081	.0454- .108	.0529- .100
	2	0.800	0.816	.682 - .904	.708 - .877
TOC	1	59.2	58.0	46.8 - 74.3	50.4 - 70.7
	2	109	107	86.8 - 128.	92.2 - 122.
Total CN	1	0.124	0.130	.0687- .161	.0805 - .149
	2	0.300	0.307	.174 - .388	.201 - .361
Non-Filt. Res.	1	69.4	73.0*	61.1 - 73.6	62.6 - 72.0
	2	24.7	27.3**	20.5 - 27.2	21.3 - 26.4
Oil and Grease	1	35.3	35.8	20.9 - 43.0	23.7 - 40.3
	2	12.8	12.8	3.99 - 18.1	5.74 - 16.3

NR - Not reported.
*Outside warning limits.
**Outside acceptance limits.

PERFORMANCE EVALUATION REPORT DATE: 11/16/87

WATER POLLUTION STUDY NUMBER WP019

LABORATORY: ORNL

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
ALUMINUM	1	87.2	78.0	49.5 - 148.	62.0 - 136.	
	2	828	858	658. - 1050.	707.- 997.	
ARSENIC	1	24.8	26.0	17.3 - 34.1	19.4 - 32.0	
	2	123	130	95.3 - 161.	104. - 153.	
BERYLLIUM	1	94.0	89.9	75.7 - 103.	79.2 - 99.6	
	2	288	270	231. - 306.	241. - 296.	
CADMIUM	1	10.1	10.0	7.22 - 12.8	7.92 - 12.1	
	2	154	150	128. - 170.	133. - 165.	
COBALT	1	47.5	47.5	37.0 - 57.4	39.6 - 54.8	
	2	609	594	506. - 694.	530. - 670.	
CHROMIUM	1	15.4	15.0	8.74 - 20.2	10.2 - 18.8	
	2	245	240	181. - 287.	194. - 274.	
COPPER	1	39.9	40.0	31.6 - 47.6	33.6 - 45.6	
	2	177	176	152. - 195.	157. - 190.	
IRON	1	49.8	50.4	30.4 - 70.0	35.3 - 65.1	
	2	413	420	357. - 471.	371. - 457.	
MERCURY	1	2.24	2.40	1.52 - 3.21	1.73 - 3.00	
	2	15.0	15.6	11.6 - 20.1	12.7 - 19.0	
MANGANESE	1	38.1	37.8	27.8 - 46.1	30.1 - 43.8	
	2	150	147	127. - 164.	132. - 159.	
NICKEL	1	62.6	63.0	46.9 - 78.8	50.9 - 74.8	
	2	282	280	237. - 322.	248. - 311.	
LEAD	1	49.6	50.4	37.2 - 64.4	40.6 - 61.0	
	2	164	168	140. - 197.	147. - 190.	

*BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 11/16/87

WATER POLLUTION STUDY NUMBER WP019

LABORATORY:

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
SELENIUM	1	23.7	20.0	12.4 - 25.8	14.0 - 24.1	
	2	138	120	84.2 - 150.	92.4 - 141.	
VANADIUM	1	62.7	62.0	46.1 - 78.4	50.5 - 74.0	
	2	637	620	520. - 720.	547. - 693.	
ZINC	1	31.3	30.4	22.7- 38.8	24.7 - 36.8	
	2	117	114	90.7 - 134.	96.1 - 129.	
ANTIMONY	3	26.3	13.8	6.04 - 22.6	8.22 - 20.4	
	4	75.1	37.3	21.6 - 54.7	25.9 - 50.4	
SILVER	3	35.2	17.5	13.4 - 21.5	14.4 - 20.4	
	4	6.9	13.43	2.13 - 4.95	2.49 - 4.60	
THALLIUM	3	2.87	3.20	1.58 - 4.82	2.01 - 4.39	
	4	28.6	32.0	21.1 - 43.2	24.1 - 40.2	
MOLYBDENUM	3	8.79	4.40	.352 - 8.85	1.52 - 7.68	
	4	74.7	37.0	19.3 - 49.3	23.2 - 45.4	
STRONTIUM	3	179	91.5	73.7 - 107.	78.3 - 102.	
	4	36.4	18.3	14.3 - 22.2	15.4 - 21.1	
TITANIUM	3	70.6	37.1	19.0 - 52.2	23.6 - 47.6	
	4	303	156	113. - 205.	125. - 192.	

*BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

SUMMARY OF DOE SURVEY - LABORATORY SUPPORT (WP019)

Parameter	ORNL Sample 1	ORNL Sample 2	ORGDP Sample 1	ORGDP Sample 2	ANL Sample 1	ANL Sample 2	BCD Sample 1	BCD Sample 2	INEL Sample 1	INEL Sample 2
Al	87.2	828	-	-	-	-	-	-	-	-
As	24.8	123	-	-	-	-	-	-	-	-
Be	94.0	288	-	-	-	-	-	-	-	-
Cd	10.1	154	-	-	-	-	-	-	-	-
Co	47.5	609	-	-	-	-	-	-	-	-
Cr	15.4	245	-	-	-	-	-	-	-	-
Cu	39.9	177	-	-	-	-	-	-	-	-
Fe	49.8	413	-	-	-	-	-	-	-	-
Hg	2.24	15.0	-	-	-	-	-	-	-	-
Mn	38.1	150	-	-	-	-	-	-	-	-
Ni	62.6	282	-	-	-	-	-	-	-	-
Pb	49.6	164	-	-	-	-	-	-	-	-
Se	23.7	138	-	-	-	-	-	-	-	-
V	62.7	637	-	-	-	-	-	-	-	-
Zn	31.3	117	-	-	-	-	-	-	-	-
Sb	26.3	75.1	-	-	-	-	-	-	-	-
Ag	35.2	6.91	-	-	-	-	-	-	-	-
Tl	2.87	28.6	-	-	-	-	-	-	-	-
Mo	8.79	74.7	-	-	-	-	-	-	-	-
Sr	179	36.4	-	-	-	-	-	-	-	-
Ti	70.6	303	-	-	-	-	-	-	-	-

SUMMARY OF DOE SURVEY - LABORATORY SUPPORT (WP019)

Parameter	ORNL		ORGDP		ANL		BCD		INEL	
	Sample 1	Sample 2	Sample 1	Sample 2	Sample 1	Sample 2	Sample 1	Sample 2	Sample 1	Sample 2
pH Units	3.97	9.18	4.01	9.20	-	-	-	-	3.90	7.80
Spec. Cond.	675	279	611	254	-	-	-	-	642	298
Total Diss. Sol.	489	286	433	177	384	411	-	-	359	147
Total Hardness	163	74.6	165	76	-	-	-	-	-	-
Total Alkalinity	56.0	6.50	58	9	-	-	-	-	-	-
Chloride	117	52.8	118	51.7	115	74.1	120	48.6	120	51.7
Fluoride	1.97	0.285	1.7	0.2	1.83	0.246	2.12	0.32	2.01	0.305
Sulfate	73.3	31.6	71.1	31.2	67.8	29.7	75.1	34.9	74.4	32.2
Ammonia ^{-}N	0.823	3.19	0.83	3.47	-	-	-	-	-	-
Nitrate ^{-}N	0.496	2.15	0.51	1.95	0.45	1.87	-	-	.492	2.062
Ortho ^{-}P	0.081	0.816	0.08	0.77	0.0743	0.78	-	-	.0729	.765
TOC	58.0	107	-	-	-	-	-	-	57.2	110
Total CN	0.130	0.307	0.13	0.35	0.095	0.283	0.096	0.046	.0933	0.287
Non-Filt. Res.	73.0	27.3	70	25	66.2	23.8	50.6	21.4	65.8	24.7
Oil and Grease	35.8	12.8	31	11	30.8	11.1	16.9	5.4	28.2	-

SUMMARY OF DOE SURVEY - LABORATORY SUPPORT (WP019)

Parameter	ORNL		ORGDP		ANL		BCD		INEL	
	Sample 1	Sample 2	Sample 1	Sample 2	Sample 1	Sample 2	Sample 1	Sample 2	Sample 1	Sample 2
pH Units	3.97	9.18	4.01	9.20	-	-	-	-	3.90	7.80
Spec. Cond.	675	279	611	254	-	-	-	-	642	298
Total Diss. Sol.	489	286	433	177	384	411	-	-	359	147
Total Hardness	163	74.6	165	76	-	-	-	-	-	-
Calcium	61.6	1.25	-	-	-	-	-	-	-	-
Magnesium	0.553	18.0	-	-	-	-	-	-	-	-
Sodium	59.9	18.1	-	-	-	-	-	-	-	-
Potassium	18.6	10.0	-	-	-	-	-	-	-	-
Total Alkalinity	56.0	6.50	58	9	-	-	-	-	-	-
Chloride	117	52.8	118	51.7	115	74.1	120	48.6	120	51.7
Fluoride	1.97	0.285	1.7	0.2	1.83	0.246	2.12	0.32	2.01	0.305
Sulfate	73.3	31.6	71.1	31.2	67.8	29.7	75.1	34.9	74.4	32.2
Ammonia ^{-}N	0.823	3.19	0.83	3.47	-	-	-	-	-	-
Nitrate ^{-}N	0.496	2.15	0.51	1.95	0.45	1.87	-	-	.492	2.062
Ortho ^{-}P	0.081	0.816	0.08	0.77	0.0743	0.78	-	-	.0729	.765
Kjeld. ^{-}N	0.527	4.36	-	-	-	-	-	-	-	-
Total ^{-}P	0.304	2.19	-	-	-	-	-	-	-	-
COD	166	323	-	-	-	-	-	-	-	-
TOC	58.0	107	-	-	-	-	-	-	57.2	110
5-day BOD	88.0	183	-	-	-	-	-	-	-	-
Total CN	0.130	0.307	0.13	0.35	0.095	0.283	0.096	0.046	.0933	0.287
Non-Filt. Res.	73.0	27.3	70	25	66.2	23.8	50.6	21.4	65.8	24.7
Oil and Grease	35.8	12.8	31	11	30.8	11.1	16.9	5.4	28.2	-
Total Phenolics	0.494	1.35	-	-	-	-	-	-	-	-
Total Res. Chlorine	0.70	1.48	-	-	-	-	-	-	-	-

PERFORMANCE EVALUATION REPORT DATE: 11/16/87

WATER POLLUTION STUDY NUMBER WP019

LABORATORY:

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
ALUMINUM	1		78.0	49.5- 148.	62.0- 136.	
	2		858	658.-1050.	707.- 997.	
ARSENIC	1		26.0	17.3- 34.1	19.4- 32.0	
	2		130	95.3- 161.	104.- 153.	
BERYLLIUM	1		89.9	75.7- 103.	79.2- 99.6	
	2		270	231.- 306.	241.- 296.	
CADMIUM	1		10.0	7.22- 12.8	7.92- 12.1	
	2		150	128.- 170.	133.- 165.	
COBALT	1		47.5	37.0- 57.4	39.6- 54.8	
	2		594	506.- 694.	530.- 670.	
CHROMIUM	1		15.0	8.74- 20.2	10.2- 18.8	
	2		240	181.- 287.	194.- 274.	
COPPER	1		40.0	31.6- 47.6	33.6- 45.6	
	2		176	152.- 195.	157.- 190.	
IRON	1		50.4	30.4- 70.0	35.3- 65.1	
	2		420	357.- 471.	371.- 457.	
MERCURY	1		2.40	1.52- 3.21	1.73- 3.00	
	2		15.6	11.6- 20.1	12.7- 19.0	
MANGANESE	1		37.8	27.8- 46.1	30.1- 43.8	
	2		147	127.- 164.	132.- 159.	
NICKEL	1		63.0	46.9- 78.8	50.9- 74.8	
	2		280	237.- 322.	248.- 311.	
LEAD	1		50.4	37.2- 64.4	40.6- 61.0	
	2		168	140.- 197.	147.- 190.	

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 11/16/87

WATER POLLUTION STUDY NUMBER WP019

LABORATORY:

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
TRACE METALS IN MICROGRAMS PER LITER:						
SELENIUM	1		20.0	12.4- 25.8	14.0- 24.1	
	2		120	84.2- 150.	92.4- 141.	
VANADIUM	1		62.0	46.1- 78.4	50.5- 74.0	
	2		620	520.- 720.	547.- 693.	
ZINC	1		30.4	22.7- 38.8	24.7- 36.8	
	2		114	90.7- 134.	96.1- 129.	
ANTIMONY	3		13.8	6.04- 22.6	8.22- 20.4	
	4		37.3	21.6- 54.7	25.9- 50.4	
SILVER	3		17.5	13.4- 21.5	14.4- 20.4	
	4		3.43	2.13- 4.95	2.49- 4.60	
THALLIUM	3		3.20	1.58- 4.82	2.01- 4.39	
	4		32.0	21.1- 43.2	24.1- 40.2	
MOLYBDENUM	3		4.40	.352- 8.85	1.52- 7.68	
	4		37.0	19.3- 49.3	23.2- 45.4	
STRONTIUM	3		91.5	73.7- 107.	78.3- 102.	
	4		18.3	14.3- 22.2	15.4- 21.1	
TITANIUM	3		37.1	19.0- 52.2	23.6- 47.6	
	4		156	113.- 205.	125.- 192.	

