

APPENDIX G
ANALYTICAL DATA QA/QC REPORT

DATA VALIDATION SUMMARY REPORT
for samples collected from
HAMMOND BOMBING AND GUNNERY RANGE
TANGIPAHOA PARISH, LOUISIANA

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INTRODUCTION

The following data validation summary report covers surface soil samples and groundwater samples collected from Hammond Bombing and Gunnery Range in Tangipahoa Parish, Louisiana from August 4 through 7, 2008. Samples were logged in under the following Sample Delivery Group (SDG):

56740

Surface soil samples were analyzed for explosives and metals. Water samples were analyzed for explosives, metals, and perchlorate. The table below details the requested parameters for each sample. The field quality control (QC) samples collected in this SDG included one set of field triplicate samples for soil matrix, one matrix spike/matrix spike duplicate (MS/MSD) pair for each of the two matrixes, one field duplicate (FD) for the water matrix. The laboratory QC included one set of laboratory triplicate samples for the soil matrix.

All soil samples were collected by Parsons in plastic bags with multi-incremental sampling (MIS) technique and shipped to APPL in one cooler without ice. All soil samples were dried and sieved by the laboratory by following the sample preparation sections of SW8330B. Processed soil samples were also ground by following method SW8330B for explosive analyses.

All water samples were also collected by Parsons. Perchlorate samples were filtered on-site by following DoD Perchlorate Handbook. Samples were shipped to APPL in two coolers with ice. Cooler temperature were 2.5°C and 3.0°C upon receiving, both were between the 2°C – 6°C range recommended by the PSAP. The chemical analyses were performed following the procedures outlined in the Standard Subcontract and the Project Sampling and Analysis Plan and Addendum (PSAP) for the Southwest Region.

SAMPLE IDs AND REQUESTED PARAMETERS

Sample ID	Matrix	Explosives and Lead	Perchlorate	Comments
HBGR-MRS01-DU1-SS-02-01	S	X		Field Triplicate
HBGR-MRS01-DU1-SS-02-02A	S	X		Field/Lab Triplicate
HBGR-MRS01-DU1-SS-02-02B	S	X		Field/Lab Triplicate
HBGR-MRS01-DU1-SS-02-02C	S	X		Field/Lab Triplicate
HBGR-MRS01-DU1-SS-02-03	S	X		MS/MSD/Field Triplicate
HBGR-MRS02-DU2-SS-02-01	S	X		
HBGR-MRS03-DU3-SS-02-01	S	X		
HBGR-MRS04-DU4-SS-02-01	S	X		
HBGR-MRS05-DU5-SS-02-01	S	X		
HBGR-MRS05-DU6-SS-02-01	S	X		
HBGR-AOC-DU7-SS-02-01	S	X		
HBGR-RL-DU8-SS-02-01	S	X		Ambient sample
HBGR-GW-02	W	X	X	
HBGR-GW-03	W	X	X	
HBGR-GW-01	W	X	X	MS/MSD/ambient sample
HBGR-GW-04	W	X	X	FD of HBGR-GW-01/ambient sample

S = Soil; W = Water

EXTRACTION AND ANALYTICAL METHODS:

PARAMETER	MATRIX	EXTRACTION METHOD	ANALYTICAL METHOD	UNITS	DRY WT. VS. WET WT
Explosives	S	8330B	8330B	mg/kg	Dry Wt.
Explosives	W	3535A	8330B	µg/L	NA
ICP-AES	S	3050B	6010B	mg/kg	Dry Wt.
ICP-AES	W	3010A	6010B	µg/L	NA
Perchlorate	W	6850	6850	µg/L	NA

ICP/AES = Inductively Coupled Plasma/Atomic Emission Spectrometry

EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the Project Work Plan. Information reviewed in the data packages included sample results; field and laboratory quality control results; calibrations; case narratives; raw data; cooler receipt forms, and chain-of-custody (COC) forms. The analyses and findings presented in this report are based on the reviewed information, and whether guidelines in the Work Plan were met.

