APPENDIX K

DATA QUALITY CONTROL SUMMARY REPORT

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Quality Control Summary Report

Phase II Remedial Investigation of Demolition Area 2

at the
Ravenna Army Ammunition Plant
Ravenna, Ohio

January 2003

QUALITY CONTROL SUMMARY REPORT
Phase II Remedial Investigation of Open Demolition Area #2
Ravenna Army Ammunition Plant
Ravenna, Ohio
JANUARY 2003

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1.0 INTRODUCTION

This Quality Control Summary Report (QCSR) covers the field and laboratory work performed during sampling events at the Ravenna Army Ammunition Plant (RAAP) Demolition Area 2 conducted during July through September 2002. Soil, sediment, surface water and groundwater were sampled for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), pesticides, polychlorinated biphenyls (PCBs), explosive compounds, metals, and miscellaneous chemical species such as sulfide, hexavalent chromium, nitrate/nitrite nitrogen, total cyanide, and total organic carbon. Samples referenced in Table 1.1 of the *Part II Quality Assurance Project Plan Addendum for Phase II Investigations of the Demolition Area 2, January 2002* were collected by SpecPro Incorporated field personnel. GPL Laboratories, 202 Perry Parkway, Gaithersburg, MD 20877, performed all analytical work.

Verification of field and laboratory results described in this QCSR was conducted under the guidance provided by the facility-wide *Quality Assurance Project Plan (QAPP) for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio, March, 2001*, and *Part II Quality Assurance Project Plan Addendum for Phase II Investigations of the Demolition Area 2, January 2002.* Where required, the USACE *Shell Document for Analytical Chemistry Requirements (USACE 1998)* was used as a secondary reference. The topics covered include:

- The conformance of the participating laboratory to Quality Control (QC) procedures described in the referenced QAPPs
- An evaluation of the quality of the data and
- All rejected data.

The following tables are located at the end of this report as appendices:

- Appendix A contains four tables.
  - Table A-1 contains primary and duplicate field sample locations with the corresponding work order numbers.
  - Table A-2 contains split sample locations with the corresponding work order numbers.
  - Table A-3 presents the RPD results of the duplicates for those samples for which all requested methods were analyzed.
  - Table A-4 presents the RPD results for additional samples for which only metals and explosives were analyzed.
- Project Quantitation Limit (PQL) goals and laboratory Method Reporting Limits (MRL) are summarized in Appendix B.

2.0 FIELD DATA VERIFICATION

Daily Quality Control Reports were completed by the SpecPro Project Manager. These reports, along with other field-generated documents such as sampling logs, boring logs, daily health and safety summaries, daily safety inspections, equipment calibration and maintenance logs, and sample management logs are maintained as part of the project files and are available for review upon request.

3.0 LABORATORY DATA VERIFICATION

The laboratory submitted several data packages consisting of calibration and QC information for each method within a Sample Delivery Group (SDG). The data packages were reviewed for each method for adherence to QAPP requirements as stated above and were evaluated for calibration, calibration verification, blank contamination, recoveries of laboratory control samples (LCS) and matrix spike/matrix spike duplicate (MS/MSD), sample duplicates, and conformance to project reporting limits. For organic analyses, instrument tuning, internal standard (IS) performance and surrogate recoveries were also evaluated. For metals, interference checks, dilution tests, and post-digestion recoveries were also evaluated.

3.1 GENERAL FINDINGS

Unless addressed specifically in the summaries for each analytical method reviewed below, preservation, the sample custody logs, preparation, extraction and cleanup logs, analysis logs, sample identification, and holding times were within acceptance criteria and met method requirements. Calibration and quality control parameters for all methods were found acceptable. All exceptions are discussed in the sections below.

High concentrations of metal analytes, hexavalent chromium, and mercury required occasional sample dilutions prior to analysis to maintain results within calibration range. PQLs were not adversely impacted by sample dilution.

Manual integration was performed for some analytes for VOC, pesticides, and explosive compounds. The rationale provided in the case narratives based the need for manual integration on improper integration performed by the software. In most cases, the adjustments were made on low-concentration standards and QC samples where concentrations were near the limit of sensitivity. The laboratory submitted software-produced EICP chromatograms and corresponding manually integrated chromatograms. The adjustments were properly executed and consistent with the intent of the LCG guidance on manual integration.

3.2 PROJECT QUANTITATION LEVELS

In general, the laboratory was able to achieve the PQLs specified in the QAPP. However, Method Reporting Limit (MRL) check standards were typically analyzed at the beginning of a sequence, and not repeated either at the end of the sequence or every 12 hours as required by the LCG for most analytical methods.

A comparison of the laboratory PQLs and the project-specific PQLs is presented in Appendix B. Prior to the beginning of the project, the laboratory was granted some PQL variances because of the inability of the laboratory to achieve QAPP specified limits.
The following non-conformances were also noted:

- The laboratory reporting limits for PAH analytes in the soil matrix were higher than the QAPP method SW8270 PQLs. Soil PQLs are 50 µg/kg while laboratory MRLs were in the 300 to 400 µg/kg range. It must be noted that the laboratory reporting limits are comparable to the reporting limits specified in the LCG.
- The laboratory reporting limits for PCB-1221 and PCB-1242 in the aqueous matrix are routinely higher than the QAPP method SW8082 PQLs of 0.5 µg/L. However, the laboratory reporting limits generally met LCG requirements.
- Several metals in both water and solid matrices did not meet the PQLs and are identified in the table below.

Table 1. Non-Conforming Metals Reporting Limits

	Soil		Water	
	GPL MRL	QAPP	GPL MRL	QAPP
Element	mg/kg	PQL	µg/L	PQL
Al	NA	NA	120	100
Sb	0.6	0.5	10	5
As	0.75	0.5	12	5
Cd	NA	NA	1.2	1
Ca	35	10	600	100
Pb	0.35	0.3	6	3
Hg	NA	NA	0.35	0.2
Se	0.65	0.5	14	5
Na	50	20	800	200
Tl	1.5	0.2	10	2

NA = GPL MRL met QAPP requirements

Overall, the laboratory met PQL requirements. The exceptions noted above are discussed under the respective method evaluations.

3.3 FIELD DUPLICATES

Field duplicate samples were collected for each matrix under investigation and analyzed for all target analytes. Additional soil duplicate samples were collected and analyzed for metal and explosive analytes. Appendix A presents two tables, A-1 and A-2, one listing primary and duplicate field sample identifications and another listing split sample identifications. The RPDs were calculated where applicable and the results are presented in Appendix A, Table A-3 and A-4. The RPDs were not calculated where one of the analytical results was non-detect, and this event is indicated by an * in the table. Where the RPD exceeded QAPP acceptance criteria, 30% for waters or 50% for soils and sediments, the word Fail qualifies the listed RPD, and no sample results were qualified.

3.4 SPLIT SAMPLES

Field samples were divided between GPL and another laboratory to evaluate analytical quality. Identification of the split field samples and the GPL work order numbers where the associated analytical results may be found are listed in Table A-2. No evaluation of inter-laboratory precision was made because analytical data from the second laboratory was not provided.

4.0 VOLATILE ORGANIC COMPOUNDS SW8260

Field and QC samples were submitted in 11 SDGs containing water samples and 6 SDGs containing soil and sediment samples.

Calibrations were generally acceptable and followed method requirements. Instrument tuning met requirements. Where the percent relative standard deviation (%RSD) failed to meet the required 15% limit for an analyte, positive results should be qualified estimated. The initial calibration (ICAL) failed %RSD acceptance criteria for acetone, methylene chloride, and 2-butanone in several SDGs. For SDG 207070, all positive acetone results and nine positive results for 2-butanone should be qualified estimated. For samples in SDG 207050, 207058, 207212, 207133, 207158, 207121, 207194, and 208002 positive results for methylene chloride should be qualified estimated.

Where the ICAL %RSD fails acceptance criteria, non-detect results should be rejected according to the LCG. Table 2, Rejected Results for Soil/Sediment Samples, and Table 3, Rejected Results for Surface and Groundwater, list specific sample numbers and analytes that should be rejected.

Where the continuing calibration verification (CCV) fails to meet the required 20% limit for an analyte, non-detect results should be rejected according to the LCG. The rejected results are also listed Tables 2 and 3.

Internal standard area counts for 1,4-difluorobenzene, chlorobenzene-d5, and fluorobenzene were slightly below 50% of the associated mid-point standard for samples DA2550540689-SO and DA2550620705-SO and the re-analyses. Internal standard area counts for chlorobenzene-d5 were slightly below 50% of the associated mid-point standard for sample DA2550770735-SO and its reanalysis. Target analytes associated with the internal standards in these three samples should be qualified as estimated.

Method blanks were contaminated above ½ the MRL with acetone and/or methylene chloride. Trip Blanks contained carbon disulfide as well. Sample results should be qualified B for common laboratory contaminants less than ten times the amount in the blank and less than five times the amount in the blank for other contaminants according to the LCG criterion.

LCS recoveries were generally acceptable. For SDG 207070, LCS recoveries were within acceptance limits except for acetone, carbon disulfide, and 2-hexanone in one LCS. Results for these analytes were already qualified for other QC criteria. For SDG 207050 and 207058, LCS recoveries were within acceptance limits except for acetone, methylene chloride. Results for acetone and methylene chloride should be qualified estimated for these two SDGs.