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PAGE 2

PERFORMANCE EVALUATION REPORT DATE: 11/16/87

WATER POLLUTION STUDY NUMBER WP019

LABORATORY:

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
MINERALS IN MILLIGRAMS PER LITER: (EXCEPT AS NOTED)						
PH-UNITS	3		4.00	3.93- 4.09	3.95- 4.07	
	4		9.19	8.86- 9.40	8.93- 9.33	
SPEC. COND.	1		659	592.- 732.	610.- 714.	
(UMHOS/CM AT 25 C)	2		272	245.- 302.	252.- 295.	
TDS AT 180 C	1		399	325.- 482.	344.- 462.	
	2		158	95.9- 217.	111.- 202.	
TOTAL HARDNESS	1		159.5	151.- 174.	154.- 172.	
(AS CACO3)	2		73.5	65.1- 82.9	67.3- 80.7	
CALCIUM	1		63.0	54.7- 74.0	57.1- 71.6	
	2		0.905	.700- 1.78	.835- 1.65	
MAGNESIUM	1		0.520	.424- .635	.451- .608	
	2		17.3	14.8- 19.8	15.4- 19.2	
SODIUM	1		52.6	46.0- 58.4	47.5- 56.8	
	2		13.7	10.8- 16.2	11.4- 15.6	
POTASSIUM	1		18.0	14.9- 21.0	15.6- 20.2	
	2		10.0	8.29- 11.5	8.68- 11.1	
TOTAL ALKALINITY	1		55.0	49.0- 60.4	50.4- 59.0	
(AS CACO3)	2		7.49	4.71- 11.6	5.57- 10.8	
CHLORIDE	1		113	106.- 128.	108.- 125.	
	2		52.1	47.1- 57.1	48.3- 55.9	
FLUORIDE	1		2.01	1.74- 2.23	1.80- 2.17	
	2		0.247	.155- .337	.178- .314	
SULFATE	1		74.0	60.7- 85.5	63.8- 82.4	
	2		33.0	24.5- 39.4	26.3- 37.5	

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT

DATE: 11/16/87

WATER POLLUTION STUDY NUMBER WP019

LABORATORY:

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
NUTRIENTS IN MILLIGRAMS PER LITER:						
AMMONIA-NITROGEN	1		0.800	.538- 1.09	.605- 1.03	
	2		3.00	2.33- 3.58	2.48- 3.43	
NITRATE-NITROGEN	1		0.500	.383- .614	.411- .586	
	2		2.00	1.59- 2.38	1.68- 2.28	
ORTHOPHOSPHATE	1		0.080	.0454- .108	.0529- .100	
	2		0.800	.682- .904	.708- .877	
KJELDAHL-NITROGEN	3		0.500	.0635- 1.02	.179- .903	
	4		4.00	2.78- 5.16	3.07- 4.87	
TOTAL PHOSPHORUS	3		0.300	.226- .394	.246- .373	
	4		2.00	1.63- 2.43	1.73- 2.34	
DEMANDS IN MILLIGRAMS PER LITER:						
COD	1		150	118.- 168.	124.- 162.	
	2		275	213.- 307.	225.- 295.	
TOC	1		59.2	46.8- 74.3	50.4- 70.7	
	2		109	86.8- 128.	92.2- 122.	
5-DAY BOD	1		97.8	61.6- 134.	70.5- 125.	
	2		175	108.- 242.	125.- 225.	
PCB'S IN MICROGRAMS PER LITER:						
PCB-AROCLOR 1016/1242	1		4.57	2.01- 6.61	2.60- 6.02	
PCB-AROCLOR 1260	2		1.86	.733- 2.54	.996- 2.28	
PCB-AROCLOR 1262	2		1.86	1.18- 2.25	1.32- 2.11	

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PERFORMANCE EVALUATION REPORT DATE: 11/16/87

WATER POLLUTION STUDY NUMBER WP019

LABORATORY:

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
PESTICIDES IN MICROGRAMS PER LITER:						
ALDRIN	1		0.851	.225- 1.16	.344- 1.04	
	2		0.334	.0833- .460	.131- .412	
DIELDRIN	1		0.829	.453- 1.12	.538- 1.03	
	2		0.290	.134- .405	.168- .370	
DDD	1		0.390	.135- .565	.189- .511	
	2		0.975	.419- 1.31	.533- 1.20	
DDE	1		0.676	.285- .920	.365- .840	
	2		0.169	.0926- .255	.113- .234	
DDT	1		0.297	.0879- .477	.137- .428	
	2		0.742	.330- 1.07	.424- .973	
HEPTACHLOR	1		0.540	.203- .745	.272- .676	
	2		0.166	.0595- .239	.0824- .216	
HEPTACHLOR EPOXIDE	1		0.105	.0550- .144	.0664- .132	
	2		0.456	.262- .603	.305- .560	
CHLORDANE	3		7.73	3.56- 9.39	4.31- 8.65	
	4		0.620	.240- .919	.327- .833	

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PAGE 5

PERFORMANCE EVALUATION REPORT

DATE: 11/16/87

WATER POLLUTION STUDY NUMBER WP019

LABORATORY:

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
VOLATILE HALOCARBONS IN MICROGRAMS PER LITER:						
1,2 DICHLOROETHANE	1		54.8	37.3- 72.9	41.9- 68.3	
	2		3.65	.694- 7.74	1.60- 6.83	
CHLOROFORM	1		92.9	52.8- 129.	62.6- 120.	
	2		14.7	8.21- 21.7	9.93- 20.0	
1,1,1 TRICHLOROETHANE	1		32.6	18.4- 52.7	22.8- 48.3	
	2		9.38	4.84- 15.5	6.20- 14.1	
TRICHLOROETHENE	1		48.2	30.3- 67.6	35.0- 62.8	
	2		2.41	1.02- 3.74	1.37- 3.39	
CARBONTETRACHLORIDE	1		27.2	16.7- 38.7	19.5- 35.9	
	2		6.81	3.31- 11.0	4.29- 9.99	
TETRACHLOROETHENE	1		28.9	15.7- 42.0	19.0- 38.6	
	2		5.36	1.65- 9.06	2.59- 8.11	
BROMODICHLOROMETHANE	1		32.2	24.5- 45.4	27.1- 42.7	
	2		7.24	4.11- 11.5	5.05- 10.5	
DIBROMOCHLOROMETHANE	1		67.7	37.7- 108.	46.6- 98.7	
	2		2.26	.643- 4.15	1.09- 3.70	
BROMOFORM	1		32.9	21.8- 48.8	25.2- 45.3	
	2		4.93	2.23- 7.22	2.87- 6.58	
METHYLENE CHLORIDE	1		42.6	25.8- 67.3	31.1- 62.0	
	2		2.13	D.L.- 5.51	.608- 4.79	
CHLOROBENZENE	1		30.8	18.7- 43.8	21.9- 40.6	
	2		3.85	1.48- 6.07	2.07- 5.48	

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.
D.L. STANDS FOR DETECTION LIMIT

PERFORMANCE EVALUATION REPORT DATE: 11/16/87

WATER POLLUTION STUDY NUMBER WP019

LABORATORY:

ANALYTES	SAMPLE NUMBER	REPORT VALUE	TRUE VALUE*	ACCEPTANCE LIMITS	WARNING LIMITS	PERFORMANCE EVALUATION
VOLATILE AROMATICS IN MICROGRAMS PER LITER:						
BENZENE	1		9.89	6.29- 14.0	7.29- 13.0	
	2		42.9	29.4- 57.7	33.0- 54.0	
ETHYLBENZENE	1		8.47	4.52- 11.6	5.44- 10.7	
	2		26.1	16.3- 35.5	18.8- 33.1	
TOLUENE	1		5.95	3.24- 8.80	3.97- 8.07	
	2		29.7	20.8- 39.4	23.2- 37.0	
1,2-DICHLOROBENZENE	1		5.42	1.20- 9.58	2.37- 8.41	
	2		61.4	36.0- 89.4	43.0- 82.4	
1,3-DICHLOROBENZENE	1		3.46	.773- 5.89	1.44- 5.22	
	2		26.0	10.7- 38.1	14.5- 34.3	
1,4-DICHLOROBENZENE	1		4.47	1.15- 8.26	2.13- 7.28	
	2		35.8	18.8- 55.0	23.6- 50.2	
MISCELLANEOUS PARAMETERS:						
TOTAL CYANIDE	1		0.124	.0687- .161	.0805- .149	
(IN MG/L)	2		0.300	.174- .388	.201- .361	
NON-FILTERABLE RESIDUE	1		69.4	61.1- 73.6	62.6- 72.0	
(IN MG/L)	2		24.7	20.5- 27.2	21.3- 26.4	
OIL AND GREASE	1		35.3	20.9- 43.0	23.7- 40.3	
(IN MG/L)	2		12.8	3.99- 18.1	5.74- 16.3	
TOTAL PHENOLICS	1		0.505	.229- .775	.298- .706	
(IN MG/L)	2		1.29	.588- 1.96	.762- 1.79	
TOTAL RESIDUAL CHLORINE	1		0.654	.401- .848	.459- .790	
(IN MG/L)	2		1.31	.920- 1.56	1.0- 1.48	

* BASED UPON THEORETICAL CALCULATIONS, OR A REFERENCE VALUE WHEN NECESSARY.

PAGE 7 (LAST PAGE)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 · FTS 545-2100)

JUN 20 1988

Mr. William R. Laing
Oak Ridge National Laboratory
Building 4500 S. MS-131
Oak Ridge, TN 37831-6107

Dear Bill:

The multi-laboratory study of the analyses for the water pollution sample, WP-020, is complete. Comparison sheets are enclosed showing the true values, acceptance limit ranges, and warning limit ranges. Values for some analytes present in the samples in determined quantities, but not generally determined in this DOE exercise, are also provided. The ORNL laboratories provided values for many of the optional analytes, and comparison with the true values should yield helpful information. A good general agreement is apparent.

Comparison of the shorter list of analytes, used for the DOE laboratories in this study, shows only one value outside the acceptance range. That is the one for fluoride at a true value of 0.123 milligrams per liter. It can be noted from the comparison sheets that a larger fraction of the participating laboratories had difficulty with that determination than for most others.

The enclosed information should be reviewed by your laboratory staff with regard to installing any corrective action which would improve analytical quality. I congratulate your laboratory on the completion of a large group of analytical determinations of high quality and thank you for your participation in the study. We remain ready to provide counsel regarding any portion of this study.

Sincerely,

Harold A. Vincent

Harold A. Vincent
Chemist, Quality Assurance Research Branch
Quality Assurance and Methods Development Division

Enclosure

cc:(w/ enclosure)
D. Karen Knight, DOE HQ

METALS	TRUE	DUNN
Aluminum	115	120
	626	652
Arsenic	391	371
	111	99
Beryllium	70.4	71.6
	571	584
Cadmium	180	195
	270	276
Cobalt	75.3	79.9
	382	391
Chromium	832	894
	89.2	90.1
Copper	291	296
	100	100
Iron	1410	1480
	763	766
Mercury	2.24	2.29
	0.936	0.94
Manganese	211	221
	860	858
Nickel	571	613
	171	170
Lead	171	158
	914	923
Selenium	32	33.4
	82.1	80.4
Vanadium	1310	1360
	360	363
Zinc	650	698
	1270	1320
Antimony	82.8	87.8
	124	128
Silver	14.6	15
	5.48	7.29
Thallium	5.76	6.23
	54.4	57.6
Molybdenu	61.6	60.1
	26.4	40
Strontium	61	62.4
	15.3	17.2
Titanium	48.2	45.8
	278	273

DOE ENVIRONMENTAL SURVEY LABORATORY CS; WP [illegible]

Analyte	TRUE	ORNL	ACPT LMTS	WARN LMTS
Chloride	69.6	74.6	69.6-77.0	68.3-75.7
	218.	234.	209.-237.	212.-234.
Fluoride	1.11	1.09	.953-1.25	.990-1.21
	0.123	0.377**	.0601-.198	.0775-.181
Sulfate	5.01	4.41	2.61-7.11	3.17-6.55
	120.	119.	101.-137.	105.-132.
AmoniaN	2.10	2.58*	1.59-2.63	1.71-2.50
	10.3	10.7	8.42-12.0	8.84-11.6
NitrateN	5.50	5.81	4.50-6.48	4.74-6.24
	0.950	0.87	.750-1.16	.799-1.11
Ortho-P	1.10	1.20	.919-1.27	.961-1.23
	4.80	5.13	4.14-5.46	4.30-5.30
Kjeld-N	8.10	8.48	5.98-10.0	6.47-9.53
	14.5	14.0	11.0-17.6	11.8-16.8
T P	9.50	9.57	7.45-11.0	7.87-10.6
	4.40	4.16	3.52-5.11	3.71-4.92
Cyanide	0.460	0.444	.308-.587	.343-.552
	0.155	0.141	.0845-.207	.0999-.192
Non-F Res	56.3	53.	44.9-67.7	47.7-64.9
	34.8	38.	24.7-45.0	27.2-42.5
Oil/Greas	14.0	13.4	6.52-18.7	8.04-17.2
	21.0	18.6	10.1-27.4	12.3-25.2

** EXCEEDS ACCEPTANCE LIMITS * EXCEEDS WARNING LIMITS

JUL 14 1988 OSH

OAK RIDGE NATIONAL LABORATORY
OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC

POST OFFICE BOX 2008
OAK RIDGE, TENNESSEE 37831

July 14, 1988

Harold Vincent
EPA-LV
P. O. Box 93478
Las Vegas, NV 89193-3478

Dear Harold:

I have checked the fluoride value that we obtained on the last water pollution sample, WP-20. The measurement was made using ion chromatography. The sample was run on triplicate, with no dilution, using two ion chromatographs. The results were as follows:

	System 1		System 2	
	Seq.	F, mg/L	Seq.	F, mg/L
QC	1	0.56	1	0.55
Calib.	2	OK	2	OK
WP-20	4	0.313	3	0.415
WP-20			13	0.403

Sample QC is an internal QC sample whose value is unknown to the analyst. The value for this control is 0.58 mg/L. Calibration is the daily calibration standard. Sequence is the sequence number within the sample data group. The three values obtained (0.313, 0.415 and 0.403) were averaged to obtain the 0.377 value reported. Although the scatter in the 3 results is greater than I would expect, I can find no problems with the measurement itself. It may be, as you noted, that there was not good precision between laboratories on this measurement of this sample.

Please call me if you have any questions.

Sincerely,

W. R. Laing
Section Head
Analytical Chemistry Division

WRL:lp

cc: Karen Knight
Susan Holladay

MARTIN MARIETTA

Internal Correspondence

JAN 06 1989 OSH

MARTIN MARIETTA ENERGY SYSTEMS, INC.