Due to the flagging requirements of the electronic data deliverable (EDD) software, Automatic Data Review (ADR), the following rules were applied for flagging the data:

If an analyte was detected in the method blank, the associated sample concentrations were examined. If the analyte was detected in a sample at a concentration similar to that found in the blank (five times the blank concentration for most analytes, or ten times the

blank concentration for common laboratory contaminants), the reporting limit for that analyte was raised to the detected level and the result was flagged “U” for that particular sample.

Analyte	LCS/MS/MSD Control Limits for Soil	LCS/MS/MSD Control Limits For Water	RPD (%) for Soil and Water
HMX	75-125%	80-115%	30
RDX	70-135%	50-160%	30
1,3,5-Trinitrobenzene	75-125%	65-140%	30
1,3-Dinitrobenzene	80-125%	45-160%	30
Nitrobenzene	75-125%	50-140%	30
Tetryl	10-150%	20-175%	30
Nitroglycerin	68-131%	71-126%	30
2,4,6-Trinitrotoluene	55-140%	50-145%	30
4-Amino-2,6-dinitrotoluene	80-125%	55-155%	30
2-Amino-4,6-dinitrotoluene	80-125%	50-155%	30
2,4-Dinitrotoluene	80-125%	60-135%	30
2,6-Dinitrotoluene	80-120%	60-135%	30
3-Nitrotoluene	75-120%	50-130%	30
PETN	69-132%	65-115%	30
2-Nitrotoluene	80-125%	45-135%	30
4-Nitrotoluene	75-125%	50-130%	30

For metals, the control limits for accuracy are 80-120% for the LCS, MS, and MSD. The precision control limit for the MS/MSD is $RPD \leq 20\%$.

For perchlorate, the control limits for LCS are 85-115% and for MS/MSD are 75-125%. The RPD requirement for the MS/MSD is $RPD \leq 20\%$.

The precision criteria for the field triplicate samples is $<30\%$ relative standard deviation (RSD) and for the lab triplicate samples is $<20\%$ RSD. If RSD exceeds the criteria, but less than 50%, all associated results are flagged with "J". If RSD greater than 50%, all associated results are flagged with "R".

The field duplicate criteria ($RPD \leq 40$ for water) was approved by Deborah Walker and Brian Jordan for the southwest region of the program.

EXPLOSIVES

General

The SDG consisted of twelve (12) soil samples and (4) groundwater samples. These samples were collected from August 4 through August 7, 2008, and were analyzed for the full list of explosives as specified in the Work Plan.

The explosives analyses were performed according to the USEPA SW846 Method 8330B. All samples in this SDG were analyzed following the procedures outlined in the laboratory Standard Operation Procedure (SOP) which was approved by USACE. All samples were prepared and analyzed within the holding time required by the method.

The explosives samples were extracted and analyzed in two analytical batches, # 080814A for soil and #080813A for water, under one set of initial calibration curve (ICAL) for each of the two columns used in the analysis.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the laboratory control spike (LCS) samples, MS/MSD samples, and the surrogate spikes. Samples HBGR-MRS01-DU1-SS-02-03 and HBGR-GW-01 were designated for MS/MSD analyses on the COC.

All LCS, MS, MSD and surrogate spike recoveries were within acceptance criteria.

Precision

Precision was evaluated using the relative percent difference (RPD) obtained from the two sets of MS/MSD concentrations. Precision was further evaluated by comparing the field triplicates and lab triplicates results. Sample HBGR-MRS01-DU1-SS-02 was collected in triplicate and sample HBGR-MRS01-DU1-SS-02-02 was designated as the parent sample for lab triplicates on the COC.

All MS/MSD RPDs were within acceptance criteria for both water and soil matrixes.

All target analytes were non-detect in all field triplicates and lab triplicate samples. %RSD calculation was not applicable.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Work Plan;
- Comparing actual analytical procedures to those described in the Work Plan;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during sample analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the Work Plan. All samples were prepared and analyzed within the holding time required by the method and the Work Plan.