Table 2. Rejected Results for Soil/Sediment Samples

SDG	Sample Number	Analyte	Type	%RSD/%D	Date Analyzed
207070	DA250101-0776SD	Bromomethane	ICAL	30.4	4/29/02
	DA250101-0849SD	Chloroethane		20.5	
	DA250099-0774SD*	Carbon disulfide		27.9	
	DA250098-0773SD*	cis-1,3-Dichloropropene		19.1	
	DA250103-0778SD	trans-1,3-Dichloropropene		24.6	
	DA250096-0771SD	4-Methyl-2-pentanone		15.5	
	DA250102-0777SD	2-Hexanone		23.9	
	DA250094-0769SD	Dibromochloromethane		17.1	
	DA250095-0770SD	Bromoform		22.6	
	DA250097-0772SD				
	DA250084-0750SD				
207133	DA2SD100-0775SD				
207070	DA2SD097-0772SD	Trichloroethene	CCV	25.0	7/16/02
	DA2SD096-0771SD				
	DA2SD102-0777SD				
	DA2SD094-0769SD				
	DA2SD095-0770SD				
	DA2SD100-0775SD				
	DA2SD098-0773SD				
207158	DA255-077-0735-S0	Bromomethane	ICAL	16.2	7/12/02
	DA250-068-0718-S0	Methylene Chloride		16.8	
		cis-1,3-Dichloropropene		19.2	
		trans-1,3-Dichloropropene		22.5	
	DA250-068-0718-S0	Bromomethane	CCV	20.6	7/24/02
	DA255-077-0735-S0	Bromomethane	CCV	21.8	8/02/02
		Carbon disulfide		24.6	
207121	DA255-0390659-S0	Bromomethane	ICAL	16.2	7/12/02
	DA2MW1040807-S0	Methylene Chloride		16.8	
	DA2MW1040808-S0	cis-1,3-Dichloropropene		19.2	
	DA255-0360653-S0	trans-1,3-Dichloropropene		22.5	
	DA255-0360850-S0	Dibromochloromethane	ICV	16.1	
		1,1,2-Trichloroethane		-22.6	
207194	DA250-044-0670-SO	Bromomethane	ICAL	16.2	7/12/02
	DA250-074-0730-SO	cis-1,3-Dichloropropene		19.2	
	DA255-086-0753-SO	trans-1,3-Dichloropropene		22.5	
	DA250-059-0700-SO	1,1,2-Trichloroethane	ICV	-22.6	
208002	DA255-062-0705-SO				8/02/02
	DA255-054-0689-SO	Carbon disulfide	MRL	58	
	DA250-056-0694-SO				7/12/02

*Bromomethane results qualified J for these samples: DA2SD099-0774SD and DA2SD098-0773SD

Table 3. Rejected Results for Surface and Groundwater Samples

SDG	Sample Number	Analyte	Type	%RSD/%D	Date Analyzed
207050	DA2SW-1020787-SW	Acetone	CCV	-71	7/19/02
207050	DA2SW-1020787-SW	Bromomethane	ICAL	16.2	
		Methylene Chloride		16.8	
207058	DA2-SW0950779SW	cis-1,3-Dichloropropene		19.2	7/12/02
	DA2-SW0990847SW	trans-1,3-Dichloropropene		22.5	
	DA2-SW0990783SW	Dibromochloromethane		16.1	
		1,1,2-Trichloroethane	ICV	-22.6	
209067	DA2SW0990784SW				
	DA2SW0950780SW				
	DA2SW1130800GW				
209033	DA21120799GW	Acetone		21.3	
		2-Butanone	ICAL	18.5	9/13/02
	DA2MW1040791GW	2-Hexanone		25.8	
	DA2MWDET10873GW				
	DA2MWDET10801GW				
	DA2MWDET40804GW				
		Acetone	ICAL	30.8	
		Bromomethane		26.1	
208195	WBGMW0120805GW	1,1-Dichloroethene		16.9	
		1,2-Dichloroethane		16.6	8/29/02
209005	WBGMW0130806GW	Tetrachloroethene		15.3	
		Toluene		15.3	
		Xylenes		15.8	
		Chloromethane	ICV	24.1	

For soil and sediment samples, MS/MSD recoveries for acetone, bromomethane, 2-butanone, were slightly outside of control limits. For aqueous samples, MS/MSD recoveries for acetone, bromomethane, carbon disulfide, trans-1,3-dichloropropene, 4-methyl-2-pentanone, 2-hexanone, and 2-butanone were slightly outside of control limits. There was no significant impact on data usability.

Because of poor MRL performance, according LCG guidance, results for bromomethane and carbon tetrachloride should be qualified estimated in samples DA2SW0990784SW, DA2SW0950780SW, DA2SW1130800GW, and DA21120799GW for SDG 209067. Also, results for carbon disulfide, bromoform, and cis-1,3-dichloropropene should be qualified estimated in samples DA2SW-1020787-SW, DA2-SW0950779SW, DA2-SW0990847SW, and DA2-SW0990783SW for SDG 207050 and 207058.

With the exceptions noted above, the data are considered to be technically sound and usable.

5.0 SEMIVOLATILE ORGANIC COMPOUNDS SW8270

Field and QC samples were submitted in 11 SDGs containing water samples and 6 SDGs containing soil and sediment samples.

Calibration and calibration verifications were generally acceptable and followed method requirements. Instrument tuning and internal standard performance met requirements except

where noted below. No MRL analysis results were identified or provided for SVOC reporting limit support. Where acceptance criteria were not met for ICAL or CCV, non-detect results should be rejected. Rejected data for soil and sediment samples are listed in Table 4 and those for aqueous samples are listed in Table 5.

For SDG 207194, positive results should be qualified estimated for benzoic acid, hexachlorocyclopentadiene, 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol, pentachlorophenol, 3,3'-dichlorobenzidine, benzoic acid, and benzo [g,h,i] perylene because of a continuing calibration percent difference (%D) exceeding 20%, providing a positive bias.

Internal standard (IS) perylene-d12 exceeded the lower control limit in the analysis of blank 56808 and sample DA2MW1070794GW. Results for dibenz (a,h)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, associated with this IS, in DA2MW1070794GW should be rejected.

Soil LCS recoveries of all analytes were within the specified control limits except for recoveries slightly outside of control limits for 2,4-dinitrophenol and 4-nitroaniline. All results for these two analytes for samples DA250-0440670-S0, DA250-0740730-S0, DA255-0860753-S0, DA250-0590700-S0 should be qualified estimated.

Aqueous LCS recoveries of all analytes were within the specified control limits except for recoveries of hexachlorocyclopentadiene and 3,3'-dichlorobenzidine, which were below 30% for several SDGs (Table 4). Results for these two analytes should also be rejected because of calibration issues in the associated SDGs. Di-n-octylphthalate recoveries exceeded QAPP requirements and results should be qualified UJ for samples DA2MW1110798GW, DA2MW1100797GW, DA2MW1070794GW, and DA2MW1070872GW.

The case narrative states that a separate analysis was performed for 3 & 4-methylphenol. Calibration, calibration verification, and internal standard performance were acceptable. It is most likely that the 3 & 4-methylphenol analysis was performed on a separate portion of the BNA extract. Although analysis data sheets for 3 & 4-methylphenol do not include results for the surrogate, surrogate recoveries for the BNA analysis were acceptable. The results for 3 & 4-methylphenol are considered to be usable.

MS/MSD recoveries were within acceptance criteria.

Results for DA2-SW0950779SW (GPL 207058-001), DA2-SW0990847SW (GPL 207058-002), and DA2SW-1020787-SW (GPL 207050-001) were reported without quality control data and all results should be rejected. Results for equipment rinse sample DA2MWER should be rejected because it was analyzed after the holding time.

For SDG 207070, the extraction log shows identical sample weights for all samples but reporting limits for the individual samples vary by as much as 50% for a given analyte and do not correspond with correction for sample moisture.

With the exceptions noted above, the data are considered to be technically sound and usable.

Table 4. Rejected Results for Surface and Groundwater Samples

SDG	Sample Number	Analyte	Type	%RSD/%D	Date Analyzed
209067	DA2SW102SW0788SW	bis (2-Chloroethyl) ether	ICAL	18.6	9/17/02
209033	DA2SW1080795GW	1,2-Dichlorobenzene		16.4	
	DA2SW0990784SW	Hexachlorocyclopentadiene 3,3'-Dichlorobenzidine Indeno [1,2,3-cd] pyrene Dibenz [a,h] anthracene Benzo [g,h,i] perylene		18.1	
	DA2SW0950780SW			22.6	
209017	DA2MW1040791GW			15.5	
	DA2MWDET10873GW			16.3	
	DA2MWDET10801GW			16.0	
209005	DA2MWDET20802GW			19.8	
208195	DA2MWDET30803GW				
209051	WBGMW0130806GW				
	WBGMW0120805GW				
209080	DA2MW1050792GW	2,4-Dinitrophenol.			
	DA2MW1060793GW				
209088	DA2MW1090796GW				
	DA2MW1130800GW				
	DA2MW1120799GW				
	DA2MW1110798GW				
	DA2MW1100797GW				
	DA2MW1070794GW				
	DA2MW1070872GW				

Table 5. Rejected Results for Soil/Sediment Samples

SDG	Sample Number	Analyte	Type	%RSD/%D	Date Analyzed
207070	DA2SD101-0776SD DA2SD101-0849SD DA2SD099-0774SD DA2SD098-0773SD DA2SD103-0778SD DA2SD097-0772SD DA2SD096-0771SD DA2SD102-0777SD DA2SD094-0769SD DA2SD095-0770SD DA2SD100-0775SD	1,2-Dichlorobenzene 2,4-Dinitrophenol	ICAL	15.9 15.5	7/25/02
207194	DA250-0440670-S0 DA250-0740730-S0 DA255-0860753-S0 DA250-0590700-S0	Hexachlorocyclopentadiene 4,6-Dinitro-2-methylphenol 2,4-Dinitrophenol	ICAL	20.7 15.7 25.3 16.3	8/19/02
208002	DA255-0620705-S0 DA255-0540689-S0 DA250-0560634-S0	4-Chloroaniline	CCV	-20.1	8/19/02
207133	DA250-0840750-S0	1,2-Dichlorobenzene 2,4-Dinitrophenol	ICAL	15.9 15.5	7/25/02
207121	DA255-0390659-S0 DA2MW1040807-S0 DA2MW1040808-S0 DA255-0360653-S0 DA255-0360850-S0	4-Nitrophenol	CCV	-24.9	7/31/02
207158	DA250-068-0718-S0 DA255-077-0735-S0	Hexachlorocyclopentadiene 4,6-Dinitro-2-methylphenol 2,4-Dinitrophenol 3,3'-Dichlorobenzidine	ICAL	24.6 18.8 23.2 16.3	8/15/02

6.0 PESTICIDES/PCBS SW8081/ SW8082

Field and QC samples were submitted in 11 SDGs containing water samples and 6 SDGs containing soil and sediment samples.