December 28, 1988

Distribution

Results of Water Pollution Sample, WP-021

Attached are the results on EPA WP-21 for inorganics. All results were satisfactory. Note the large number of results that are very close to the true value. This is really good work!

W. R. Laing

W. R. Laing

Distribution
CAPA Group
EAL Group
W. Shults
S. Holladay
P. Howell
D. Bostick
B. Fitts
K. Owenby
K. Daniels

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
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P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

DEC 19 1988

Mr. William R. Laing
Oak Ridge National Laboratory
P.O. Box 2008
Building 4500 S. MS-131
Oak Ridge, TN 37831-6107

Dear Bill:

Results of the multi-laboratory study of the analyses for the water pollution sample, WP-021, are attached. The attachments include comparison sheets showing the true values, values determined in your laboratory, acceptance limit ranges, and warning limit ranges. Explanations of these terms are given on one attachment.

The laboratories participating in the DOE environmental survey were instructed to use the WP performance evaluation samples to augment available PE materials by providing analytical determinations for survey-requested analytes which were not available as components in those other PE samples. The laboratories could option to determine other WP sample components for their own QA/QC purposes. The comparison of the survey list of analytes, shows no ORNL values out of range. No response regarding corrective action is required.

Thank you for your participation in the study. We remain ready to counsel regarding any portion of this work.

Sincerely,

Harold A. Vincent

Harold A. Vincent
Chemist, Quality Assurance Research Branch
Quality Assurance and Methods Development Division

Enclosure

cc: (w/Enclosure)
Vincent Fayne, DOE HQ
Alan Crockett, INEL

DOE LAB RESULTS ; WF021 12/7/88

Analyte	EPA	ORNL
pH-units	5.61	
	8.35	
Spec cond.	642	
	670	
TDS	370	
	377	
Tot Hrdns	235	
	92.2	
Sodium	11.0	14.5
	95.0	105
Potassium	11.0	12.0
	21.5	24.0
Total Alk	13.9	
	104	
Chloride	172	172
	65.4	66.0
Fluoride	0.320	0.40
	3.70	3.71
Sulfate	15.1	14.8
	116	123
AmmoniaN	0.270	
	1.20	
NitrateN	0.250	
	1.90	
Ortho-P	0.065	
	0.900	
Kjeld-N	0.380	
	5.71	
Total-P	0.150	
	3.50	
COD	43.5	
	229	
TOC	17.2	
	90.5	
BOD	27.9	
	146	
Cyanide	0.150	0.154
	0.225	0.226
Non-F res	81.1	
	43.0	
Oil/Greas	5.2	
	29.5	
Tot-Phen	0.557	
	2.82	
TotRCl	0.301	
	1.91	

WP021 Continued --

METALS

Aluminum	624	627
	234	234
Arsenic	390	383
	54.2	51.8
Beryllium	135	139
	8.99	8.91
Cadmium	222	221
	24.0	24.3
Cobalt	509	510
	17.0	18.2
Chromium	125	128
	41.7	42.7
Copper	96.0	102
	8.00	10.2
Iron	210	216
	42.0	42.7
Mercury	10.7	9.79
	1.47	1.31
Manganese	315	323
	70.0	70.4
Nickel	350	372
	140	145
Lead	126	116
	21.0	19.5
Selenium	180	181
	40.0	40.3
Vanadium	124	133
	43.1	45.7
Zinc	190	198
	63.3	70.5
Antimony	149	153
	179	170
Silver	0.95	0.93
	11.7	11.1
Thallium	8.00	7.91
	72.0	66.3
Molybdenum	47.5	45.8
	18.5	
Strontium	42.7	36.7*
	8.54	8.25
Titanium	100	98.6
	63.1	62.4

** EXCEEDS ACCEPTANCE LIMITS

* EXCEEDS WARNING LIMITS

DOE LAB RESULTS ; WP021 12/7/88

Analyte	TRUE	ORNL	ACPT LMTS	WARN LMTS
Chloride	172	172	157 - 179	159 - 176
	65.4	66.0	58.6- 71.7	60.3- 70.1
Fluoride	0.320	0.40	.242- .403	.263- .383
	3.70	3.71	3.06- 4.12	3.20- 3.99
Sulfate	15.1	14.8	11.5- 18.2	12.3- 17.4
	116	123	96.1- 133	101- 128
AmmoniaN	0.270		.0896-.517	.141-.466
	1.20		.856- 1.56	.942- 1.48
NitrateN	0.250		.163- .334	.183- .313
	1.90		1.51- 2.26	1.60- 2.17
Ortho-P	0.065		.0380-.0922	.0445-.0857
	0.900		.762- 1.04	.796- 1.01
Kjeld-N	0.380		D.L.- .900	.0680- .785
	5.71		4.07- 7.22	4.45- 6.84
Total-P	0.150		.0960- .216	.110- .202
	3.50		2.85- 4.33	3.03- 4.15
Cyanide	0.150	0.154	.0844- .196	.0986- .182
	0.225	0.226	.128- .297	.150- .276
Non-F Res	81.1		74.9- 84.6	76.1- 83.4
	43.0		36.7- 45.7	37.9- 44.6
Oil/Greas	5.2		1.37- 9.14	2.33- 8.17
	29.5		16.8- 36.7	19.3- 34.2

** EXCEEDS ACCEPTANCE LIMITS

* EXCEEDS WARNING LIMITS

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BCD Results of Inorganic and Organic Performance Evaluation Studies

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PERFORMANCE EVALUATION SCORES FOR BCD

Code	Score
QB3FY88 Organic	95.6
QB2FY88 Organic	47.3
QB1FY88 Organic	47.2

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(702/798-2100 - FTS 545-2100)

xc RL Jenner
Dennis Reichart
Bruce Hedy *
Sue Hetzel
Ramona Mayer
Greg Dus Sault

AUG 0 8 1988

Dr. Judith Gebhart
Battelle-Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693

Dear Dr. Gebhart:

* with attachment

The Individual Laboratory Summary Report (ILSR) summarizing the results of the participation of your laboratory in the EMSL-LV third quarter organic performance evaluation study (QB3, FY88) is enclosed. In addition, general information concerning the scoring procedure used for QB3 is included.

The score for your laboratory at 95.6 is in the CLP category of acceptable (score--90 or above), with no response required regarding any changes or corrective actions. Even with the good score, it would be wise to examine the report for information which would be helpful to your laboratory in this kind of analysis.

Congratulations on the good score! This office will be glad to furnish any counsel and further information regarding this work.

Sincerely,

Harold A. Vincent

Harold A. Vincent
Chemist
Quality Assurance Research Branch, QAD

Enclosures

cc:
D. Karen Knight, DOE HQ

NOTE

Documentation to support Battelle's 95.6 score for EMSL-LV's Organic QB3 FY88 evaluation has been requested. ORNL will attach this documentation upon receipt from Battelle.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

Rec'd 4/29/88 by

Copied: J.E. Gebhart 4/29
D.W. Roichart 4/2

Mr. Gregory A. DusSault
Battelle Columbus Division
Anal & Struct. Chem. Center
505 King Avenue
Columbus, OH 43201-2693

Dear Mr. DusSault:

For your information and review the results for your participation in the EMSL-LV Second Quarter Organic Performance Evaluation Study (QB2, FY88) are included here. Enclosed is general information about the Superfund Performance Evaluation Program. The PE portion of the Laboratory Profile Package, called the "Individual Laboratory Summary Report" (ILSR) was described in your letter reports last quarter. Other general information about the PE program is explained on the following pages.

The samples consisted of aqueous materials spiked with Target Compound List (TCL) and non-TCL pollutants at environmentally representative levels. Samples for all laboratories were from the same homogeneous batch. Each sample set was to be prepared and analyzed by current contractually required procedures.

The EMSL-LV thanks you for your participation in this study and wishes to congratulate the laboratories for an overall fine performance. We trust that this information is vital to you as a member of the community of laboratories analyzing hazardous waste samples for Superfund.

Sincerely,

Larry Butler, Ph.D.
Supervisor, Performance Evaluation Program
Quality Assurance Research Branch
Quality Assurance and Methods Development Division

Enclosure

cc: (w/enclosure)
Carla Dempsey, OERR
Joan Fisk, OERR
Emile Boulos, OERR
Angelo Carasea, OERR
Howard Fribush, OERR

Enclosure

The sample set consisted of aqueous materials spiked with base/neutral/acid/pesticide (BNAP) Target Compound List (TCL) and non-TCL compounds diluted in water to environmentally representative levels (full-volume organics). This included three (3) 80-ounce bottles of semi-volatiles and pesticides; one (1) 80-ounce bottle filled with blank water for BNAP blank analyses; four (4) 40-mL vials filled with water spiked with volatile organics; and two (2) 40-mL vials filled with blank water for volatiles blank analysis. The sample set was to be prepared and analyzed by current contractually required procedures.

All analytical results, calibrations, quality control procedures, and reporting and deliverable requirements were to be submitted by the participating laboratories by contract as a regular case.

EMSL-LV PE Reports - The entire format for EMSL-LV PE reports has been revised. Identification, Quantification, and Contamination (formerly called false positives) are now scored by by an algorithm contained in your laboratory's "Individual Laboratory Summary Report" (ILSR).

Confidence Intervals (CI) were derived from the laboratory submitted values using the statistical procedure BIWEIGHT which does not generate outliers. Instead values are weighted as to their position, relative to the mean. No values are discarded. Other details are included in your ILSR. The confidence interval calculation and the scoring algorithm are intrinsic parts of the ILSRs.

Also in the footnotes to the study is the EMSL-LV method for the scoring of U-flagged values. This U-value scoring procedure has not changed from earlier PE studies.

For your convenience, attached are the ILSR for your laboratory, footnotes, and a graphical programmatic representation of scores. The bar graph shows the mean laboratory performance plotted versus time. The left bar for each quarter represents the mean score, whereas the right bar for the same quarter is the standard deviation of the scores. The numbers on top of the left bar are the numbers of laboratories in each study. Please compare your score with the programmatic mean.

The EMSL-LV is recommending the following scoring categories, which are a National Program Office directive:

1. 100 to 90 percent - "Acceptable Performance, No corrective action necessary;"

2. 90 to 70 percent - "Acceptable Performance, Corrective Action Necessary;"

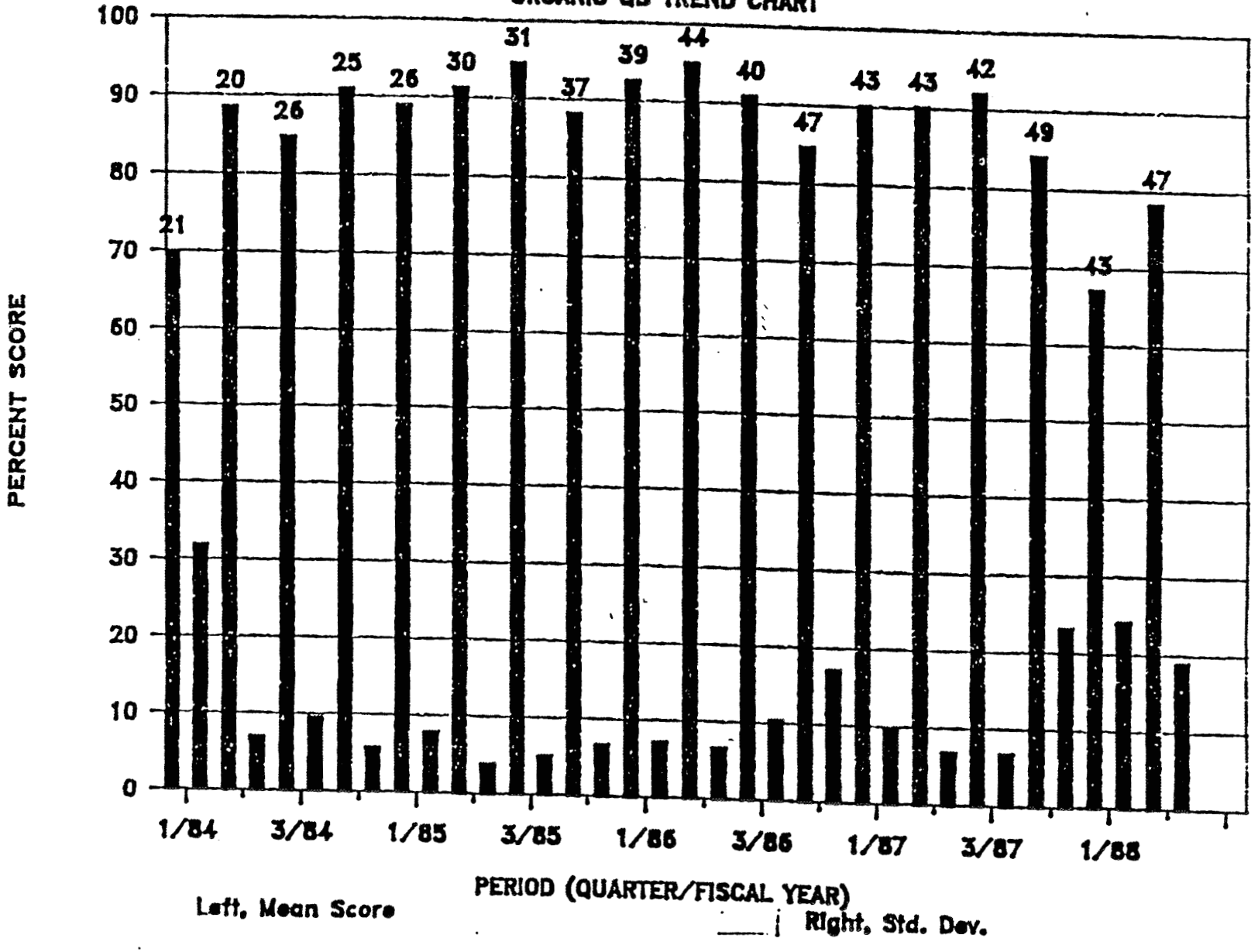
3. 70 percent or lower - "Unacceptable Performance, Corrective Action Mandatory."