- All initial calibration criteria were met for both columns.
- All secondary source verification criteria were met on the primary column.
- All initial calibration verification (ICV) criteria were met.
- All continuing calibration verification (CCV) criteria were met.
- MDLs were developed within 12 months of sample analyses.

There were two method blanks associated with the explosives analyses in this SDG. All results were compliant.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All explosives results for the samples in this SDG were considered usable. The completeness for the explosives portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

METALS

General

The lead portion of this SDG consisted of twelve (12) soil samples and four (4) water samples. The samples were collected from August 4 through August 7, 2008 and analyzed for aluminum, antimony, chromium, copper, lead and zinc. All soil samples were dried and sieved prior to digestion, so all metal results were reported as dry weight.

The metal analyses were performed using USEPA SW846 Method 6010B. The samples were analyzed following the procedures outlined in the Work Plan. All samples were prepared and analyzed within the holding time required by the method and the Work Plan.

The samples for metal analyses were digested in two analytical batches, #080815A for the soil batch and #080812A for the water batch. The samples were analyzed under two sets of ICAL.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample, LCS duplicate (LCSD), and the MS/MSD samples. Samples HBGR-MRS01-DU1-SS-02-03 and HBGR-GW-01 were designated for MS/MSD analyses on the COC.

All LCS and LCSD recoveries were within acceptance criteria for both matrixes.

The non-compliant MS/MSD recoveries for the water pair are listed below:

HBGR-GW-01

Metals	MS, %R	MSD, %R	Criteria, %R
Lead	75	78	80 - 120
Zinc	138	146	

“J” flag was applied to the lead and zinc results of the parent sample.

The non-compliant MD/MSD recoveries for the soil pair are listed below:

HBGR-MRS01-DU1-SS-02-03

Metals	MS, %R	MSD, %R	Criteria, %R
Aluminum	714	749	80 - 120
Antimony	64	60	
Chromium	68	68	
Copper	77	(80)	
Lead	60	61	
Zinc	62	63	

() indicates the %R was compliant.

The concentration of aluminum in the parent sample was significantly greater than the spiked amount, >10 times, which caused unusual %recoveries. “J” or “UJ” flags were applied to all parent sample results except copper which had minor exceedance in the MS analysis.

Precision

Precision was evaluated using the RPD obtained from the two sets of MS/MSD concentrations. Precision was further evaluated by comparing the field triplicate and lab triplicate lead results. Sample HBGR-MRS01-DU1-SS-02 was collected in triplicate and sample HBGR-MRS01-DU1-SS-02-02 was designated as the parent sample for lab triplicates on the COC.

The MS/MSD RPD met acceptance criteria for both matrixes.

The percent RSDs for the laboratory triplicate samples are listed below:

HBGR-MRS01-DU1-SS-02-02

Metal	A (mg/kg)	B (mg/kg)	C (mg/kg)	%RSD	Criteria
Aluminum	6050	5160	6300	10	<20%RSD
Chromium	7.1	8.8	7.9	11	
Copper	3.4	3.4	3.3	1.7	
Lead	6.3	6.1	6.3	1.9	
Zinc	11	10	12	9.1	

The percent RSDs for the field triplicate samples are listed below:

HBGR-MRS01-DU1-SS-02

Metal	-01 (mg/kg)	-02 (mg/kg)	-03 (mg/kg)	%RSD	Criteria
Aluminum	6430	6050	6020	3.7	<30%RSD
Chromium	8.3	7.1	8.6	9.9	
Copper	3.6	3.4	3.5	2.9	
Lead	6.3	6.3	8.4	17	
Zinc	11	11	11	0	

HBGR-MRS01-GW-01

Metal	Parent (µg/L)	FD (µg/L)	%RPD	Criteria
Copper	18	17	5.7	<40%RPD
Zinc	431	474	9.5	

RSD and RPD calculations are only applicable when all triplicate or duplicate results were greater than PQL.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Work Plan;
- Comparing actual analytical procedures to those described in the Work Plan;
- Evaluating preservation and holding times; and
- Examining laboratory blanks for cross contamination of samples during sample analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the Work Plan. The samples were prepared and analyzed within the holding times required by the method.