Calibration and calibration verifications were generally acceptable and followed method requirements. Methoxychlor, heptachlor, and 4,4'-DDT results for SDG 208002, 209017, and 209005 should be rejected because of low recoveries in the calibration verification. Associated calibration and method blanks were free of contamination. Rejected values are listed in Table 6.

Table 6. Rejected Results Required by Calibration Verification Failure

SDG	Sample Number	Analyte	Analysis	%D Front/Rear Column	Date Analyzed
208002	DA255-062-0705-SO DA255-054-0689-SO DA250-056-0694-SO	Methoxychlor 4,4'-DDT	CCV L25829	Not provided	8/22/02
209005	WBGMW0130806GW	Heptachlor	CCV L26223	-26.3/35.4	9/9/02
209017	DA2MWDET20802GW DA2MWDET30803GW	Heptachlor	CCV L26252	-45.9/31.9	9/10/02

LCS recoveries of all analytes were within the specified control limits except for occasional recoveries slightly outside of control limits. However, for SDGs 209080, 209088, 209033, 209080 and 208195, delta-BHC recovery was significantly below acceptance criteria and results for this analyte should be qualified R. MS/MSD recoveries were acceptable.

Surrogate recoveries were generally acceptable. However, the surrogate recovery reported for decachlorobiphenyl in sample DA2-SW0990783SW and tetrachloro-m-xylene recovery in sample DA2SD098-0773SD were below the control limit. PCB analytes associated with these surrogate should be qualified UJ according to LCG.

Breakdown, which exceeded the LCG acceptance criterion of 15%, was reported for several SDGs, requiring rejection of associated results as shown in Table 7.

Table 7. Rejected Results Required by Breakdown Failure

SDG	Sample Numbers	Analyte
207121, 207133, 209005, 209051, 209080, 208195, 209088, 209017, 209033	All samples	Endrin
207050, 207070, 207058, 209067	All samples	Endrin, 4,4'-DDT
207212	All samples	4,4'-DDT

With the exceptions noted above, the data are considered to be technically sound and usable.

7.0 EXPLOSIVES AND PROPELLANTS SW8330

Field and QC samples were submitted in 11 SDGs containing water samples and 9 SDGs containing soil and sediment samples.

Target analyte 2,6-dinitrotoluene was not included in any QC samples. This item was discussed in the respective case narratives based on co-elution of this analyte with 2,4-dinitrotoluene.

Calibration and calibration verifications were acceptable and followed method requirements. Associated calibration and method blanks were free of contamination.

Several analytes, as listed in Table 8, failed second-column confirmation analysis criteria of ±40% and were qualified J.

Table 8. Second-Column Confirmation Analysis Results Requiring Qualification as Estimated

SDG	Sample Number	Analyte
207194	DA2500440670SO	2,4,6-trinitrotoluene RDX
	DA2500860754SO	2,4,6-trinitrotoluene 4-amino-2,6-dinitrotoluene
207158	DA2550670715SO DA2550680717SO	HMX
	DA2500350652SO	2-nitrotoluene,
	DA2500670716SO	2,4-dinitrotoluene
	DA2500670716SO DA2500350652SO DA2500720726SO DA2500730728SO	2,4,6-trinitrotoluene
207196	DA255-0390658SO	
207158	DA2500720726SO	RDX
208036	DA250-0820746-SO DA255-1140870-SO	
207121	DA250-0470676-SO	4-amino-2,6-dinitrotoluene

For method 8330 including the analysis of nitroglycerine, 4-nitroaniline was used as the surrogate. The recoveries of the surrogate ranged from 0% to 1650% both in calibration standards and samples. According to LCG guidance, samples with surrogate recoveries below 10% should be rejected.

No surrogate results were reported for nitroguanidine. The laboratory stated that nitroguanidine was direct injected and there is typically no surrogate added when the direct injection method is used.

MS/MSD and LCS recoveries met QAPP requirements.

With the exceptions noted above, the data are considered to be technically sound and usable.

8.0 METALS SW6010 AND MERCURY SW7470/SW7471

Field and QC samples were submitted in 12 SDGs containing water samples and 9 SDGs containing soil and sediment samples.

While the initial calibration was acceptable, only a blank and one standard were used for calcium, magnesium, sodium and potassium. For the balance of the metals, a blank and two standards were used for calibration. The QAPP Addendum calls for documentation of acceptable calibration using three standards and a blank. Continuing calibration verifications were performed at the required frequencies.

Calibration and calibration verification performance were within acceptance criteria. Interference checks, dilution tests, and post-digestion recoveries were within acceptance criteria except where noted. The preparation blank frequently contained calcium, chromium, copper, sodium, and occasionally other target analytes above the MRL. The initial calibration blank was free of contamination, while continuing calibration blanks contained aluminum, iron, lead, sodium, thallium, magnesium, and occasionally other target analytes. Results for these analytes should be qualified B where positive values are less than 5 times the blank value in accordance with the LCG.

LCS recoveries of all analytes were within the specified control limits.

MS/MSD recoveries frequently were outside of control limits for antimony, arsenic, copper, magnesium, and potassium. However, post digestion spike recoveries were with acceptance limits. The matrix spike recoveries failed control limits for antimony, lead, potassium, and zinc for soil sample DA2550860753-SO. For this sample, native concentration for each was within four times the spike amount and each result should be qualified as estimated, JI, according to the LCG.

Most results for barium, cadmium, copper, lead, manganese, selenium, sodium, thallium, and zinc in ICSA interference check samples exceeded ± ½ the respective MRL. However, LCG guidance for this QC element is not definitive and no qualifiers were prescribed.

Preparation blank contamination with lead, zinc, and sodium was associated with SDG209067, 209080, and 207070. Results less than five times the blank value should be qualified as B in accordance with the LCG.

Table 9 lists rejected analyte results in various samples where the MRL recoveries were below 65% and the analytical results were non-detect.

Table 9. Metals Results Qualified as Rejected

SDG	Sample Number	Analyte	Criterion Failed
207070	DA2SD101-0849SD	Antimony	MRL
	All samples	Aluminum	MRL
207133	DA250-0840750-SO DA255-0850751-SO DA250-0850752-SO DA2MW1110835-SO DA2MW1110836-SO	Antimony	MRL
	All samples	Silver Vanadium	MRL
209067	DA2SW0990784SW DA2SW0950780SW DA2SW1130800GW DA21120799GW	Thallium	MRL

With the exceptions noted above, the data are considered to be technically sound and usable.

9.0 GENERAL CHEMISTRY (EPA 353.2 NITRATE NITROGEN, EPA 376.1 SULFIDE, IAAP NITROCELLULOSE, SW846 9014 CYANIDE, SW846 7196A HEXAVALENT CHROMIUM)

Calibrations for general chemistry methods were acceptable. Sulfide is a titrimetric method and data for the standardization of the titrant was provided. Subsequent continuing calibration verification standards confirmed that the analyses remained in control. Associated calibration and method blanks were free of contamination.

LCS (identified in laboratory reports as ICVs) recoveries for analytes were within the specified control limits. MS/MSD recoveries were within acceptance criteria.

Several sample dilutions were required because of the high concentrations of hexavalent chromium in the project matrix. Reported values accurately reflected target analyte concentrations in project samples.

The data are considered to be technically sound and usable.

10.0 QUALITY CONTROL PARAMETERS

10.1 ACCURACY

Accuracy is defined as the agreement of a measurement with an accepted reference or true value and was measured by the percent recovery of each analyte in the Laboratory Control Samples analyzed with each sample batch. Any rejection of analytical results based on non-conformant LCS recoveries is discussed under each method in previous sections of this report. The overall level of accuracy is considered to be acceptable.

10.2 PRECISION

Precision is defined as the agreement between a set of replicate measurements without consideration or knowledge of the true value. Precision was evaluated based on MS/MSD and field duplicate results where available. Any rejection of analytical results based on non-conformant MS/MSD RPDs are discussed under each method in previous sections of this report. Field duplicate samples were also analyzed and RPDs were calculated where applicable. This data is presented in Appendix A, Table A-3. Where there were RPD failures, they were noted as Fail in Table A-3.

The overall level of precision is considered to be acceptable.

10.3 COMPLETENESS

The estimated number of samples initially planned to address the investigative requirements of this project are listed in Table 4-1 of the QAPP Addendum. The numbers of samples collected for each method are summarized below in Table 10. Requirements for VOC, SVOC and pesticide results for soils and sediment were reduced because of changes in project requirements between the beginning of planning and the start of fieldwork.

Table 10. Completeness

Matrix	Samples Planned	Samples Collected	Percent Complete
Groundwater and Surface Water			
VOC	38	29	76
SVOC	35	29	83
Pesticides/PCBs	35	29	83
Explosives	35	29	83
Metals	35	29	83
General Chemistry	35	32	91
Soil and Sediment			
VOC	51	26	51
SVOC	47	26	55
Pesticides/PCBs	47	26	55
Explosives	110	166	151
Metals	165	166	101
General Chemistry	47	31	66

Table 11 summarizes the overall rejected results for all methods except the general chemistry methods. Soil and sediment VOCs and aqueous SVOCs had higher than 10% rejections. The overall percentage of acceptable results was 92.8%, meeting the project completeness goal of 90%.