The Analytical Operations Branch of the Office of Emergency and Remedial Response also requires that all laboratories who fail to correctly identify or quantify two or more parameters or compounds or who have blank contamination (false positives) exceeding the contract requirements document the corrective action they plan to undertake. These laboratories must document in a letter to their Project Officer, Deputy Project Officer, and myself within two weeks of receipt of the results of this study, the source of the problem(s) and the corrective action(s) the laboratory plans to implement to prevent the problem(s) from occurring in future Quarterly Blind PE samples.

The government reserves the right to fairly and equably adjust scores for any PE study, should the National Program Office determine that there were unusual problems with the PE samples themselves or the scoring procedure. Determinations made by the National Program Office are final.

CONTRACT LABORATORY PROGRAM

ORGANIC QB TREND CHART



QB 2 FY 88 ORGANIC, CASE NOS. 8783 AND 8784

TCL:

b CONFIDENCE INTERVALS (CI) WERE DERIVED FROM LABORATORY SUBMITTED VALUES. LESS THAN VALUES (<x), J-VALUES, U-VALUES, B-VALUES, AND NON-SUBMITTED VALUES (-) WERE NOT USED IN THE CALCULATION OF THE CI.
c CI WERE NOT SET SINCE 40 % OR MORE OF THE LABORATORIES SUBMITTED A NON-USABLE VALUE.
B INDICATES THAT THE COMPOUND WAS FOUND IN THE BLANK.
D INDICATES A DILUTION.
E COMPOUND EXCEEDS CALIBRATION RANGE OF INSTRUMENT.
J ESTIMATED VALUE LESS THAN THE CROL.
NA NOT APPLICABLE OR NOT ANALYZED FOR.
NR NOT REQUIRED.
NS NOT SUBMITTED.
U ANALYZED FOR BUT NOT DETECTED.
X VALUE WAS OUTSIDE BOTH THE WARNING AND THE ACTION LIMIT. POINTS DEDUCTED FOR QUANTITATION ONLY.
& POINTS DEDUCTED FOR IDENTIFICATION ONLY.
* VALUE WAS OUTSIDE THE WARNING LIMIT ONLY. NO POINTS DEDUCTED.
\- VALUE NOT SUBMITTED FOR THIS COMPOUND.
\+ INDICATES A TCL CONTAMINANT DETERMINED BY GRUBB'S TEST FOR COMPOUNDS WITH NO CI SET BASED ON "c" CRITERIA.
? BEST ESTIMATE OF VALUE AND/OR QUALIFIER. POOR OR ILLEGIBLE COPY SUBMITTED.
\# WARNING LIMIT (80 PERCENT CI).
\#\# ACTION LIMIT (90 PERCENT CI).

NON-TCL / TIC:

NA NOT APPLICABLE. POINTS WERE NOT DEDUCTED SINCE 40 PERCENT OF THE LABORATORIES DID NOT IDENTIFY THIS COMPOUND.
\- NOT IDENTIFIED.
ND NOT DETECTED. POINTS DEDUCTED.
F INDICATES A CONTAMINANT. POINTS DEDUCTED.
X INDICATES THAT THE DATA WERE MANUALLY MANIPULATED BY THE ANALYST.
A ALDOL CONDENSATION PRODUCT.

SCORING NOTES: PROCEDURE FOR GRADING U-VALUES

1. ANY U-VALUE RESPONSE (LABORATORY DETECTION LIMIT) > CROL, EVEN IF IT IS IN THE 90 % CI, CAUSES A POINT DEDUCTION. IF 25 % OR MORE OF THE LABORATORIES REPORT A U-VALUE OVER THE CROL, THEN NO POINTS ARE DEDUCTED FOR ANY LABORATORY. THIS COULD INDICATE A MATRIX INTERFERENCE IN THE SAMPLE.

2. IF CROL < LOWER CI, THEN USE CI AS SET.

3. IF LOWER CI < CROL AND CROL < UPPER CI, THEN SET LOWER CI TO ZERO (0). NO POINTS DEDUCTED FOR IDENTIFICATION OR QUANTITATION LESS THAN OR EQUAL TO THE CRDL.

4. IF CROL > LOWER AND UPPER CI, THEN NO CI USED. ANALYTE DROPPED FROM THE SCORING. NO POINTS DEDUCTED FOR IDENTIFICATIONS OR QUANTITATIONS. CONTAMINANTS POSSIBLE.

NOTE THAT ONLY CLP LABORATORIES WERE USED IN THE CALCULATION OF THE CI.

NOTE THAT A U-VALUE FOLLOWED BY AN AMPERSAND (&) (U &) MEANS THAT POINTS WERE LOST FOR IDENTIFICATION ONLY.

NOTE THAT FOR NON-TCL/TIC A DASH FOLLOWED BY A "ND" (- ND) INDICATES THAT POINTS WERE DEDUCTED FOR IDENTIFICATION ONLY.

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ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 88

LABORATORY: Battelle Columbus (OH)
PERFORMANCE: UNACCEPTABLE - Corrective Actions Mandatory
RANK: Above = 47 Same = 0 Below = 5

% SCORE: 47.3
REPORT DATE: 4/13/1
MATRIX: WATER

COMPOUND	90 % CI LOWER	90 % CI UPPER	LABORATORY DATA CONC	LABORATORY DATA Q	#LABS NOT-ID	PROGRAM DATA #LABS MIS-QUANT	PROGRAM DATA #LABS CONTAM	TOTAL #LABS
TCL VOLATILE								
BROMOMETHANE	64	240	120		0	3	0	52
METHYLENE CHLORIDE	c	c	84		0	0	0	52
1,1-DICHLOROETHANE	34	55	44		0	3	0	52
2-BUTANONE	38	170	10	U	4	7	0	52
BROMODICHLOROMETHANE	59	80	73		0	4	0	52
1,1,2-TRICHLOROETHANE	54	76	62		0	8	0	52
BENZENE	12	17	15		1	5	0	52
2-HEXANONE	48	200	99		1	4	0	52
TOLUENE	18	30	23	B	0	2	0	52
CHLOROBENZENE	85	110	100		0	3	0	52
STYRENE	80	110	100		0	6	0	52
XYLENES (TOTAL)	120	180	150		0	6	0	52
TCL SEMIVOLATILE								
2-CHLOROPHENOL	23	52	46 44		0	6	0	52
N-NITROSO-DI-N-PROPYLAMINE	45	84	82 86	X	0	7	0	52
ISOPHORONE	65	140	122 130		0	6	0	52
2,4-DIMETHYLPHENOL	10	53	57 59	X X	0	2	0	52
BENZOIC ACID	50	200	190 220	X	0	7	0	52
HEXACHLOROBUTADIENE	61	160	150 150		0	3	0	52
2-METHYLNAPHTHALENE	20	55	45 52		1	3	0	52
2,4,6-TRICHLOROPHENOL	55	100	94 92		0	9	0	52
2-NITROANILINE	50	100	67 77		0	2	0	52
ACENAPHTHYLENE	59	100	120 120	X X	0	9	0	52
ACENAPHTHENE	61	100	100 110	X	0	5	0	52
2,4-DINITROPHENOL	81	260	190 210		3	7	0	52
DIBENZOFURAN	96	160	140 150		0	7	0	52
4-NITROPHENOL	50	200	140 170		0	1	0	52
FLUORENE	64	100	110 120	X X	0	5	0	52
DIETHYLPHTHALATE	c	c	9	J	0	0	0	52
PENTACHLOROPHENOL	74	230	180 140		0	6	0	52
PHENANTHRENE	62	100	100 100		1	5	0	52
ANTHRACENE	57	100	100 96		0	5	0	52
PYRENE	42	110	110 100		0	6	0	52
BUTYL BENZYL PHTHALATE	c	c	9	BJ	0	0	0	52
BENZO(A)ANTHRACENE	31	100	88 92		0	2	0	52
DI-N-OCTYL PHTHALATE	10	100	45 45		0	2	0	52
DIBENZ(A,H)ANTHRACENE	17	140	60 61		1	2	0	52
TCL PESTICIDES								
HEPTACHLOR	0.05	0.43	0.29		0	8	0	52
ALDRIN	0.14	0.53	0.38		18	5	0	52
ENDRIN	0.16	0.48	0.86	X	2	11	0	52
TOXAPHENE	c	c	1	B	0	0	1	52
NON-TCL SEMIVOLATILE								
BENZOPHENONE ft 995 pur 870			97	J	0	0	0	52
DISULFOTON			0	ND	0	0	0	52
CHLORPYRIFOS ft 963 pur 546			19	J	0	0	0	52
2-NITRO-P-CRESOL ft 999 pur 827			77	J	0	0	0	52
TCL SEMIVOLATILE (Contaminants)								
BENZYL ALCOHOL			14	MS 13 MSD 11	0	0	0	52

ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 88

LABORATORY: Battelle Columbus (OH)
PERFORMANCE: UNACCEPTABLE - Corrective Actions Mandatory
RANK: Above = 47 Same = 0 Below = 5

% SCORE: 47.3
REPORT DATE: 4/13/1
MATRIX: WATER

COMPOUND	90 % CI LOWER	90 % CI UPPER	LABORATORY DATA CONC		#LABS NOT-ID	PROGRAM DATA #LABS MIS-QUANT	#LABS CONTAM	TOTAL #LABS
BIS(2-ETHYLHEXYL)PHTHALATE			6,5,6J		0	0	1	52
TCL PESTICIDES (Contaminants)								
DIELDRIN			0.051 0.51	JE	0	0	1	52
HEPTACHLOR EPOXIDE			0.012	J	0	0	0	52
ALPHA-CHLORDANE			0.04	J	0	0	0	52
NON-TCL SEMIVOLATILE (Contaminants)								
2H-INDOL-2-ONE,1,3-DIHYDRO- fit 967 pur 600			21	JE	0	0	2	52
BORANE,DIMETHOXY- fit 954 pur 529			15	JE	0	0	0	52
BENZENE, POSS C2 NITRO- fit 906 pur 452			48	JE	0	0	0	52
FURANONE,BENZO-3(2H)- fit 931 pur 277			12	JE	0	0	0	52

A # OF TCL COMPOUNDS NOT-IDENTIFIED: 1
B # OF TCL COMPOUNDS MIS-QUANTIFIED: 7
C # OF TCL CONTAMINANTS: 1

D # OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 1
E # OF NON-TCL CONTAMINANTS: 4

X = 36 # of Total TCLs spiked

$$\text{Score} = 100 - \left[\frac{150}{X} * (2A+B+C) + 2.2 * (D+E)\right]$$

2+7+1 1+4

= 4.17

For Review and Approval

	Name	Initials	Date
Originator	BJ Hidy	BJH	6/2/88
Concurrence			
	JE Gebhart	JEG	6/2/88
	RA Mayer	[illegible]	6/2/88
Approved			

No. G1271-2260 (826)

Internal Distribution

RL Joiner/JE Gebhart
DW Raichart
LH Kenny
SS Hetzel
RA Mayer
RMO
File

June 2, 1988

Dr. Harold Vincent
U.S. EPA Environmental Monitoring
Systems Laboratory (EMSL-LV)
944 E. Harmon
Las Vegas, NV 89109

Dear Dr. Vincent:

Please find enclosed for your review and approval, a listing of the corrective actions taken in response to our participation in the EMSL-LV Second Quarter FY-88 Organic Performance Evaluation Study (QB2-FY-88) [Case No. 8783].

The information provided by the Superfund Performance Evaluation Program has been of great use to Battelle by indicating areas in which we can improve the performance of our analytical and quality assurance programs.

If you have any questions or comments concerning the corrective actions we have taken, please contact me at (614-424-4605) or Bruce Hidy at (614-424-4591).

Sincerely,

J E Gebhart

J. E. Gebhart, Ph. D.
Section Manager
Analytical Chemistry Section

JEG:gp

cc: Karen Knight (DOE)

Enclosure

CORRECTIVE ACTIONS FOR QB2, FY 88

TCL VOLATILE

Performance Problems

One TCL volatile compound, 2-Butanone, was not detected. This compound is difficult to detect due to its poor purging efficiency, poor chromatography (broad peak shape), and poor response (low response factor). Careful inspection of the sample file showed this compound to be present at the expected retention time.

Corrective Actions

We are currently trying to improve the purging efficiency of this compound by increasing the purge flow from 30 mL/min to 40 mL/min. We have also increased the sensitivity of the automated search procedure and will continue to manually search all samples for this compound until we are certain that the automated procedure is reliable.

TCL SEMIVOLATILE

Performance Problems

Six TCL semivolatile compounds were detected and reported at levels which exceeded the 90% confidence interval (CI) for each compound. Additionally, three TCL semivolatile compounds were flagged as exceeding their upper warning limit. Further investigation of this fraction showed that the majority of the compounds detected and reported were near the upper limit of their 90% CI.

Corrective Actions

The two most likely causes for this consistent high bias in our reported values were investigated. First, the volume calibration for the sample extract vials was checked. If the samples extracts had been concentrated to a volume less than 1.0 mL then the analyte concentrations would appear to be higher than expected. Each sample vial was clearly and accurately marked for 1.0 mL. The second likely cause was that the concentration of our internal standard solution had changed such that the concentration of the internal standard analytes was less than the 40 ng/µL specified by the SOW. A fresh internal standard solution was prepared from a new ampule of the same Lot number used for the QB analyses. A comparison of the response of the two solution showed very good agreement for all of the compounds. At this point a third, less likely, cause was investigated. A fresh calibration curve was prepared from materials obtained from the EPA QAMB. The 50 µg/L standard used for the daily CCC used during the analysis of the QB samples was compared to the 50 µg/L standard from QAMB materials. Again, all analytes were found to be in good agreement between the two standards. None of the above items would appear to be the source of the consistent high bias in our data. At this point we have been unable to identify any additional possibilities likely or unlikely which we can evaluate. The only other possibility we have considered is based on the fact that we prepared these samples using continuous liquid-

liquid extraction and normally achieve high extraction efficiency and high recoveries of the analytes. If the majority of the reporting laboratories used separatory funnel extractions, which may have yielded lower recoveries, then the 90% CI may be bias toward the lower recovery values.