- All instrument initial calibration criteria were met.
- All metals met criteria in the RL check standards.
- All second source criteria were met. Both ICVs were prepared with a secondary source.
- All CCV criteria were met.
- All interference check (ICSA/ICSAB) criteria were met.
- A dilution test (DT) was performed with sample HBGR-MRS01-DU1-SS-02-03 for the soil batch. The DT was applicable for aluminum, chromium and lead, since only these three metals were detected greater than 50 times the MDL in the parent sample.

Metals	%D	Criteria, %D
Aluminum	36	≤10
Chromium	37	
Lead	45	

- A post digestion spike (PDS) was performed on the same sample as the DT.

Metals	%R	Criteria, %R
Aluminum	123	

Antimony	29	75 - 125
Chromium	37	
Copper	39	
Lead	35	
Zinc	34	

“J” or “UJ” were applied to antimony, chromium, copper, lead and zinc results of all soil samples in this SDG.

- A dilution test (DT) was performed with sample HBGR-GW-01 for the water batch. The DT was applicable for zinc, since only zinc was detected greater than 50 times the MDL in the parent sample.

Metals	%D	Criteria, %D
Zinc	24	≤10

- A post digestion spike (PDS) was performed on the same sample as the DT.

Metals	%R	Criteria, %R
Aluminum	94	75 - 125
Antimony	91	
Chromium	97	
Copper	92	
Lead	90	
Zinc	85	

There were one method blank and several calibration blanks associated with the lead analyses in this SDG. All blanks were compliant.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All metal results for the samples in this SDG were considered usable. Therefore, the completeness for the metal portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

PERCHLORATE

General

The perchlorate portion of this SDG consisted of four (4) surface water samples. The samples were collected on August 6 and 7, 2008 and were analyzed for perchlorate as specified in the Work Plan.

The perchlorate analyses were performed according to the procedures outlined in the laboratory Standard Operation Procedure (SOP). All samples were prepared and analyzed within the holding time required by the method SW6850.

The perchlorate analyses were performed in one analytical batch (#080812A) under a single ICAL.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample and MS/MSD samples. Sample HBGR-GW-01 was designated for MS/MSD analyses for perchlorate on the COC for this SDG.

All LCS and MS/MSD recoveries were within the control limits.

Precision

Precision was evaluated using the RPD obtained from the MS/MSD samples. Precision was further assessed by comparing the field duplicate analyte results. Sample HBGR-GW-04 was collected as a field duplicate of sample HBGR-GW-01.

The MS/MSD RPD was within acceptance criteria.

Perchlorate was not detected in both the parent and field duplicate samples.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Work Plan;
- Comparing actual analytical procedures to those described in the Work Plan;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the Work Plan. All samples were prepared and analyzed within the holding time required by the method and the Work Plan.

- All initial calibration criteria were met.
- All secondary source verification criteria were met.
- All initial and continuing calibration verification criteria were met.
- The interference check sample met the method criteria.
- All Perchlorate 83/85 ratios of the spiked sample or standard solution met the 2.3 – 3.8 requirement of DoD Perchlorate Handbook.
- The MDL study for water was conducted within 12 months of sample analyses.

One method blank was associated with this SDG. The method blank was free of perchlorate.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All perchlorate results for the samples in this SDG were considered usable. Thus, the completeness for the perchlorate portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

COMPARABILITY

All data was generated using contract-specific standard methods and reported with known data quality, type of analysis, units, etc.

DATA USABILITY

All calculations were spot checked and verified. All data in this SDG are considered usable for the purposes of this project.