Table 11. Summary of Rejected Results for All Methods Except the General Chemistry Methods

Media	Analysis Group	Rejected Results	Total Results	Percent Rejected
Soil	Metals	21	3720	0.6
	Volatile Organics	83	555	15.0
	Semivolatile Organics	54	990	5.4
	Pesticides/PCBs	12	435	2.8
	Explosives	170	2495	6.8
	Subtotal	340	8195	4.1
Sediment	Metals	12	261	4.5
	Volatile Organics	106	407	26.0
	Semivolatile Organics	22	726	3.0
	Pesticides/PCBs	22	319	6.9
	Explosives	22	187	11.8
	Subtotal	184	1900	9.7
Surface Water, Groundwater, And QC	Metals	4	648	0.6
	Volatile Organics	74	999	7.4
	Semivolatile Organics	371	1782	20.8
	Pesticides/PCBs	60	725	8.3
	Explosives	27	450	6.0
	Subtotal	536	4604	11.6
Project Totals		**1060**	**14699**	**7.2**

PCBs = polychlorinated biphenyls
QC = quality control

10.4 REPRESENTATIVENESS

Representativeness is the degree to which data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness was evaluated by comparing the results of the field duplicate pairs and conducting sampling in accordance with the work plan (QAPP) and relevant SOPs. Results for all analytes satisfied the field duplicate evaluation criteria and all sampling/analysis protocols were followed.

10.5 COMPARABILITY

Comparability expresses the confidence with which one data set can be compared to another. Comparability for this project could not be evaluated because of the absence of any previous data.

11.0 ELECTRONIC DATA DELIVERABLES (EDD)

The EDDs were reviewed for completeness and the following observations were made. Overall the EDDs were acceptable with the following exceptions:

- No calibration data or quality control data were included in the EDDs. However, all the data packages are presented in electronic format as well as hard copies. Calibration and quality control data are available in both CD-ROM and hard copy formats.
- The VOC and SVOC LCS analyzed with SDG 208002 contained only a short analyte list reported in the EDD, well under the target analyte list as required by the QAPP Addendum. However, the results for the whole target analyte list were reported in the hardcopy data package and CD-ROM.

APPENDIX A
TABLES

Table A-1 - Primary and Duplicate Field Sample Identification

Medium	Sample Location	Primary Sample #/ Duplicate #	VOC Work Order #	SVOC Work Order #	Explosives Work Order #	Propellants Work Order #	Pesticides/PCB Work Order #	Metals/Mercury Work Order #
Sediment	DA2-101	DA2SD1010776/ DA2SD1010849	207070	207070	207070	207070	207070	207070
Soil	DA2-034	DA2SS0340649/ DA2SS0340851	None	None	207196	None	None	207196
Soil	DA2-036	DA2SS0360653/ DA2SS0360850	207121	207121	207121	207121	207121	207121
Soil	DA2-037	DA2SS0370655/ DA2SS0370852	None	None	208036	None	None	208036
Soil	DA2-040	DA2SO0400662/ DA2SO0400854	None	None	207196	None	None	207196
Soil	DA2-044	DA2SS0440669/ DA2SS0440856	None	None	207194	None	None	207194
Soil	DA2-055	DA2SS0550691/ DA2SS0550855	None	None	208002	None	None	208002
Soil	DA2-057	DA2SO0570696/ DA2SO0570857	None	None	208001	None	None	208001
Soil	DA2-061	DA2SO0610704/ DA2SO0610863	None	None	208001	None	None	208001
Soil	DA2-070	DA2SO0700722/ DA2SO0700864	None	None	208001	None	None	208001
Soil	DA2-071	DA2SO0710724/ DA2SO0710865	None	None	208001	None	None	208001
Soil	DA2-081	DA2SS0810743/ DA2SS0810866	None	None	208001	None	None	208001
Soil	DA2-109	DA2MW1090827/ DA2MW1090859	None	None	207158	None	None	207158
Soil	DA2-109	DA2MW1090828/ DA2MW1090860	None	None	207158	None	None	207158
Soil	DA2-038	DA2SO0380658/ DA2SO0380852	None	None	207196	None	None	207196
Groundwater	DA2-DET-1	DA2MWDET10801GW/ DA2MWDET10873GW	209033	209033	209033	209033	209033	None
Groundwater	DA2-DET-1	DA2MWDET10801GF/ DA2MWDET10873GF	None	None	None	None	None	209033
Surface Water	DA2-099	DA2SW0990783/ DA2SW0990847	207058	207058	207058	207058	207058	207058

Table A-2 - Split Sample Identification

Medium	Sample Location	Primary/Split Sample #	VOC Work Order #	SVOC Work Order #	Explosives Work Order #	Propellants Work Order #	Pesticides/PCB Work Order #	Metals/Mercury Work Order #
Sediment	DA2-101	DA2SD1010776	207070	207070	207070	207070	207070	207070
Soil	DA2-038	DA2SO0380657	None	None	207196	None	None	207196
Soil	DA2-044	DA2SO0440670	207194	207194	207194	207194	207194	207194
Soil	DA2-046	DA2SO0460674	207196	207196	207196	207196	207196	207196
Soil	DA2-054	DA2SS0540689	208002	208002	208002	208002	208002	208002
Soil	DA2-056	DA2SS0560693	208002	208002	208002	208002	208002	208002
Soil	DA2-059	DA2SO0590700	207194	207194	207194	207194	207194	207194
Soil	DA2-062	DA2SS0620705	208002	208002	208002	208002	208002	208002
Soil	DA2-065	DA2SO0650712	None	None	208001	None	None	208001
Soil	DA2-069	DA2SO0690720	None	None	208001	None	None	208001
Soil	DA2-074	DA2SS0740729	207194	207194	207194	207194	207194	207194
Soil	DA2-083	DA2SS0830747	207196	207196	207196	207196	207196	207196
Soil	DA2-086	DA2SS0860753	207194	207194	207194	207194	207194	207194
Soil	DA2-113	DA2MW1130844	None	None	207196	None	None	207196
Soil	DA2-113	DA2MW1130843	None	None	207196	None	None	207196
Groundwater	DA2-113	DA2MW1130800GW	209067	209067	209067	209067	209067	None
Groundwater	DA2-113	DA2MW1130800GF	None	None	None	None	None	209067
Groundwater	WBG-013	WBGMW0130806GW	209005	209005	209005	209005	209005	None
Groundwater	WBG-013	WBGMW0130806GF	None	None	None	None	None	209005
Surface Water	DA2-099	DA2SW0990783	207058	207058	207058	207058	207058	207058

Table A-3 - Field Duplicate Comparison-Samples Analyzed for All Analytes

Analyte	DA2-SW0990847SW/ DA2-SW0990783SW Surface Water RPD	DA2MWDET10801GW/ DA2MWDET10873GW Groundwater RPD	DA2SD101-0776SD/ DA2SD101-0849SD Sediment RPD	DA255-0360653-S0/ DA255-0360850S0 Soil RPD
VOC	**207058**	**209033**	**207070**	**207121**
1,1,1-Trichloroethane	*	*	*	*
1,1,2,2-Tetrachloroethane	*	*	*	*
1,1,2-Trichloroethane	*	*	*	*
1,1-Dichloroethane	*	*	*	*
1,1-Dichloroethene	*	*	*	*
1,2-Dichloroethane	*	*	*	*
1,2-Dichloropropane	*	*	*	*
2-Butanone	*	*	*	*
2-Hexanone	*	*	*	*
4-Methyl-2-Pentanone	*	*	*	*
Acetone	15.6	*	12.8	Fail 85.7
Benzene	*	*	*	*
Bromochloromethane	*	*	*	*
Bromodichloromethane	*	*	*	*
Bromoform	*	*	*	*
Bromomethane	*	*	*	*
Carbon Disulfide	Fail 41	Fail 35.3	*	*
Carbon Tetrachloride	*	*	*	*
Chlorobenzene	*	*	*	*
Chloroethane	*	*	*	*
Chloroform	*	*	*	*
Chloromethane	*	*	*	*
cis-1,2-Dichloroethene	*	*	*	*
cis-1,3-Dichloropropene	*	*	*	*
Dibromochloromethane	*	*	*	*
Ethylbenzene	*	*	*	*
Ethylene Dibromide	*	*	*	*
m,p-Xylenes	*	*	*	*
Methylene Chloride	8.9	8.7	0	22.2
o-Xylene	*	*	*	*
Styrene	*	*	*	*
Tetrachloroethylene	*	*	*	*
Toluene	*	*	*	*
trans-1,2-dichloroethene	*	*	*	*
trans-1,3-dichloropropene	*	*	*	*
Trichloroethene	*	*	*	*
Vinyl Chloride	*	*	*	*
1,2,4-Trichlorobenzene	*	*	*	*
1,2-Dichlorobenzene	*	*	*	*
1,3-Dichlorobenzene	*	*	*	*
1,4-Dichlorobenzene	*	*	*	*
2,2-Oxybis(1-Chloropropane)	*	*	*	*
2,4,5-Trichlorophenol	*	*	*	*
2,4,6-Trichlorophenol	*	*	*	*
2,4-Dichlorophenol	*	*	*	*
2,4-Dimethylphenol	*	*	*	*
2,4-Dinitrophenol	*	*	*	*
2,4-Dinitrotoluene	*	*	*	*
2,6-Dinitrotoluene	*	*	*	*
2-Chloronaphthalene	*	*	*	*
2-Chlorophenol	*	*	*	*