TCL PESTICIDES

Performance Problems

One TCL pesticide compound, Endrin, was reported above the 90% CI established for that compound. This compound was confirmed using the secondary column. However, confirmation of the quantification was not investigated prior to the submission of this QB. Further investigation showed that the endrin standard used for calibration for this data had degraded significantly resulting in a lower than expected response for that standard. This caused the reported value for the sample to be higher than it should have been. No other standards were found to have degraded.

Corrective Actions

We will carefully evaluate the performance of all of our standards for each of the compounds based on their historical performance prior to the analysis of all samples. Any significant change (as specified by the SOW) in the response of any analyte will be addressed by preparation of a new standard for that analyte.

NON-TCL VOLATILES

Performance Problems

None indicated.

Corrective Actions

None required.

NON-TCL SEMIVOLATILE

Performance Problems

One Non-TCL semivolatile compound, Disulfoton, was not detected. This compound was found to be totally unresolved chromatographically from phenanthrene-d10, an internal standard present at a relatively high level in the sample.

Corrective Actions

Additional attention will be paid to the symmetry of the TCL compound peaks, internal standard and surrogate compound peaks for indications of partial coelution of Non-TCL compounds. Also, additional attention will be paid to the mass spectra of the TCL compounds detected and the mass spectra of all

internal standard and surrogate standard peaks to determine the presents of "extra" ions which would indicate complete coelution of a Non-TCL compound with these other standard peaks.

TCL VOLATILE (Contaminants)

Performance Problems

None indicated.

Corrective Actions

None required.

TCL SEMIVOLATILE (Contaminants)

Performance Problems

One TCL semivolatile compound, Benzyl alcohol, was reported as detected at 14 µg/L, just above the CRQL of 10 µg/L. Confirmation of the mass spectra for benzyl alcohol was made against that days CCC standard. This compound was also detected and report in the matrix spike and matrix spike duplicate analyses at 13 µg/L and 11 µg/L respectively. Benzyl alcohol was not detected or reported in the sample blank analysis.

Corrective Actions

Based on the above data we believe that the detection and reporting of this compound was valid and no corrective actions are justified.

TCL PESTICIDE (Contaminants)

Performance Problems

One TCL pesticide, Dieldrin, was detected and reported as 0.051 µg/L (Form I PEST, page 0270) which is below the CRQL of 0.10 µg/L. The value was incorrectly entered as 0.51 µg/L on the EPA Individual Laboratory Summary Report Form.

Corrective Actions

Because the value was incorrectly entered by EPA no corrective actions are justified.

NON-TCL SEMIVOLATILE (Contaminants)

Performance Problems

Four Non-TCL semivolatile compounds (TICs) detected and reported were scored as contaminants. In the judgement of the experienced analysts who generated

and reviewed the data, all of the criteria required to report these compounds as TICs were met. Additional review of the matrix spike and matrix spike duplicate analyses showed the presence of these compounds in both samples. None of these compounds were detected in the sample blank or the standards analyzed for this QB. The results of the forward library search gave FIT values of >900 and PURITY values of >300 for each compound. However, the three correctly identified TICs all had FIT values >950 and PURITY values >500.

Corrective Actions

In the future, the analysts who generate and review the TIC data will use as an additional guideline that the expected FIT values should be >950 and the expected PURITY values should be >500. However, we will continue to report all TIC compounds which in the judgement of an experienced analyst meet the criteria required for reporting the compound.

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ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 88

LABORATORY: Battelle Columbus (OH)
PERFORMANCE: UNACCEPTABLE - Corrective Action Mandatory
RANK: Above = 30 Same = 0 Below = 8

% SCORE: 47.2
REPORT DATE: 5/2/1988
MATRIX: WATER

COMPOUND NAME	90 % CI LOWER	90 % CI UPPER		LABORATORY DATA CONC	Q	#LABS MISS ID	#LABS MISS QUAN	#LABS ID CONT	TOTAL #LABS
TCL VOLATILE									
VINYL CHLORIDE	99	250		180		0	8	0	39
~~ACETONE~~	~~0~~	~~0~~		~~130~~		~~0~~	~~0~~	~~2~~	~~39~~
CHLOROFORM	41	58		51	B	0	5	0	39
CARBON TETRACHLORIDE	14	28		18		0	4	0	39
CIS-1,3-DICHLOROPROPENE	40	100		62		5	7	0	39
BROMOFORM	100	170		120		0	5	0	39
1,1,2,2-TETRACHLOROETHANE	55	84		62		0	6	0	39
CHLOROBENZENE	90	130		120		0	4	0	39
TCL SEMIVOLATILE									
PHENOL	0	110		110	S	0	2	0	39
1,2-DICHLOROBENZENE	40	92		74		0	5	0	39
4-METHYLPHENOL	12	59		43		0	3	0	39
HEXACHLOROETHANE	44	120		84		0	3	0	39
2-NITROPHENOL	29	70		56		0	3	0	39
1,2,4-TRICHLOROBENZENE	34	82		73		0	4	0	39
4-CHLORO-3-METHYL PHENOL	35	88		76		0	4	0	39
HEXACHLOROCYCLOPENTADIENE	0	100		10	U S	0	2	0	39
~~2,4,5-TRICHLOROPHENOL~~	~~c~~	~~c~~		~~63~~		~~0~~	~~0~~	~~1~~	~~39~~
2-CHLORONAPHTHALENE	19	49		40		0	3	0	39
DIMETHYL PHTHALATE	0	100		8	J	0	1	0	39
4-CHLOROPHENYL PHENYL ETHER	27	62	28	10	U &	0	4	0	39
HEXACHLOROBENZENE	48	100	46	10	U &	0	2	0	39
3;3'-DICHLOROBENZIDINE	0	170		20	U S	0	3	0	39
CHRYSENE	58	140	62	10	U &	1	5	0	39
BENZO(a)PYRENE	31	170	55	10	U &	0	4	0	39
INDENO(1,2,3-cd)PYRENE	39	130		77		1	4	0	39
TCL PESTICIDES									
~~GAMMA-BHC (LINDANE)~~	~~c~~	~~c~~		~~0.47~~		~~0~~	~~0~~	~~1~~	~~39~~
DIELDRIN	0.44	0.68		0.52		0	8	0	39
ENDOSULFAN SULFATE	0.17	0.46		0.28		9	2	0	39
ENDRIN KETONE	0.42	0.78		0.61		5	5	0	39
NON-TCL VOLATILE									
DIBROMOMETHANE				63	J	0	0	0	39
NON-TCL SEMIVOLATILE									
ANILINE				0	ND	0	0	0	39
1,2,3,4-TETRACHLOROBENZENE				110	J	0	0	0	39
2,4-D				0	NA	0	0	0	39
ATRAZINE				140	J	0	0	0	39
TRIFLURALIN				140	J	0	0	0	39
2,3,4,6-TETRACHLOROPHENOL				53	J	0	0	0	39
TCL VOLATILE (Contaminants)									
METHYLENE CHLORIDE				3	J				
1,2-DICHLOROPROPANE				10					
TRICHLOROETHENE				2	J				
TRANS-1,3-DICHLOROPROPENE				3	J				
TOLUENE				3	BJ				
TCL SEMIVOLATILE (Contaminants)									
2,4,6-TRICHLOROPHENOL				66	F				

False positive from 2,4,5. Noted on QUAN Report but included in Formaster.

ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 88

LABORATORY: Battelle Columbus (OH)
PERFORMANCE: UNACCEPTABLE - Corrective Action Mandatory
RANK: Above = 30 Same = 0 Below = 8

% SCORE: 47.2
REPORT DATE: 5/2/1988
MATRIX: WATER

COMPOUND NAME	90 % CI LOWER	90 % CI UPPER	LABORATORY DATA CONC	Q	#LABS MISS ID	#LABS MISS QUAN	#LABS ID CONT	TOTAL #LABS
TCL PESTICIDE (Contaminants)								
ALPHA-BHC			0.053	F				
HEPTACHLOR			0.015					
GAMMA-CHLORDANE			0.087	J				

OF TCL COMPOUNDS NOT IDENTIFIED: 4
OF TCL COMPOUNDS MISQUANTIFIED: 0
OF TCL CONTAMINANTS: 0

OF TIC COMPOUNDS NOT IDENTIFIED: 1
OF TIC CONTAMINANTS: 2

CODED SUMMARY OF LABORATORY SCORES
QB 1 FY 88
5/2/1988

CODE	SCORE	TCLS NOT ID	TCLS MISQUANT	TCLS CONTAM	TCLS CPDS	TICS NOT ID	TICS CONTAM	TICS CPDS
J1	100	0	0	0	7	0	0	1
U1	100	0	0	0	26	0	0	6
C6	100	0	0	0	25	0	0	6
V2	100	0	0	0	7	0	0	1
Z3	100	0	0	0	7	0	0	1
T2	100	0	0	0	7	0	0	1
O3	97.8	0	0	0	7	1	0	1
T1	97.8	0	0	0	7	1	0	1
P2	94.2	0	1	0	26	0	0	6
C4	94.2	0	1	0	26	0	0	6
C5	94.2	0	1	0	26	0	0	6
M3	93.4	0	0	0	26	3	0	6
M2	93.4	0	0	0	26	1	2	6
P3	92.0	0	0	1	26	1	0	6
E2	91.2	0	0	0	26	1	3	6
J2	89.8	0	1	0	26	1	1	6
R1	89.0	0	0	0	26	2	3	7
T3	89.0	0	0	0	26	2	10	7
Y3	88.5	0	1	1	26	0	0	6
A1	88.5	1	0	0	26	0	0	6
S3	87.6	0	0	1	26	3	0	6
E1	86.3	0	2	0	26	0	1	6
U2	85.7	0	1	0	7	0	0	1
C2	85.7	0	1	0	7	0	0	1
M1	85.7	0	1	0	7	0	0	1
I1	83.2	0	1	0	26	2	3	6
D2	81.9	0	2	0	26	0	3	6
A4	81.9	0	2	0	26	1	2	6
X1	80.5	0	2	1	26	1	0	6
D6	80.5	0	3	0	26	0	1	6
I2	80.5	0	3	0	26	0	1	6
A3	77.5	0	1	1	26	2	3	6
C1	76.1	0	3	0	26	0	3	6
D5	76.1	0	3	0	26	0	3	6
R2	74.7	0	3	1	26	0	1	6
F3	74.7	0	5	0	26	0	1	6
J3	72.5	0	2	2	26	0	2	6
B1	71.7	1	0	1	26	1	4	6
V3	69.4	1	1	0	23	2	7	6
D4	69.0	0	5	0	26	0	1	6
Z2	68.4	2	0	0	19	0	0	5
Y2	66.8	1	2	1	26	0	2	6
K3	65.9	1	1	1	26	2	3	6
L2	59.9	0	6	1	26	0	0	6
G2	59.6	2	1	2	26	0	0	6
K2	58.8	1	2	2	26	2	1	6
E3	58.8	1	3	1	26	1	2	6
S1	57.4	1	5	0	26	1	0	6
B2	57.1	1	0	1	7	0	0	1
Y1	56.6	2	0	2	26	1	3	6
D3	54.4	1	3	1	26	2	4	6
Q3	51.5	0	4	0	16	2	4	5
D1	48.1	1	6	1	26	0	0	6
W2	45.9	1	7	0	26	1	0	6
H2	42.8	2	2	2	26	1	6	6
X3	42.8	1	5	1	26	4	1	6
F1	41.5	1	4	3	26	1	2	6
K1	35.7	2	6	0	26	1	2	6
F2	35.7	4	1	1	26	1	2	6
R3	28.6	4	0	4	26	1	0	6
U3	25.5	2	2	5	26	5	0	6
A2	25.5	0	9	2	26	1	6	6
O1	0	2	11	1	26	3	7	6
B4	0	0	15	1	26	5	4	6

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For Review and Approval

	Name	Initials	Date
Originator	BJ Hidy	BJH	6/2/88
Concurrence			
	JE Gebhart	JEG	6/2/88
	RA Mayer	RAM	6/2/88
Approved			

No. G-1271-2260 (826)

Internal Distribution

RL Joiner/JE Gebhart
DW Raichart
LH Kenny
SS Hetzel
RA Mayer
RMO
File

June 2, 1988

Dr. Harold Vincent
U.S. EPA Environmental Monitoring
Systems Laboratory (EMSL-LV)
944 E. Harmon
Las Vegas, NV 89109

Dear Dr. Vincent:

Please find enclosed for your review and approval, a listing of the corrective actions taken in response to our participation in the EMSL-LV First Quarter FY 88 Organics Performance Evaluation Study [redacted] [Case No. 8124].

The information provided by the Superfund Performance Evaluation Program has been of great use to Battelle by indicating areas in which we can improve the performance of our analytical and quality assurance programs.

If you have any questions or comments concerning the corrective actions we have taken, please contact me at (614-424-4605) or Bruce Hidy at (614-424-4591).

Sincerely,

J E Gebhart

J. E. Gebhart, Ph. D.
Section Manager
Analytical Chemistry Section

JEG:gp

Enclosure

cc: Karen Knight

CORRECTIVE ACTIONS FOR QB1, FY 88

TCL VOLATILE

Performance Problems

None indicated.

Corrective Actions

None required.

TCL SEMIVOLATILE

Performance Problems

Four (4) TCL compounds, 4-Chlorophenyl phenyl ether, Hexachlorobenzene, Chrysene, and Benzo(a)pyrene were reported on Form I SV-2 (page 0125) as not detected. However, data from our QUAN report (pages 0130 and 0131) show clearly that all of these compounds were detected and quantified. Therefore, an error occurred during the transfer of the data between Finnigan INCOS™ data system QUAN program and the Finnigan PC based QA Formaster™ II software. This error was not detected during our review of the data because only compounds reported as detected on Form I are checked against the QUAN report.