Table A-3 - Field Duplicate Comparison-Samples Analyzed for All Analytes				
Analyte	**DA2-SW0990847SW/ DA2-SW0990783SW Surface Water RPD**	**DA2MWDET10801GW/ DA2MWDET10873GW Groundwater RPD**	**DA2SD101-0776SD/ DA2SD101-0849SD Sediment RPD**	**DA255-0360653-S0/ DA255-0360850S0 Soil RPD**
2-Methylnaphthalene	*	*	*	*
SVOC	**207058**	**209033**	**207070**	**207121**
2-methylphenol	*	*	*	*
2-Nitroaniline	*	*	*	*
2-Nitrophenol	*	*	*	*
3 & 4-Methylphenol	*	*	*	*
3,3-Dichlorobenzidine	*	*	*	*
3-Nitroaniline	*	*	*	*
4,6-dinitro-2-methyl phenol	*	*	*	*
4-Bromophenyl-phenylether	*	*	*	*
4-chloro-3-methylphenol	*	*	*	*
4-Chloroaniline	*	*	*	*
4-Chlorophenyl Phenyl Ether	*	*	*	*
4-Nitroaniline	*	*	*	*
4-Nitrophenol	*	*	*	*
Acenaphthene	*	*	*	*
Acenaphthylene	*	*	*	*
Anthracene	*	*	*	*
Benzo(a)anthracene	*	*	*	*
Benzo(a)pyrene	*	*	*	*
Benzo(b)fluoranthene	*	*	*	*
Benzo(g,h,i)perylene	*	*	*	*
Benzo(k)fluoranthene	*	*	*	*
Benzoic Acid	*	*	*	*
Benzyl Alcohol	*	*	*	*
Benzyl Butyl Phthalate	*	*	*	*
bis(2-chloroethoxy) methane	*	*	*	*
bis(2-chloroethyl) ether	*	*	*	*
bis(2-ethylhexyl) phthalate	*	*	*	*
Carbazole	*	*	*	*
Chrysene	*	*	*	*
Dibenz(a,h)Anthracene	*	*	*	*
Dibenzofuran	*	*	*	*
Diethyl Phthalate	*	*	*	*
Dimethyl Phthalate	*	*	*	*
di-n-Butyl Phthalate	*	Fail 157.7	*	*
di-n-Octyl Phthalate	*	*	*	*
Fluoranthene	*	*	*	*
Fluorene	*	*	*	*
Hexachlorobenzene	*	*	*	*
Hexachlorobutadiene	*	*	*	*
Hexachlorocyclopentadiene	*	*	*	*
Hexachloroethane	*	*	*	*
Indeno(1,2,3-c,d)Pyrene	*	*	*	*
Isophorone	*	*	*	*
Naphthalene	*	*	*	*
Nitrobenzene	*	*	*	*
n-Nitroso-di-n-Propylamine	*	*	*	*
n-Nitrosodiphenylamine	*	*	*	*
Pentachlorophenol	*	*	*	*
Phenanthrene	*	*	*	*
Phenol	*	*	*	*
Pyrene	*	*	*	*

Table A-3 - Field Duplicate Comparison-Samples Analyzed for All Analytes

Analyte	DA2-SW0990847SW/ DA2-SW0990783SW Surface Water RPD	DA2MWDET10801GW/ DA2MWDET10873GW Groundwater RPD	DA2SD101-0776SD/ DA2SD101-0849SD Sediment RPD	DA255-0360653-S0/ DA255-0360850S0 Soil RPD
Metals	**207058**	**209033**	**207070**	**207121**
Aluminum	13.1	Fail 136.6	3.1	1.3
Antimony	*	*	*	3.8
Arsenic	*	Fail 54.9	10	7.8
Barium	0.6	13	2.2	3.5
Beryllium	*	*	9.5	5.5
Cadmium	*	*	16	9.3
Calcium	0	0.1	4.7	1.8
Chromium	*	Fail 102.7	6.2	0
Cobalt	*	*	2.9	1.9
Copper	20.7	Fail 74.6	24.8	1.4
Iron	3.1	Fail 51.4	9.3	2
Lead	*	*	6	6.1
Magnesium	0.8	4.5	15.9	3
Manganese	0.6	6.9	9.4	5.3
Nickel	*	Fail 168.8	16.3	2.5
Potassium	3.1	1.8	4.6	2
Selenium	*	*	2.8	32.4
Silver	*	Fail 80	*	*
Sodium	0.2	3.6	48.5	6.6
Thallium	*	*	*	21.9
Vanadium	*	20	1.9	1
Zinc	*	7.9	15.8	2.7
Mercury	*	*	42.4	0
Pesticides				
4,4-DDD	*	*	*	*
4,4-DDE	*	*	*	*
4,4-DDT	*	*	*	*
Aldrin	*	*	*	*
Alpha-BHC	*	*	*	*
Alpha-Chlordane	*	*	*	*
Beta-BHC	*	*	*	*
Chlordane	*	*	*	*
Delta-BHC	*	*	*	*
Dieldrin	*	*	*	*
Endosulfan I	*	*	*	*
Endosulfan II	*	*	*	*
Endosulfan Sulfate	*	*	*	*
Endrin	*	*	*	*
Endrin Aldehyde	*	*	*	*
Endrin Ketone	*	*	*	*
Gamma-BHC (Lindane)	*	*	*	*
Gamma-Chlordane	*	*	*	*
Heptachlor	*	*	*	*
Heptachlor Epoxide	*	*	*	*
Methoxychlor	*	*	*	*
Toxaphene	*	*	*	*
PCB				
PCB-1016	*	*	*	*
PCB-1221	*	*	*	*
PCB-1232	*	*	*	*
PCB-1242	*	*	*	*
PCB-1248	*	*	*	*

Table A-3 - Field Duplicate Comparison-Samples Analyzed for All Analytes

Analyte	DA2-SW0990847SW/ DA2-SW0990783SW Surface Water RPD	DA2MWDET10801GW/ DA2MWDET10873GW Groundwater RPD	DA2SD101-0776SD/ DA2SD101-0849SD Sediment RPD	DA255-0360653-S0/ DA255-0360850S0 Soil RPD
PCB-1254	*	*	*	*
PCB-1260	*	*	*	*
Explosives	**207058**	**209033**	**207070**	**207121**
1,3,5-Trinitrobenzene	*	*	*	*
1,3-Dinitrobenzene	*	*	*	*
2,4,6-Trinitrotoluene	*	*	*	*
2,4-Dinitrotoluene	*	*	*	*
2,6-Dinitrotoluene	*	*	*	*
2-Amino-4,6-Dinitrotoluene	*	*	*	*
4-Amino-2,6-Dinitrotoluene	*	*	*	*
HMX	*	*	*	*
m-Nitrotoluene	*	*	*	*
Nitrobenzene	*	*	*	*
Nitroglycerine	*	*	*	*
o-Nitrotoluene	*	*	*	*
p-Nitrotoluene	*	*	*	*
RDX	*	*	*	*
Tetryl	*	*	*	*
Nitroguanidine	*	*	*	*
General Chemistry				
Nitrate/Nitrite	14	10.5	*	*
Sulfide	*	*	30.8	Fail 121.2
Nitrocellulose	*	3.6	*	*
Chromium, Hexavalent	*	*	Fail 93	*
Cyanide, Total	*	*	*	*

NA = Not analyzed

* = At least one result of the replicate pair was non-detect

Table A-4A - Field Duplicate Comparison-Samples Analyzed for Metals and Explosives							
Analytes	**DA2MW109-0827S0/ DA2MW109-0859S0 Soil RPD**	**DA2MW109-0828S0/ DA2MW109-0860S0 Soil RPD**	**DA255-044-0669SO/ DA255-044-0856SO Soil RPD**	**DA255-034-0649SO/ DA255-034-0851SO Soil RPD**	**DA250-038-0658SO/ DA255-038-0852SO Soil RPD**	**DA250-040-0662SO/ DA250-040-0854SO Soil RPD**	**DA255-081-0743SO/ DA255-081-0866SO Soil RPD**
Metals	**207158**	**207158**	**207194**	**207196**	**207196**	**207196**	**208001**
Aluminum	0	1	14.1	0	4.4	2.8	25
Antimony	Fail 72.5	4.7	20.4	0	0	4.1	9.1
Arsenic	7.3	7.5	7	27.6	0.8	23.8	16.8
Barium	3.3	23.8	31.6	27.2	18.8	4.2	11.3
Beryllium	1.6	0	14.6	13.5	4.8	2.6	0
Cadmium	30.1	5.4	34.5	15.4	15.4	50	21.8
Calcium	37.2	5.6	0	20.6	18.6	5.9	41.8
Chromium	7.8	4	14.1	6.5	0	6.1	16.2
Cobalt	9.3	5.1	24.6	10.6	6.1	26.6	10.5
Copper	18.6	4.9	14.5	35.5	7.5	20.5	27.3
Iron	40.7	5	9.5	39.1	0.5	22.2	13.9
Lead	15.5	Fail 63.6	13	4.5	12.8	5.6	16.1
Magnesium	3.1	2.3	15.6	1.9	0.4	12.7	38.6
Manganese	16	9	18.1	14.6	18.9	Fail 57.8	20.5
Nickel	3.8	6.7	19.7	11.5	4.5	12.4	14.6
Potassium	2.8	1.9	30	0.8	1.8	6.4	6.5
Selenium	45.2	5.8	6.9	*	*	*	18.2
Silver	Fail 75	*	*	*	*	*	*
Sodium	39	4.5	6.9	*	14.3	0.8	7.1
Thallium	Fail 68.5	*	*	*	35.3	19.2	*
Vanadium	0	3.1	12.2	10.3	5	3.6	9.8
Zinc	7.5	5.3	0.6	10.4	0.2	9.4	18
Mercury	6.5	*	33.3	23.3	40	0	13.3
Explosives							
1,3,5-Trinitrobenzene	*	*	*	*	*	*	*
1,3-Dinitrobenzene	*	*	*	*	*	*	*
2,4,6-Trinitrotoluene	*	*	*	*	*	*	*
2,4-Dinitrotoluene	*	*	*	*	*	*	*
2,6-Dinitrotoluene	*	*	*	*	*	*	*
2-Amino-4,6-Dinitrotoluene	*	*	*	*	*	*	*
4-Amino-2,6-Dinitrotoluene	*	*	*	*	*	*	*
HMX	*	*	*	*	*	*	*
m-Nitrotoluene	*	*	*	*	*	*	*
Nitrobenzene	*	*	*	*	*	*	*
Nitroglycerine	*	*	*	*	*	*	*
o-Nitrotoluene	*	*	*	*	*	*	*
p-Nitrotoluene	*	*	*	*	*	*	*
RDX	*	*	*	*	*	*	*
Tetryl	*	*	Fail 170.9	*	*	*	*
Nitroguanidine	NA	NA	NA	NA	NA	NA	NA