Corrective Actions

We have revised our data review procedures such that the reviewer will check from the QUAN report to the Form I to ensure the all of the compounds verified and reported on the QUAN report have been transferred and correctly reported on Form I.

TCL PESTICIDES

Performance Problems

None indicated.

Corrective Actions

None required.

NON-TCL VOLATILES

Performance Problems

None indicated.

Corrective Actions

None required.

NON-TCL SEMIVOLATILE

Performance Problems

One (1) Non-TCL semivolatile compound, aniline, was not detected. This compound appears to be only partially resolved chromatographically from phenol, a TCL compound present at a relatively high level in this sample.

Corrective Actions

Additional attention will be paid to the symmetry of the TCL compound peaks for indications of partial coelution of Non-TCL compounds. Also, additional attention will be paid to the mass spectra of the TCL compounds detected to determine the presents of "extra" ions which would indicate complete coelution of a Non-TCL compound with a TCL compound.

TCL VOLATILE (Contaminants)

Performance Problems

None indicated.

Corrective Actions

None required.

TCL SEMIVOLATILE (Contaminants)

Performance Problems

One (1) TCL semivolatile compound, 2,4,6-Trichlorophenol, was reported as detected on Form I SV-1 (page 0124). This contaminant is actually a false positive caused by the close elution of 2,4,5-Trichlorophenol, another of the TCL semivolatile compounds. The false positive status of this compound was detected and indicated on the QUAN report (page 0129) during the initial review of the data, however the entry for this compound was not edited from the QUAN report prior to transfer of the data to Form I.

Corrective Actions

We have added an additional review of the QUAN report for each sample just prior to the transfer of the data to the QA Formaster™ II system. This will ensure that the QUAN report is free of false positive entries or that an adequate notation is made to that samples review file so that any incorrect entries can be edited from the final Form I.

TCL PESTICIDE (Contaminants)

Performance Problems

One (1) TCL pesticide, alpha-BHC, was detected and reported at 0.053 µg/L which is just above the CRQL of 0.05 µg/L. The retention time for this compound was confirmed on the secondary column. However, the quantification for this compound above the CRQL was not confirmed on the secondary column.

Corrective Actions

We are now using the quantitative information provided by the secondary column as well as the data form matrix spike and matrix spike duplicate analyses (when available) to more carefully evaluated how compounds at or near their CRQL will be reported.

Draft - Do Not Cite
LLNLSNLL Data Document
Issue Date: June 1989
Revision: 01

ORGDP Results of Inorganic and Organic Performance Evaluation Studies

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PERFORMANCE EVALUATION SCORES FOR ORGDP

Code	Score
QB1FY88 Inorganic	82.4
QB4FY87 Inorganic	95.5
QB2FY88 Organic	93.6

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Results for ORGDP's
Organic QB1, FY88, were requested and
will be distributed upon receipt

(Blank Page)

Results for ORGDP's Organic QB4, FY87,
were requested and will be
distributed upon receipt

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ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 88

LABORATORY: Martin Marietta ORGDP (TN)
PERFORMANCE: ACCEPTABLE
RANK: Above = 0 Same = 2 Below = 48

% SCORE: 93.6
REPORT DATE: 4/1/1988
MATRIX: WATER

COMPOUND	98 % CI LOWER	98 % CI UPPER	LABORATORY DATA CONC	LABORATORY DATA Q	#LABS NOT-ID	PROGRAM DATA #LABS MIS-QUANT	PROGRAM DATA #LABS CONTAM	TOTAL #LABS
TCL VOLATILE								
BROMOMETHANE	64	240	170		0	2	0	50
METHYLENE CHLORIDE	c	c	83	B	0	0	0	50
1,1-DICHLOROETHANE	34	55	47		0	3	0	50
2-BUTANONE	38	170	40	*	3	7	0	50
BROMODICHLOROMETHANE	59	80	62		0	3	0	50
1,1,2-TRICHLOROETHANE	54	76	60		0	8	0	50
BENZENE	12	17	14		1	5	0	50
2-HEXANONE	48	200	74		1	3	0	50
TOLUENE	18	30	21	B	0	2	0	50
CHLOROBENZENE	85	110	95		0	3	0	50
STYRENE	80	110	120	X	0	6	0	50
XYLENES (TOTAL)	120	180	130		0	5	0	50
TCL SEMIVOLATILE								
2-CHLOROPHENOL	23	52	29		0	5	0	50
N-NITROSO-DI-N-PROPYLAMINE	45	84	50		0	6	0	50
ISOPHORONE	65	140	96		0	5	0	50
2,4-DIMETHYLPHENOL	10	53	15		0	2	0	50
BENZOIC ACID	50	200	50	U	0	7	0	50
HEXACHLOROBUTADIENE	61	160	89		0	2	0	50
2-METHYLNAPHTHALENE	20	55	32		0	3	0	50
2,4,6-TRICHLOROPHENOL	55	100	67		0	8	0	50
2-NITROANILINE	50	100	43	J *	0	2	0	50
ACENAPHTHYLENE	59	100	70		0	8	0	50
ACENAPHTHENE	61	100	71		0	4	0	50
2,4-DINITROPHENOL	81	260	150		3	7	0	50
DIBENZOFURAN	96	160	130		0	6	0	50
4-NITROPHENOL	50	200	58	*	0	1	0	50
FLUORENE	64	100	75		0	4	0	50
DIETHYLPHTHALATE	c	c	46		0	0	0	50
PENTACHLOROPHENOL	74	230	100		0	6	0	50
PHENANTHRENE	62	100	73		0	5	0	50
ANTHRACENE	57	100	68		0	4	0	50
PYRENE	42	110	70		0	6	0	50
BUTYL BENZYL PHTHALATE	c	c	24		0	0	0	50
BENZO(A)ANTHRACENE	31	100	76		0	2	0	50
DI-N-OCTYL PHTHALATE	10	100	60	B	0	2	0	50
DIBENZ(A,H)ANTHRACENE	17	140	110		0	2	0	50
TCL PESTICIDES								
HEPTACHLOR	0.05	0.43	0.19	D	1	8	0	50
ALDRIN	0.13	0.53	0.22	D	19	5	0	50
ENDRIN	0.16	0.48	0.28		3	11	0	50
TOXAPHENE	c	c	1	U	0	0	1	50
NON-TCL SEMIVOLATILE								
BENZOPHENONE			74		0	0	0	50
DISULFOTON			51		0	0	0	50
CHLORPYRIFOS			37		0	0	0	50
2-NITRO-P-CRESOL			44		0	0	0	50
TCL SEMIVOLATILE (Contaminants)								
NITROBENZENE			7	J	0	0	0	50

ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 88

LABORATORY: Martin Marietta ORGDP (TN)
PERFORMANCE: ACCEPTABLE
RANK: Above = 0 Same = 2 Below = 48

% SCORE: 93.6
REPORT DATE: 4/1/1988
MATRIX: WATER

COMPOUND	90 % CI LOWER	90 % CI UPPER	LABORATORY DATA CONC	LABORATORY DATA Q	PROGRAM DATA #LABS NOT-ID	PROGRAM DATA #LABS MIS-QUANT	PROGRAM DATA #LABS CONTAM	TOTAL #LABS
BIS(2-ETHYLHEXYL)PHTHALATE			18	B	0	0	1	50
NON-TCL VOLATILE (Contaminants)								
CYCLOTRISILOXANE,HEXAMETHYL-			15	JB	0	0	0	50
NON-TCL SEMIVOLATILE (Contaminants)								
UNKNOWN			7		0	0	18	50
UNKNOWN			23	F	0	0	10	50

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 1
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 0
OF NON-TCL CONTAMINANTS: 1

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LLNLSNLL Data Document
Issue Date: June 1989
Revision: 01

ANL Results of Inorganic and Organic Performance Evaluation Studies

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PERFORMANCE EVALUATION SCORES FOR ANL

Code	Score
QB2FY89 Inorganic	88.4
QB1FY89 Inorganic	94.8
QB2FY89 Organic	*
QB1FY89 Organic	71.6

* Reported on schedule - no score received as of April 1989.

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ARGONNE NATIONAL LABORATORY
9700 South Cass Avenue, Argonne, Illinois 60439

April 6, 1989

FEDERAL EXPRESS

Ms. Renee Tucker
Oak Ridge National Laboratory
Martin Marietta Energy Systems, Inc.
P.O. Box 2008
Oak Ridge, TN 37831

Dear Renee,

Please find enclosed a copy of our scored results for the U.S. Environmental Protection Agency Inorganic Quarterly Blind (QB) Performance Evaluation sample set for the second fiscal quarter of 1989, i.e., QB2FY89. The Inorganic QB2FY89 results cover (1) that period immediately after completion of our analysis of samples received from the Morgantown Energy Technology Center site, and (2) that period during which analyses were performed on samples received from the Lawrence Livermore National Laboratory site. Our scored Organic QB2FY89 analytical results will be forwarded to you as soon as we receive them from the U.S. EPA Environmental Monitoring Systems Laboratory-Las Vegas (EMSL-LV).

Corrective action responses for our Inorganic QB2FY89 results, and for our Organic QB2FY89 results, if required, will be forwarded to you after being judged acceptable by EMSL-LV.

I believe the enclosed, the forthcoming scored results for Organic QB2FY89, and our subsequent corrective action statements for each of the QB2FY89 sample sets will complete the QB information owed you for all sites. If I am incorrect, or if you require additional information or have any questions, please call me at (312)972-3173.

Sincerely,

Fred

Fredric J. Martino
Analytical Chemistry Laboratory
Chemical Technology Division

FJM/vaa

cc: (w/enc.)
M. Steindler (2)
(w/o enc.)

P. Nelson	E. Palys - QES
D. Green	V. Fayne - DOE
P. Lindahl	R. Scott - DOE
M. Erickson	A. Crockett - INEL
D. Graczyk	H. Vincent - EMSL-LV
DES File	R. Fitts - ORNL

Operated by The University of Chic -e United States Department of Energy

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

MAR 28 1989

Mr. Peter C. Lindahl
Analytical Chemistry Division, BLD 205
Argonne National Laboratory
9700 S. Cass Avenue
Argonne, IL 60439

Dear Mr. Lindahl:

The results of the participation of your laboratory in the Environmental Monitoring Systems Laboratory-Las Vegas (EMSL-LV) second quarter Inorganic Performance Evaluation study (QB2, FY89 Inorganic) are enclosed. This includes copies of the statistical information on the numbers of laboratories in the program that had difficulties with specific analytes.

For scores of less than 100 for each quarterly blind performance evaluation sample, the Department of Energy (DOE) Environmental Survey requires that the laboratory provide a formal response which would describe any changes or corrective actions that have been taken to improve analytical performance and eliminate deficiencies. That response will become a part of the quality assurance record for analytical work completed by the laboratory for sites in the DOE environmental survey. In order to meet delivery times for data Document publication, please send your corrective action responses to Vincent Fayne at DOE headquarters with copies sent to me at the EMSL-LV within 15 days of receipt of this letter.

This office will be glad to furnish any counsel and further information regarding this work.

Sincerely,

Harold A. Vincent

Harold A. Vincent
Chemist, Quality Assurance Research Branch
Quality Assurance and Methods Development Division

Enclosures

cc: (w/Enclosures)
Vincent Fayne, DOE HQ
Alan Crockett, INEL

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INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 89

LABORATORY NAME: Argonne National (IL) [V1] % Score: 88.4
PERFORMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary REPORT DATE: 3/15/1989
LABORATORY RANK: Above = 22 Same = 0 Below = 7 MATRIX: WATER

ELEMENT NAME	95 % CI LOWER	95 % CI UPPER	LAB RESULTS REPORTED VALUE	LAB RESULTS QUALIFIER CODE	#LABS NOT-ID	#LABS MIS-QUANT	PROGRAM DATA #LABS FALSE POS	PROGRAM DATA #LABS MSPK OUT	PROGRAM DATA #LABS DUP OUT	TOTAL #LABS
ALUMINUM	1000	1160	1030		0	5	0	0	0	30
ANTIMONY	66.7	113	85.9		0	2	0	2	1	30
ARSENIC	28.9	44.2	35		0	1	0	1	1	30
BARIUM	4060	4880	4210		0	0	0	0	0	30
BERYLLIUM	23.0	28.6	27.3		0	1	0	0	0	30
CADMIUM	53.8	66.5	61.3		0	3	0	0	0	30
CALCIUM	7180	8470	7120	X	0	2	0	0	0	30
CHROMIUM	38.0	52.0	46.3		0	3	0	0	0	30
COBALT	57.2	80.0	66.7		0	3	0	0	0	30
COPPER	37.3	67.0	53.4		0	2	0	0	0	30
IRON	323	402	374		0	2	0	0	0	30
LEAD	14.9	25.2	22.4		0	1	0	1	0	30
MAGNESIUM	5000.0	5350	4980	B	1	2	0	0	0	30
MANGANESE	57.4	73.3	66.5		0	3	0	0	0	30
MERCURY	6.0	10.6	8.9		0	3	0	0	0	30
NICKEL	66.4	90.9	90.2	S	0	0	0	0	0	30
POTASSIUM	10600	13000	11600		0	4	0	0	0	30
SELENIUM	12.6	22.9	18		0	1	0	5	1	30
SILVER	10.0	18.2	5.7	B	11	1	0	1	0	30
SODIUM	d	d	1230	BE	0	0	0	0	0	30
THALLIUM	33.2	59.6	40.9		0	2	0	4	0	30
VANADIUM	50.0	70.3	61.6		0	1	0	0	0	30
ZINC	20.0	41.2	30		0	1	0	0	0	30

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 1
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 1
WATER : Ag

OF DUPLICATES OUT: 0
WATER :

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 2 FY 89

:ATORY NAME: Argonne National (IL) [V1]
)RMANCE LEVEL: ACCEPTABLE - Corrective Actions Necessary
:ATORY RANK: Above = 22 Same = 0 Below = 7