NA = Not analyzed * = At least one result of the replicate pair was non-detect

Table A-4B - Field Duplicate Comparison-Samples Analyzed for Metals and Explosives						
Analytes	**DA250-070-0722SO/ DA250-070-0864SO Soil RPD**	**DA250-061-0704SO/ DA250-061-0863SO Soil RPD**	**DA250-071-0724SO/ DA250-071-0865SO Soil RPD**	**DA250-057-0696SO/ DA250-057-0857SO Soil RPD**	**DA255-055-0691SO/ DA255-055-0855SO Soil RPD**	**DA255-037-0655SO/ DA255-037-0852SO Soil RPD**
Metals	208001	208001	208001	208001	208002	208036
Aluminum	5.8	12.7	7.4	16.1	0.8	0.9
Antimony	8.7	0	4.1	4.4	8.7	7.4
Arsenic	16.6	5.6	15.1	32.7	1.8	33.4
Barium	6.9	30.8	5.7	12.3	41.9	4
Beryllium	4.8	1.1	12.5	12.7	6.1	5.3
Cadmium	2.5	8.7	10.9	25	22.7	5.5
Calcium	1.1	Fail 64.3	1.5	24.1	9.7	0.7
Chromium	3.4	5.1	4.2	10.3	4.1	38.9
Cobalt	2.9	13.2	14.1	24.2	Fail 76.1	10.7
Copper	5.7	4.8	7.8	31	13.8	4.7
Iron	5.4	1.9	11.9	25.3	3.5	10.9
Lead	3.9	0.8	5.9	22.1	18.7	24.4
Magnesium	4.7	7.6	6.2	13.8	3.2	15.5
Manganese	6.5	43.1	29.5	37.5	Fail 63.1	10.3
Nickel	2.9	13.2	7.6	16.6	5.3	12.7
Potassium	0.9	1.6	0.6	14.5	2.2	6.9
Selenium	Fail 60.3	*	*	*	*	*
Silver	*	*	*	*	*	*
Sodium	20.9	12	7.9	19	*	36.4
Thallium	*	*	*	*	*	8.7
Vanadium	8.1	6.5	9.3	15.3	3.7	10.5
Zinc	2.6	2.1	3.8	13.4	2.1	7.9
Mercury	50	*	0	0	0	28.6
Explosives						
1,3,5-Trinitrobenzene	*	*	*	*	*	*
1,3-Dinitrobenzene	*	*	*	*	*	*
2,4,6-Trinitrotoluene	*	*	*	*	*	*
2,4-Dinitrotoluene	*	*	*	*	*	Fail 71
2,6-Dinitrotoluene	*	*	*	*	*	*
2-Amino-4,6-Dinitrotoluene	*	*	*	*	*	*
4-Amino-2,6-Dinitrotoluene	*	*	*	*	*	*
HMX	*	*	*	*	*	*
m-Nitrotoluene	*	*	*	*	*	*
Nitrobenzene	*	*	*	*	*	*
Nitroglycerine	*	*	*	*	*	*
o-Nitrotoluene	*	*	*	*	*	*
p-Nitrotoluene	*	*	*	*	*	*
RDX	*	*	*	*	*	*
Tetryl	*	*	*	*	*	*
Nitroguanidine	NA	NA	NA	NA	NA	NA

NA = Not analyzed NA = Not analyzed * = At least one result of the replicate pair was non-detect.

Appendix B

Project Quantitation Limit (PQL) Goals and Achieved Method Reporting Limits

Table B-1 – Project Quantitation Limit Goals and Achieved Method Reporting Limits

	Water		Soil/Sediment	
Parameters/Methods	**Project Quantitation Goal**	**Achieved Method Detection Level**	**Project Quantitation Goal**	**Achieved Method Detection Level**
VOCs SW 846-8260B	**(ug/L)**	**(ug/L)**	**(ug/kg)**	**(ug/kg)**
1,1,1-Trichloroethane	**1**	**5.0**	**5**	**5**
1,1,2,2-Tetrachloroethane	**1**	**5.0**	**5**	**5**
1,1,2-Trichloroethane	**1**	**5.0**	**5**	**5**
1,1-Dichloroethane	**1**	**5.0**	**5**	**5**
1,1-Dichloroethene	**1**	**5.0**	**5**	**5**
1,2-Dibromomethane	**1**	**5.0**	**5**	**5**
1,2-Dichloroethane	**1**	**5.0**	**5**	**5**
1,2-Dichloroethene (total)	**1**	**5.0**	**5**	**5**
1,2-Dichloropropane	**1**	**5.0**	**5**	**5**
2-Butanone	**10**	**10**	**20**	**10**
2-Hexanone	**10**	**10**	**20**	**10**
4-Methyl-2-pentanone	**10**	**10**	**20**	**10**
Acetone	**10**	**10**	**20**	**10**
Benzene	**1**	**5.0**	**5**	**5**
Bromochloromethane	1	**5.0**	**5**	**5**
Bromodichloromethane	**1**	**5.0**	**5**	**5**
Bromoform	**1**	**5.0**	**5**	**5**
Bromomethane	**1**	**5.0**	**5**	**10**
Carbon Disulfide	**1**	**5.0**	**5**	**5**
Carbon Tetrachloride	**1**	**5.0**	**5**	**5**
Chlorobenzene	**1**	**5.0**	**5**	**5**
Chloroethane	**1**	**5.0**	**5**	**10**
Chloroform	**1**	**5.0**	**5**	**5**
Chloromethane	**1**	**5.0**	**5**	**10**
cis-1,3-Dichloropropene	**1**	**5.0**	**5**	**5**
Dibromochloromethane	**1**	**5.0**	**5**	**5**
Ethylbenzene	**1**	**5.0**	**5**	**5**
Methylene Chloride	**1**	**5.0**	**5**	**10**
Styrene	**1**	**5.0**	**5**	**5**

Table B-1 – Project Quantitation Limit Goals and Achieved Method Reporting Limits

Parameters/Methods	Water		Soil/Sediment	
	Project Quantitation Goal	Achieved Method Detection Level	Project Quantitation Goal	Achieved Method Detection Level
Tetrachloroethene	**1**	**5.0**	**5**	**5**
Toluene	**1**	**5.0**	**5**	**5**
trans-1,3-Dichloropropene	**1**	**5.0**	**5**	**5**
VOCs SW 846-8260B	**(ug/L)**	**(ug/L)**	**(ug/kg)**	**(ug/kg)**
Trichloroethene	**1**	**5.0**	**5**	**5**
Vinyl Chloride	**1**	**5.0**	**5**	**10**
Xylenes (total)	**2**	**15**	**10**	**15**
SVOCs SW 846-8270C	**(ug/L)**	**(ug/L)**	**(ug/kg)**	**(ug/kg)**
1,2,4-Trichlorobenzene	**10**	**11**	**330**	**330**
1,2-Dichlorobenzene	**10**	**11**	**330**	**330**
1,3-Dichlorobenzene	**10**	**11**	**330**	**330**
1,4-Dichlorobenzene	**10**	**11**	**330**	**330**
2,4,5-Trichlorophenol	**25**	**22**	**330**	**330**
2,4,6-Trichlorophenol	**10**	**11**	**330**	**330**
2,4-Dichlorophenol	**10**	**11**	**330**	**330**
2,4-Dimethylphenol	**10**	**11**	**330**	**330**
2,4-Dinitrophenol	**25**	**22**	**800**	**660**
2,4-Dinitrotoluene	**10**	**11**	**330**	**330**
2,6-Dinitrotoluene	**10**	**11**	**330**	**330**
2-Chloronaphthalene	**10**	**11**	**330**	**330**
2-Chlorophenol	**10**	**11**	**330**	**330**
2-Methylnaphthalene	**10**	**11**	**330**	**330**
2-Methylphenol	**10**	**11**	**330**	**330**
2-Nitroaniline	**25**	**11**	**800**	**330**
2-Nitrophenol	**10**	**11**	**330**	**330**
3,3'-Dichlorobenzidine	**25**	**22**	**330**	**660**
3-Nitroaniline	**25**	**11**	**800**	**330**
4,6-Dinitro-2-methylphenol	**25**	**22**	**800**	**660**
4-Bromophenylphenylether	**10**	**11**	**330**	**330**
4-Chloro-3-methylphenol	**10**	**11**	**330**	**330**

Table B-1 – Project Quantitation Limit Goals and Achieved Method Reporting Limits