% Score: 88.4
REPORT DATE: 3/15/1989
MATRIX: SOIL

:NT NAME	95 % CI LOWER	95 % CI UPPER	LAB RESULTS REPORTED VALUE	LAB RESULTS QUALIFIER CODE	#LABS NOT-ID	#LABS MIS-QUANT	PROGRAM DATA #LABS FALSE POS	PROGRAM DATA #LABS MSPK OUT	PROGRAM DATA #LABS DUP OUT	TOTAL #LABS
:NUM	7280	12200	7510	S	0	1	0	0	0	30
IONY	c	c	1.2	U	0	0	0	24	0	30
IIC	2.4	5.6	3.1		0	2	2	1	0	30
JM	40.0	53.1	46.7		0	0	0	0	0	30
.LIUM	c	c	0.48	B	0	0	0	0	0	30
:UM	c	c	0.31	B	0	0	0	1	1	30
:UM	40500	49400	38600	X	0	5	0	0	0	30
IIUM	11.4	29.6	20.3		0	2	0	1	1	30
.T	d	d	5.5	B	0	0	0	0	0	30
:R	19.5	35.8	24.6	E	0	2	0	0	1	30
	11700	18900	12100	S	0	1	0	0	0	30
	18.0	24.6	19.9		0	4	0	0	0	30
:SIUM	22600	28100	22600	S	0	2	0	0	0	30
\NESE	271	338	275	S	0	2	0	1	0	30
JRY	c	c	0.04	U	0	0	0	1	1	30
:L	19.8	31.4	24.6		0	2	0	0	0	30
SSIUM	1000.0	1270	577	B	1	1	0	0	0	30
IIUM	c	c	0.21	U	0	0	0	11	1	30
:R	c	c	5.7	#	0	0	0	5	1	30
IM	d	d	128	BE	0	0	0	0	0	30
.IUM	c	c	0.98	U	0	0	0	3	0	30
)IUM	15.2	51.3	24.8		0	0	0	0	0	30
	52.6	71.5	58		0	1	0	0	1	30

ELEMENTS NOT-IDENTIFIED: 0
ELEMENTS MIS-QUANTIFIED: 1
FALSE POSITIVES: 1

MATRIX SPIKES OUT: 1
: Sb

DUPLICATES OUT: 0
:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

FEB 07 1989

Mr. Peter C. Lindahl
Analytical Chemistry Division, Bldg. 205
Argonne National Laboratory
9700 S. Cass Avenue
Argonne, IL 60439

Dear Mr. Lindahl:

The results of the participation of your laboratory in the Environmental Monitoring Systems Laboratory-Las Vegas (EMSL-LV) first quarter Inorganic Performance Evaluation Study (QB1, FY89, Inorganic) are enclosed. This includes copies of the statistical information on the numbers of laboratories in the program that had difficulties with specific analytes.

For scores of less than 100 for each quarterly blind performance evaluation sample, the Department of Energy (DOE) Environmental Survey requires that the laboratory provide a formal response which would describe any changes or corrective actions that have been taken to improve analytical performance and eliminate deficiencies. That response will become a part of the quality assurance record for analytical work completed by the laboratory for sites in the DOE environmental survey. In order to meet delivery times for data document publication, please send your corrective action responses to Vincent Fayne at DOE Headquarters with copies sent to me at the EMSL-LV within 15 days of receipt of this letter.

This office will be glad to furnish any counsel and further information regarding this work.

Sincerely,

Harold A. Vincent

Harold A. Vincent,
Chemist, Quality Assurance Research Branch
Quality Assurance and Methods Development Division

Enclosures

cc: (w/Enclosures)
Vincent Fayne, DOE HQ
Alan Crockett, INEL

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INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 89

BORATORY NAME: Argonne National (IL) [B2]
:RFORMANCE LEVEL: ACCEPTABLE
BORATORY RANK: Above = 13 Same = 1 Below = 26

% Score: 94.8
REPORT DATE: 12/15/1988
MATRIX: WATER

EMENT NAME	95 % CI LOWER	95 % CI UPPER	LAB RESULTS REPORTED VALUE	LAB RESULTS QUALIFIER CODE	#LABS NOT-ID	#LABS MIS-QUANT	PROGRAM DATA #LABS FALSE POS	PROGRAM DATA #LABS MSPK OUT	PROGRAM DATA #LABS DUP OUT	TOTAL #LABS
UMINUM	433	617	521		0	3	0	0	0	41
TIMONY	60.0	67	45.9	B	12	4	0	1	0	41
SENIC	66	95	95.1	S	0	1	1	5	0	41
RIUM	340	425	361	E	0	1	0	0	0	41
RYLLIUM	135	162	154		0	2	0	1	0	41
DMIUM	151	184	160		0	5	0	1	0	41
LCIUM	d	d	977	B	0	0	0	0	0	41
ROMIUM	62	79	72		0	1	0	0	1	41
BALT	172	225	198		0	0	0	0	0	41
PPER	171	208	187		0	3	0	0	0	41
ON	100.0	158	99.1	B	0	3	0	1	0	41
AD	46	74	67.3		0	0	0	4	0	41
GNESIUM	d	d	1190	B	0	0	0	0	0	41
NGANESE	149	185	166		0	2	0	1	0	41
RCURY	12	23	16.9		0	6	0	1	0	41
CKEL	100	141	125		0	0	0	0	0	41
TASSIUM	16200	20400	17700		1	5	0	0	0	41
LENIUM	26	40	33.6		0	2	0	3	1	41
LVER	c	c	5.8	B	0	0	0	6	1	41
DIUM	11700	14200	12700		1	3	0	0	0	41
ALLIUM	51	77	56.1		0	4	1	2	1	41
NADIUM	101	127	130	X	0	2	0	0	0	41
NC	56	93	61.3		0	2	0	1	0	41

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 1
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 2
TER : As, Mn

OF DUPLICATES OUT: 0
TER :

INORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QB 1 FY 89

LABORATORY NAME: Argonne National (IL) [B2]
PERFORMANCE LEVEL: ACCEPTABLE
LABORATORY RANK: Above = 13 Same = 1 Below = 26

% Score: 94.8
REPORT DATE: 12/15/1988
MATRIX: SOIL

ELEMENT NAME	95 % CI LOWER	95 % CI UPPER	LAB RESULTS REPORTED VALUE	LAB RESULTS QUALIFIER CODE	#LABS NOT-ID	#LABS MIS-QUANT	PROGRAM DATA #LABS FALSE POS	PROGRAM DATA #LABS MSPK OUT	PROGRAM DATA #LABS DUP OUT	TOTAL #LABS
ALUMINUM	6290	19500	8970		0	1	0	0	1	41
ANTIMONY	c	c	0.78	B	0	0	0	27	1	41
ARSENIC	3.8	10	8	S	0	5	0	9	2	41
BARIUM	164	209	177		0	1	0	0	0	41
BERYLLIUM	1.0	1.4	0.97		8	2	0	0	0	41
CADMIUM	c	c	1		0	0	0	0	3	41
CALCIUM	42100	49700	43800		0	2	0	0	0	41
CHROMIUM	10	22	16.3		0	2	0	1	1	41
COBALT	10.0	14	10.5		1	1	0	0	0	41
COPPER	16	30	20		0	2	0	1	3	41
IRON	14600	20300	16100		0	0	0	0	0	41
LEAD	85	220	215	S	0	0	0	6	16	41
MAGNESIUM	2870	4570	3260		0	0	0	0	0	41
MANGANESE	567	698	622		0	4	0	0	0	41
MERCURY	c	c	0.07	B	0	0	0	3	3	41
NICKEL	13	27	18.7		0	1	0	0	0	41
POTASSIUM	1080	3500	1800		1	2	0	0	0	41
SELENIUM	c	c	0.26	B	0	0	0	21	0	41
SILVER	c	c	1.5	B	0	0	0	7	0	41
SODIUM	d	d	185	BE	0	0	0	0	0	41
THALLIUM	c	c	1.1	U	0	0	0	3	0	41
VANADIUM	15	39	21.3		0	1	0	1	0	41
ZINC	109	147	116		0	0	0	0	1	41

OF ELEMENTS NOT-IDENTIFIED: 0
OF ELEMENTS MIS-QUANTIFIED: 0
OF FALSE POSITIVES: 0

OF MATRIX SPIKES OUT: 1
SOIL : Sb

OF DUPLICATES OUT: 0
SOIL :

NOTE

The Analytical Operations Branch of the Office of Emergency and Remedial Response requires that laboratories who have scores of under 90% detail the corrective action they plan to undertake. The laboratories must document in a letter to their Project Officer, Deputy Project Officer, and the EMSL-LV within two weeks of receipt of the results of this study, the source of the problem(s) and the corrective action(s) the laboratory plans to undertake to prevent the problem(s) from occurring in future quarterly Blind PE samples.

c CI WERE NOT SET SINCE 40 % OR MORE OF THE LABORATORIES SUBMITTED A NON-USABLE VALUE.
d CI NOT USED. SEE SCORING NOTES, PROCEDURE FOR GRADING U-VALUES NO. 4.
B INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL.
E INDICATES A VALUE ESTIMATED OR NOT REPORTED DUE TO THE PRESENCE OF INTERFERENCES.
S INDICATES VALUE DETERMINED BY THE METHOD OF STANDARD ADDITION.
+ CORRELATION COEFFICIENT FOR THE MSA IS LESS THAN 0.995.
NR NOT REQUIRED.
U ANALYZED FOR BUT NOT DETECTED.
X VALUE WAS OUTSIDE BOTH THE WARNING AND THE ACTION LIMIT. POINTS DEDUCTED.
S VALUE WAS OUTSIDE THE WARNING LIMIT ONLY. NO POINTS DEDUCTED.
- VALUE NOT SUBMITTED FOR THIS PARAMETER.
# INDICATES A FALSE POSITIVE BY DIXON'S TEST. POINTS DEDUCTED.
? BEST ESTIMATE OF VALUE AND/OR QUALIFIER. POOR COPY AND/OR ILLEGIBLE VALUE SUBMITTED.
< INDICATES A VALUE LESS THAN THE CRDL OR THE INSTRUMENT DETECTION LIMIT.
[] INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS B-FLAG.
() INDICATES AN ESTIMATED VALUE LESS THAN THE CRDL. SAME AS B-FLAG.

SCORING NOTES:

CONFIDENCE INTERVALS (CI) WERE DERIVED FROM LABORATORY SUBMITTED VALUES. LESS THAN VALUES (<x), U-VALUES, AND NON-SUBMITTED VALUES (-) WERE NOT USED IN THE CALCULATION OF THE CI.

PROCEDURE FOR GRADING U-VALUES

1. ANY U-VALUE RESPONSE (INSTRUMENT DETECTION LIMIT) > CRDL FOR THE APPROPRIATE DILUTION, EVEN IF IT IS IN THE 95 % CI, CAUSES A POINT DEDUCTION. IF 25 % OR MORE OF THE LABORATORIES REPORT A U-VALUE OVER THE CRDL, NO POINTS ARE DEDUCTED FOR ANY LABORATORY, POSSIBLY INDICATING A MATRIX INTERFERENCE IN THE SAMPLE.

2. IF CRDL < LOWER CI, THEN USE CI AS SET.

3. IF LOWER CI < CRDL AND CRDL < UPPER CI, THEN SET LOWER CI TO ZERO (0). NO POINTS DEDUCTED FOR IDENTIFICATION OR QUANTITATION LESS THAN OR EQUAL TO THE CRDL.

4. IF CRDL > LOWER AND UPPER CI, THEN NO CI USED. PARAMETER DROPPED FROM THE SCORING. NO POINTS DEDUCTED FOR IDENTIFICATIONS OR QUANTITATIONS. FALSE POSITIVES POSSIBLE.

NOTE THAT ONLY CLP LABORATORIES WERE USED IN THE CALCULATION OF THE CI.

NOTE THAT A U-VALUE FOLLOWED BY X (U X) MEANS THAT POINTS WERE LOST FOR IDENTIFICATION AND QUANTITATION.

ARGONNE NATIONAL LABORATORY
9700 South Cass Avenue, Argonne, Illinois 60439

February 20, 1989

Mr. Vincent Fayne
U.S. Department of Energy
Office of Environmental Audit
Forrestal Building, EH-24
1000 Independence Avenue, SW
Washington, DC 20585

Dear Vince,

As Harold Vincent, U.S. EPA EMSL-LV, has reported, the Argonne National Laboratory/Analytical Chemistry Laboratory's score on the Inorganic Performance Evaluation (PE) Study (QB1 FY89, Case No. 10589) was 94.8%. In accordance with DOE Environmental Survey policy on addressing PE sample results, the following clarifications are presented:

Water Matrix

CVAA - Reported value within acceptance range; no corrective action required.

FAA - As matrix spike outside of acceptance range.

ICP - Mn matrix spike outside of acceptance range;
V value outside of acceptance range.

CVAA = Cold vapor atomic absorption for mercury, FAA = Furnace atomic absorption, and ICP = Inductively coupled plasma emission spectroscopy.

FAA As and ICP Mn matrix spike data reviewed prior to submission indicated for the water sample that these two matrix spikes were outside the recovery criteria acceptance limits of 75-125%, and these data were flagged according to CLP protocol. Assessment by Don Graczyk, the Inorganic Coordinator, and me resulted in the conscious decision to accept the one point penalty (0.5 x 2 values outside the control limit) to our score rather than spend the extra two or three days of effort to redigest and reanalyze another set of samples for these two elements. The required post-digestion spike recovery for Mn of 98.6% was within the acceptance limits of 75-125%. It is also worth noting in the case of As that five of the forty-one participating laboratories had the As matrix spike outside the acceptance window. No corrective actions are planned since this appears to be a method problem.

Our reported value for V (130 µg/L) is just outside the upper limit of the 101-127 µg/L acceptance range. Review of our ICP quality control results for V, including the ICB, ICV, CCB, CCV, PB, and aqueous LCS data, showed all results within the CLP acceptance limits. Further examination of the blank data showed that the ICB, CCB, and PB results ranged from 17.4 to 26.2 µg/L and, while they are all less than the V CRDL of 50 µg/L, suggest a upward drift of the V baseline signal. This baseline/blank contribution is the most likely reason that the reported V value is slightly high. Review

of the results for the analysis of an ICP standard at two times the CRDL showed that these values were within the CRDL, but also biased high by the blank value (e.g., found values of 123 µg/L and 117 µg/L vs. the true value of 100 µg/L). Since all results were within the CRDL and within the CLP guidelines, it appears that corrective actions are not necessary; hence none are planned.