Parameters/Methods	Water		Soil/Sediment	
	Project Quantitation Goal	Achieved Method Detection Level	Project Quantitation Goal	Achieved Method Detection Level
4-Chloroaniline	**10**	**11**	**330**	**330**
4-Chlorophenyl-phenyl ether	**10**	**11**	**330**	**330**
3 & 4-Methylphenol	**10**	**11**	**330**	**660**
4-Nitroaniline	**25**	**11**	**800**	**330**
4-Nitrophenol	**25**	**22**	**800**	**660**
Acenaphthene	**10**	**11**	**50**	**330**
SVOCs SW 846-8270C	**(ug/L)**	**(ug/L)**	**(ug/kg)**	**(ug/kg)**
Acenaphthylene	**10**	**11**	**50**	**330**
Anthracene	**10**	**11**	**50**	**330**
Benzo(a)anthracene	**10**	**11**	**50**	**330**
Benzo(a)pyrene	**10**	**11**	**50**	**330**
Benzo(b)fluoranthene	**10**	**11**	**50**	**330**
Benzo(g,h,i)perylene	**10**	**11**	**50**	**330**
Benzo(k)fluoranthene	**10**	**11**	**50**	**330**
Benzoic acid	**25**	**22**	**800**	**660**
Benzyl alcohol	**10**	**11**	**330**	**330**
2,2'-oxybis(1-Chloropropane)	**10**	**11**	**330**	**330**
bis(2-chloroethoxy) methane	**10**	**11**	**330**	**330**
bis(2-Chloroethyl) ether	**10**	**11**	**330**	**330**
bis(2-Ethylhexyl)phthalate	**10**	**11**	**330**	**330**
Butylbenzylphthalate	**10**	**11**	**330**	**330**
Carbazole	**10**	**11**	**50**	**330**
Chrysene	**10**	**11**	**50**	**330**
Di-n-butylphthalate	**10**	**11**	**330**	**330**
Di-n-octylphthalate	**10**	**11**	**330**	**330**
Dibenzo(a,h)anthracene	**10**	**11**	**50**	**330**
Dibenzofuran	**10**	**11**	**330**	**330**
Diethylphthalate	**10**	**11**	**330**	**330**
Dimethylphthalate	**10**	**11**	**330**	**330**
Fluoranthene	**10**	**11**	**50**	**330**

Table B-1 – Project Quantitation Limit Goals and Achieved Method Reporting Limits

Parameters/Methods	Water		Soil/Sediment	
	Project Quantitation Goal	Achieved Method Detection Level	Project Quantitation Goal	Achieved Method Detection Level
Fluorene	**10**	**11**	**50**	**330**
Hexachlorobenzene	**10**	**11**	**330**	**330**
Hexachlorobutadiene	**10**	**11**	**330**	**330**
Hexachloroethane	**10**	**11**	**330**	**330**
Hexacholorocyclopentadiene	**10**	**11**	**330**	**330**
Indeno(1,2,3-cd)pyrene	**10**	**11**	**50**	**330**
Isophorone	**10**	**11**	**330**	**330**
N-Nitroso-di-n-dipropylamine	**10**	**11**	**330**	**330**
N-Nitrosodiphenylamine	**10**	**11**	**330**	**330**
SVOCs SW 846-8270C	**(ug/L)**	**(ug/L)**	**(ug/kg)**	**330**
Naphthalene	**10**	**11**	**50**	**330**
Nitrobenzene	**10**	**11**	**330**	**330**
Pentachlorophenol	**25**	**22**	**330**	**660**
Phenanthrene	**10**	**11**	**50**	**330**
Phenol	**10**	**11**	**330**	**330**
Pyrene	**10**	**11**	**50**	**330**
Pesticides SW 846-8081	**(µg/L)**	**(µg/L)**	**(µg/kg)**	**(µg/kg)**
4,4-DDD	**0.05**	**0.05**	**1.7**	**1.7**
4,4-DDE	**0.05**	**0.05**	**1.7**	**1.7**
4,4-DDT	**0.05**	**0.05**	**1.7**	**1.7**
Aldrin	**0.05**	**0.05**	**1.7**	**1.7**
alpha-BHC	**0.05**	**0.05**	**1.7**	**1.7**
alpha-Chlordane	**0.05**	**0.05**	**1.7**	**1.7**
beta-BHC	**0.05**	**0.05**	**1.7**	**1.7**
Chlordane	**0.05**	**1.0**	**1.7**	**33**
delta-BHC	**0.05**	**0.05**	**1.7**	**1.7**
Dieldrin	**0.05**	**0.05**	**1.7**	**1.7**
Endosulfan I	**0.05**	**0.05**	**1.7**	**1.7**
Endosulfan II	**0.05**	**0.05**	**1.7**	**1.7**
Endosulfan Sulfate	**0.05**	**0.05**	**1.7**	**1.7**

Table B-1 – Project Quantitation Limit Goals and Achieved Method Reporting Limits

Parameters/Methods	Water		Soil/Sediment	
	Project Quantitation Goal	Achieved Method Detection Level	Project Quantitation Goal	Achieved Method Detection Level
Endrin	**0.05**	**0.05**	**1.7**	**1.7**
Endrin aldehyde	**0.05**	**0.05**	**1.7**	**1.7**
Endrin Ketone	**0.05**	**0.05**	**1.7**	**1.7**
gamma-BHC (Lindane)	**0.05**	**0.05**	**1.7**	**1.7**
gamma-Chlordane	**0.05**	**0.05**	**1.7**	**1.7**
Heptachlor	**0.05**	**0.05**	**1.7**	**1.7**
Heptachlor Epoxide	**0.05**	**0.05**	**1.7**	**1.7**
Methoxychlor	**0.1**	**0.05**	**1.7**	**1.7**
Toxaphene	**2.0**	**1.0**	**170**	**33**
PCB SW 846-8082	**(ug/L)**	**(ug/L)**	**(ug/kg)**	**(ug/kg)**
Arochlor-1016	**0.5**	**1.0**	**33**	**33**
Arochlor-1221	**0.5**	**1.0**	**33**	**33**
PCB SW 846-8082	**(ug/L)**	**(ug/L)**	**(ug/kg)**	**(ug/kg)**
Aroclor-1232	**0.5**	**1.0**	**33**	**33**
Aroclor-1242	**0.5**	**1.0**	**33**	**33**
Aroclor-1248	**0.5**	**1.0**	**33**	**33**
Aroclor-1254	**0.5**	**1.0**	**33**	**33**
Aroclor-1260	**0.5**	**1.0**	**33**	**33**
Explosive Compounds SW 846-8330	**(ug/L)**	**(ug/L)**	**(mg/kg)**	**(mg/kg)**
HMX (Octahydro-1,3,5,7-Tetranitro-1,3,5,7-tetrazocine)	**0.5**	**0.52**	**1.0**	**0.2**
RDX (cyclonite) Hexahydro-1,3,5-trinitro-1,3,5-triazine	**0.5**	**0.52**	**1.0**	**0.2**
1,3,5-Trinitrobenzene	**0.2**	**0.26**	**0.25**	**0.1**
1,3-Dinitrobenzene	**0.2**	**0.26**	**0.25**	**0.1**
Tetryl	**0.2**	**0.52**	**1.0**	**0.2**
Nitrobenzene	**0.2**	**0.26**	**0.25**	**0.1**
2,4,6-Trinitrotoluene	**0.2**	**0.26**	**0.25**	**0.1**
2,4-Dinitrotoluene	**0.1**	**0.26**	**0.25**	**0.1**
2,6-Dinitrotoluene	**0.1**	**0.26**	**0.25**	**0.1**
2-Amino-4,6-dinitrotoluene	**0.2**	**0.26**	**0.25**	**0.1**
4-Amino-2,6-dinitrotoluene	**0.2**	**0.26**	**0.25**	**0.1**

Table B-1 – Project Quantitation Limit Goals and Achieved Method Reporting Limits

Parameters/Methods	Water		Soil/Sediment	
	Project Quantitation Goal	Achieved Method Detection Level	Project Quantitation Goal	Achieved Method Detection Level
o-Nitrotoluene	**0.2**	**0.52**	**0.25**	**0.2**
m-Nitrotoluene	**0.2**	**0.52**	**0.25**	**0.2**
p-Nitrotoluene	**0.2**	**0.52**	**0.25**	**0.2**
Additional Explosive Compounds:	**(ug/L)**	**(ug/L)**	**(mg/kg)**	**(mg/kg)**
Nitroglycerin	**3.0**	**26**	**3**	**10**
Nitroquanidine	**20**	**10**	**0.25**	**0.13**
Nitrocellulose	**500**	**700**	**5**	**39**
Metals SW 846-6010B/6020 or 7000	**(ug/L)**	**(ug/L)**	**(mg/kg)**	**(mg/kg)**
Aluminum	**100**	**200**	**10**	**20**
Antimony	**5**	**20**	**.05**	**2.0**
Arsenic	**5**	**20**	**0.5**	**2.0**
Barium	**10**	**5.0**	**1**	**0.5**
Beryllium	**1**	**2.0**	**0.1**	**0.2**
Metals SW 846-6010B/6020	**(ug/L)**	**(ug/L)**	**(mg/kg)**	**(mg/kg)**
Cadmium	**1**	**6.0**	**0.1**	**0.6**
Calcium	**100**	**1000**	**10**	**100**
Chromium	**5**	**5.0**	**0.5**	**0.5**
Cobalt	**5**	**5.0**	**0.5**	**0.5**
Copper	**5**	**10**	**0.5**	**1.0**
Iron	**100**	**150**	**10**	**15**
Lead	**3**	**10**	**0.3**	**1.0**
Magnesium	**100**	**250**	**10**	**25**
Manganese	**10**	**5.0**	**1**	**0.5**
Mercury (CVAA) SW846-7470A/7471A	**0.2**	**0.2**	**0.1**	**0.03**
Nickel	**10**	**10**	**1**	**1.0**
Potassium	**200**	**250**	**20**	**25**
Selenium	**5**	**20**	**0.5**	**2.0**
Silver	**5**	**3.0**	**0.5**	**0.3**
Sodium	**200**	**2500**	**20**	**250**