Soil Matrix

CVAA - No confidence interval set; no corrective action required.

FAA - Sb matrix spike outside of acceptance range.

ICP - Reported values within acceptance range; no corrective actions required.

Review of the FAA Sb matrix spike result prior to its submission indicated that it was outside the recovery criteria acceptance limits of 75-125% and it was flagged accordingly. Again, review and assessment resulted in the decision that since this was a method problem we would accept the one-half point penalty to our score. It is notable that 27 of the forty-one participating laboratories reported an Sb matrix spike result outside the acceptance window.

We presume our decision not to spend the additional time required to reprepare and reanalyze the PE samples for the matrix spikes was prudent and presents no problem. In addition, I trust our score of 94.8% on the inorganic PE sample analysis is consistent with the DOE Environmental Survey's goals of providing data of high quality. Should you have any questions regarding our inorganic PE sample results or this corrective action response, please contact me at FTS 972-3490 or Don Graczyk at FTS 972-3489.

Sincerely,

Pete

Peter C. Lindahl
Analytical Chemistry Laboratory
Chemical Technology Division

PCL:amb

cc: M. Steindler (2)
P. Nelson
D. Green
D. Graczyk
R. Heinrich
M. Erickson
F. Martino
E. Palys
R. Scott (DOE-OEA)
H. Vincent (EPA EMSL-LV)
A. Crockett (INEL)
DES File

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
(702/798-2100 - FTS 545-2100)

FEB 07 1989

Mr. Lindahl
Analytical Chemistry Division, Bldg. 205
Argonne National Laboratory
9700 S. Cass Avenue
Argonne, IL 60439

Dear Mr. Lindahl:

The results of the participation of your laboratory in the Environmental Monitoring Systems Laboratory-Las Vegas (EMSL-LV) first quarter Organic Performance Evaluation Study (QB1, FY89 Organic) are enclosed. This includes copies of the statistical information on the numbers of laboratories in the program that had difficulties with specific analytes.

For scores of less than 100 for each quarterly blind performance evaluation sample, the Department of Energy (DOE) Environmental Survey requires that the laboratory provide a formal response which would describe any changes or corrective actions that have been taken to improve analytical performance and eliminate deficiencies. That response will become a part of the quality assurance record for analytical work completed by the laboratory for sites in the DOE environmental survey. In order to meet delivery times for data document publication, please send your corrective action responses to Vincent Fayne at DOE Headquarters with copies sent to me at the EMSL-LV within 15 days of receipt of this letter.

This office will be glad to furnish any counsel and further information regarding this work.

Sincerely,

Harold A. Vincent,
Chemist, Quality Assurance Research Branch
Quality Assurance and Methods Development Division

Enclosures

cc: (w/Enclosures)
Vincent Fayne, DOE HQ
Alan Crockett, INEL

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ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QS 1 FY 89

LABORATORY: Argonne National (IL) — % SCORE: 71.6
PERFORMANCE: ACCEPTABLE - Response Explaining Deficiency(ies) Required — REPORT DATE: 12/22/88
RANK: Above = 42 Same = 1 Below = 20 — MATRIX: WATER

COMPOUND	CONFIDENCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MISSING	PROGRAM DATA #LABS NOT*TO	#LABS TO-CPD	TOTAL #LABS
CL VOLATILE										
INYL CHLORIDE	74	140	66	150	95		1	0	9	9
CETONE	NU	NU	NU	NU	99		0	1	8	9
,1-DICHLOROETHENE	23	36	21	37	31		2	0	9	9
,2-DICHLOROETHENE (TOTAL)	75	110	69	120	95		1	0	9	9
,1,1-TRICHLOROETHANE	60	87	56	91	74		0	0	9	9
ICHLOROETHENE	39	52	38	54	45		0	1	8	9
IBROMOCHLOROMETHANE	15	23	14	24	19		2	0	9	9
-PENTANONE,4-METHYL-	20	37	17	40	29		1	0	9	9
ITRACHLOROETHENE	40	55	38	57	49		1	0	9	9
THYL BENZENE	40	53	39	55	47		1	0	9	9
CL SEMIVOLATILE										
-CHLOROPHENOL	21	35	19	42	29		0	2	7	9
,3-DICHLOROBENZENE	NU	NU	NU	NU	10	U	0	9	0	9
,4-DICHLOROBENZENE	37	68	33	73	23	X	5	0	9	9
ENZYL ALCOHOL	47	91	41	110	58		2	5	4	9
,2-DICHLOROBENZENE	20	36	18	44	13	X	5	0	9	9
-METHYLPHENOL	24	39	22	47	22	S	1	1	8	9
EXACHLOROETHANE	27	59	22	76	12	X	5	0	9	9
,4-DIMETHYLPHENOL	33	83	25	110	77		1	0	9	9
IS(2-CHLOROETHOXY)METHANE	30	49	28	51	36		2	0	9	9
,4-DICHLOROPHENOL	58	88	54	100	70		2	0	9	9
,2,4-TRICHLOROBENZENE	20	35	18	43	14	X	5	0	9	9
EXACHLOROBUTADIENE	27	56	23	71	10	X	7	0	9	9
EXACHLOROCYCLOPENTADIENE	NU	NU	NU	NU	10	U	0	5	4	9
,4,6-TRICHLOROPHENOL	23	37	21	45	29		2	0	9	9
-CHLORONAPHTHALENE	27	45	24	55	26	S	1	0	9	9
,6-DINITROTOLUENE	50	82	45	87	52		1	0	9	9
CENAPHTHENE	30	47	27	54	31		0	0	9	9
LUORENE	44	96	59	100	43	S	1	0	9	9
-NITROSODIPHENYLAMINE	41	73	36	90	120	X	1	0	9	9
EXACHLOROBENZENE	44	96	36	100	65		2	0	9	9
ENTACHLOROPHENOL	NU	NU	NU	NU	29		0	0	9	9
NTHRACENE	30	49	27	52	36		1	0	9	9
,3'-DICHLOROBENZIDINE	NU	NU	NU	NU	50	U	0	9	0	9
ENZO(B)FLUORANTHENE	34	70	29	88	28	X	2	0	9	9
ENZO(A)PYRENE	44	92	37	120	42	S	2	0	9	9
NDENO(1,2,3-CD)PYRENE	41	93	34	100	42		3	0	9	9
IBENZ(A,H)ANTHRACENE	40	97	31	100	41		3	0	9	9
CL PESTICIDES										
LPHA-BHC	NU	NU	NU	NU	0.05	U	0	7	2	9
ETA-BHC	NU	NU	NU	NU	0.05	U	0	9	0	9
ELTA-BHC	NU	NU	NU	NU	0.24		0	8	1	9
AMMA-BHC (LINDANE)	NU	NU	NU	NU	0.05	U	0	8	1	9
EPTACHLOR	0.080	0.19	0.064	0.24	0.17		0	1	8	9
LDRIN	0.15	0.39	0.11	0.42	0.35		1	1	8	9
EPTACHLOR EPOXIDE	0.13	0.28	0.100	0.30	0.19		1	0	9	9
NDOSULFAN I	NU	NU	NU	NU	0.2		0	1	8	9
,4'-DDE	0.31	0.43	0.26	0.67	0.51		2	0	9	9
NDOSULFAN II	NU	NU	NU	NU	0.26		0	2	7	9
NDRIN KETONE	0.26	0.62	0.21	0.67	0.43		0	1	8	9
ON-TCL VOLATILE										
ETHANE,IODO-					710			0	9	9

ORGANIC PERFORMANCE EVALUATION SAMPLE
INDIVIDUAL LABORATORY SUMMARY REPORT
FOR QS 1 FY 89

ABORATORY: Argonne National (IL)
RFORMANCE: ACCEPTABLE - Response Explaining Deficiency(ies) Required
RANK: Above = 42 Same = 1 Below = 20

% SCORE: 71.6
REPORT DATE: 12/22/88
MATRIX: WATER

MPOUND	CONFIDENCE INTERVALS WARNING LOWER	WARNING UPPER	ACTION LOWER	ACTION UPPER	LABORATORY DATA CONC	Q	#LABS MIS-QNT	PROGRAM DATA #LABS NOT-ID	#LABS ID-CPD	TOTAL #LABS
THANE,DIBROMO-					260			1	8	9
NZENE,T-BUTYL-					190			1	8	9
HER,2-CHLORO-ETHYL-VINYL					23			1	8	9
THANE,TRICHLORO-FLUORO-					470			0	9	9
N-TCL SEMIVOLATILE										
NZOPHENONE					60			2	7	9
NBAZOLE					0			4	3	9
N-TCL SEMIVOLATILE (Contaminants)										
-CARBAZOLE,9-NITROSO-					95			7	2	9

OF TCL COMPOUNDS NOT-IDENTIFIED: 0
OF TCL COMPOUNDS MIS-QUANTIFIED: 7
OF TCL CONTAMINANTS: 0

OF NON-TCL COMPOUNDS NOT-IDENTIFIED: 0
OF NON-TCL CONTAMINANTS: 0

ARGONNE NATIONAL LABORATORY
9700 South Cass Avenue, Argonne, Illinois 60439

March 9, 1989

Mr. Vincent Fayne
U.S. Department of Energy
Office of Environmental Audit
Forrestal Building, EH-24
1000 Independence Avenue, S.W.
Washington, DC 20585

Dear Vince,

As Harold Vincent (U.S. EPA EMSL-LV) has reported, the Argonne National Laboratory/Analytical Chemistry Laboratory's score on the water matrix sample of the EMSL-LV's Organic Performance Evaluation (PE) Study (QB1FY89, Case No. 10582) was 71.6% and in the acceptable performance category. In accordance with DOE Environmental Survey policy on addressing PE sample results, we have identified the problem(s) and enumerated the corrective action(s) below.

A. Volatiles

Identification of Problem(s): No problems identified. All compounds were within the quantitation confidence intervals.

Corrective Action(s): No corrective actions(s) required.

B. Semivolatiles

Identification of Problem(s): No compounds were misidentified. The quantitation of seven compounds was outside the confidence intervals and was classified as "misquantified" in the EPA scoring. These seven misquantifications represented all of the points deducted. Of the misquantified compounds, only one was above the upper limit of the confidence intervals. Thus, two separate problems appear to have caused the compounds to be mis-quantitated.

1. N-Nitrosodiphenylamine (NNDPA). Our NNDPA concentration was well above the action confidence intervals. The problem with the NNDPA quantitation has been identified as a bad calibration standard. The standard used for these samples is the EPA standard (Neutral Extractables "A," Lot No. C-094-02, dated 8/87; note that despite the old dates on these standards, they are the most recently received from the EPA). The area counts for the NNDPA in this standard were inordinately low and we should have noted this as a potential problem. NNDPA is an unstable compound. Problems with EPA's standard have been previously noted ever since they began mixing the NNDPA in with other compounds as part of the "Neutral Extractables A" standard. Apparently, other laboratories are not using this mixed EPA standard.

Operated by The University of Chicago for The United States Department of Energy

2. Other Compounds. The other compounds missed in the QB1 sample were all below the confidence intervals. We have reviewed the EPA's report of our QB score, searched our records, conducted some experiments in the laboratory, and discussed the QB results with EMSL-LV staff as well as with the other DOE laboratories. Based on the information obtained, we believe that the problem is poor extraction efficiency. It is interesting to note that several other laboratories missed a similar suite of compounds also on the low side. All of the DOE laboratories that missed these compounds used separatory funnel extractions.

Corrective Action(s):

1. N-Nitrosodiphenylamine (NNDPA). We will not utilize the mixed EPA standard in future determinations of NNDPA. A separate standard will be prepared for the quantitation.

2. Other Compounds

   In order to improve extraction efficiency, we will monitor the extraction personnel to ensure that all extractions are done for at least the full required two minutes. We are also considering implementing continuous liquid-liquid extractors if sufficient space can be identified to set them up.

C. Pesticides/PCBs

Identification of Problem(s): No problems identified. All compounds were within the quantitation confidence intervals.

Corrective Action(s): No corrective action(s) required.

I trust you will find that our Organic Performance Evaluation Study score and our corrective action response are in accord with the DOE Environmental Survey's Action Plan for quality assurance audits. Should you have questions or comments regarding these results or our response to them, please call me at FTS 972-3490, or the ACL Organic Analysis Group Leader, Mitch Erickson, at FTS 972-7772.

Sincerely,

Peter C. Lindahl
Analytical Chemistry Laboratory
Chemical Technology Division

PCL/vaa

cc: M. Steindler (2)
P. Nelson
D. Green
M. Erickson
A. Boparai
J. Demirgian
F. Martino
E. Palys
R. Scott - DOE
A. Crockett - INEL
H. Vincent - EMSL-LV
DES File

ARGONNE NATIONAL LABORATORY
9700 South Cass Avenue, Argonne, Illinois 60439

April 6, 1989

Mr. Robert Fitts
Program Manager
Oak Ridge Environmental Survey
Program
Environmental Sciences Division
Oak Ridge National Laboratory
P.O. Box 2008
Oak Ridge, TN 37831

Dear Bob,

Per Renee Tucker's letter of March 6, 1989, I am sending you a copy of the SOP that I have been using to determine the Oak Ridge organic data usability.

I trust this is what you need.

Sincerely,

Pete

Peter C. Lindahl
Analytical Chemistry Laboratory
Chemical Technology Division

PCL:amb

Enclosure NOTE: The enclosure for this letter was DRT-SOP-002 Rev 3 with attachments (see pages D-iii through D-lxii).

cc: w/o Encl.
D. Green
F. Martino
M. Steindler (2)
P. Nelson
R. Tucker (ORNL)

w/Encl.
DES File

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