Table B-1 – Project Quantitation Limit Goals and Achieved Method Reporting Limits

Parameters/Methods	Water		Soil/Sediment	
	Project Quantitation Goal	**Achieved Method Detection Level**	**Project Quantitation Goal**	**Achieved Method Detection Level**
Thallium	**2**	**30**	**0.2**	**3.0**
Vanadium	**10**	**10**	**1**	**1.0**
Zinc	**10**	**20**	**1**	**2.0**
General Chemistry	**(mg/L)**	**(mg/L)**	**(mg/kg)**	**(mg/kg)**
Nitrate/Nitrite Nitrogen E353.2	**0.1**	**0.02**	**NL**	**NA**
Sulfide E376.2	**1.0**	**2.5**	**NL**	**80**
Total Cyanide SW846 9014T	**0.01**	**0.005**	**0.5**	**0.25**
Hexavalent Chromium SW846 7196A	**NL**	**0.05**	**NL**	**0.4**
Total Organic Carbon SW846 9060A	**1.0**	**1.0**	**10.0**	**100**

PCB = polychlorinated biphenyls
SVOC = semivolatile organic compound
VOC = volatile organic compounds
NL = Project Quantitation Level not listed for this analyte in the Facility-Wide QAPP
NA = Not Analyzed

APPENDIX C

DATA VERIFICATION REPORT SHEETS

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207058

Analytical Method: General Chemistry **Analyte:** Hexavalent chromium, total cyanide, Nitrate/nitrite nitrogen, sulfide, nitrocellulose

Sample Matrix: Water, 3 samples

Preservation: Met Holding Time: Met

Initial Calibration: Acceptable Calibration Verification: Acceptable

Method Blank: Acceptable LCS: See below.

MS/MSD: See below.

Project MDL: Acceptable RL: Acceptable

Lab Duplicates: Duplicate analyses were not made on an associated field sample for hexavalent chromium and total cyanide, and samples from other work orders were replicated for the other analytes. The sample concentration was non-detect for hexavalent chromium, total cyanide, nitrocellulose, and sulfide.

Qualifier Flags: Results for hexavalent chromium, nitrate/nitrite nitrogen and sulfide should be rejected because no LCS was analyzed in the analytical batch for these analytes.

Comments: No MS/MSD was analyzed for sulfide

Initial Calibration verification (ICV): The appropriate initial calibration verification standards were successfully analyzed with each analytical batch for hexavalent chromium and total cyanide. Two sets of calibration data are included that may be documentation for nitrate/nitrite nitrogen and nitrocellulose, respectively. The laboratory should include clear identification of the target analyte when the same instrument method file is used for the analysis of more than one chemical species. Sulfide is a titrimetric method and data for the standardization of the titrant was provided. Subsequent continuing calibration verification standards confirmed that the analyses remained in control.

MRL Check Standard: The QAPP Addendum for the Phase II Remedial Investigations of Demolition Area 2 does not list project quantitation levels for hexavalent chromium. No MRL standard was analyzed for total cyanide, nitrate/nitrite nitrogen, or sulfide. The lowest calibration standard for hexavalent chromium was 0.01 mg/L and for total cyanide, 0.005 mg/L.

Laboratory Control Sample: The recoveries of total cyanide and nitrocellulose were within the specified control limits. Hexavalent chromium, nitrate/nitrite nitrogen, and sulfide LCS analyses were not performed.

Sample Results Acceptable: With the exceptions noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207058
Analytical Method: 7470 **Analyte:** Mercury

Sample Matrix: Water, 3 samples

Preservation: Yes

Holding Time: Met

Instrument Checks:

Initial Calibration: 19 July 2002

Calibration Verification: 19 July 2002

Method Reporting Limit (MRL) Check Standard: See below.

Method Blank: Acceptable

LCS: Acceptable

MS/MSD: Acceptable

Surrogates: N/A

Project MDL: Not provided

RL: See below.

Field/Lab Duplicates: Acceptable

Qualifier Flags: None

Comments: The QAPP Addendum for the Phase II Remedial Investigations of Demolition Area 2 calls for a project quantitation level of 0.2 µg/L for mercury. The result for this sample was reported at below a quantitation limit (BQL) of 0.35 µg/L. The lowest calibration standard for mercury was 0.2 µg/L, which may be used to set the reporting limit.

Summary sheet for method detection and reporting limits from March 2002 was included in the data package. The case narrative states that the calibration standards were verified against an independent check standard. No supporting documentation was included in the data package.

Sample Results: With the exceptions and qualifications as noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207058
Analytical Method: 6010 **Analyte:** Metals

Sample Matrix: Water, 3 samples

Preservation: Yes Holding Time: Met

Initial Calibration: 19 July 2002, see below

Calibration Verification: 19 July 2002

Method Reporting Limit (MRL) Check Standard: See below

Method Blank: See below LCS: Acceptable

MS/MSD: Acceptable Surrogates: N/A

Project MDL: Acceptable RL: See below.

Dilution Test: See below. Post Digestion Test: See below.

Field/Lab Duplicates: See below

Interference Check Standard (ICS): See below

Qualifier Flags Applied: Various

Comments: While the initial calibration was acceptable, only a blank and one standard were used for calcium, magnesium, sodium and potassium. For the balance of the metals, a blank and two standards were used for calibration. Louisville District Chemistry Guidelines (LDCG) requires a blank and three standards containing all analytes for initial calibration and qualification as rejected in the absence of this level of calibration.

MRL: The case narrative states that for ICP run 020715 two elements are not within the 30% true value. The data sheet submitted with the package identifies a SDG number of 207058 and that sheet lists aluminum (76.6%), cadmium (120.8%), copper (140.8%), magnesium (128%), silver (70.5%), and thallium (151.8%). All these metals were recovered beyond the acceptance criteria of 20%. The LDCG requires that, if the MDL check was run at the end of the analysis and the results were acceptable, the suspect data should not be rejected, but qualified as estimated. The laboratory should confirm that this requirement has been met.

Blanks: The initial calibration blank showed no contamination. Continuing calibration blanks showed the presence of copper, iron, magnesium, and thallium. The lab should confirm that all positives have been flagged U when less than 5 times the blank concentration according to LDCG.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207058
Analytical Method: 6010 **Analyte:** Metals

Serial Dilutions: Serial dilution results for aluminum, copper, and nickel are not acceptable. Post digestion results were not provided. Therefore the results of the field sample for aluminum, copper and nickel are suspect and should be qualified J.

Sample Duplicate: The reported RPD of 200% for beryllium, nickel, and zinc is incorrect and should be corrected. The matrix precision for all other metals present in the field sample is acceptable.

ICS: the ICS indicated interference for beryllium, cadmium, manganese, and zinc, requiring qualification of all results for these analytes as estimated, J.

Additional Checks: Summary sheet for method detection and reporting limits from March 2002 and a quarterly linear range check from March 2002 were included in the data package. The case narrative states that the calibration standards were verified against an independent check standard. No supporting documentation was included in the data package.

Sample Results: With the exceptions and qualifications as noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207058
Analytical Method: 8330 **Analyte:** Nitroguanidine

Sample Matrix: Water, 3 samples

Preservation: Yes

Holding Time: The sample was extracted and analyzed 20 days after receipt. The QAPP requirement is extraction within 7 days, followed by analysis within 40 days for this method. Consequently, the data for nitroguanidine should be rejected. No further verification was performed for this method.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207058
Analytical Method: 8082 **Analyte:** PCB

Sample Matrix: Water, 3 samples

Preservation: Yes

Holding Time: Met

Initial Calibration: 21 June 2002

Calibration Verification: 19 July 2002.

Method Blank: Acceptable

LCS: Acceptable

MS/MSD: See below

Surrogates: See below.

Project MDL: Acceptable

RL: Acceptable

Field/Lab Duplicates: None

Other QC: No confirmation was required because all sample results were non-detect.

Qualifier Flags: Analytes associated with surrogate decachlororbiphenyl in samples DA2-SW0990783SW and DA2-SW0990847SW require J.

Comments: Calibration verification results from the rear column RTX-CLP2 for both PCBs are unacceptable. The case narrative should indicate the effect of this out-of-control event on the results of the field sample.

Surrogates: The control limits reported in the summary sheet are too wide and inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits. Recoveries for decachlororbiphenyl in samples DA2-SW0990783SW and DA2-SW0990847SW were below acceptance criteria. Associated analyte results for these two samples required qualification as estimated, J.

MS/MSD: The percent recoveries of PCB-1016 and PCB-1260 are both acceptable. The matrix precision as measured by %RPD for both compounds is higher than the acceptable 20%. The lack of precision will have no effect on the results of the field sample because the matrix spikes were performed on a different sample and on an earlier date (14 July 2002) than the field sample analysis, and may not reflect the true matrix of the field sample. No flagging is needed.

Reporting Limits: The analysis data sheet for the field samples indicate that the reporting limits for PCB-1221 and PCB-1242 are higher than the project specified limit of 0.5 µg/L. This marginal elevation may not affect the usability of the sample result. The sample did not show the presence of any PCB above the corresponding reporting limits.

Sample Results: The reported results for all analytes are non-detect.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207070

Analytical Method: 8081 **Analyte:** Pesticides

Sample Matrix: Soil, 11 samples

Preservation: Yes Holding Time: Met

Breakdown Checks: Acceptable Initial Calibration: 24 July 2002

Calibration Verification: 24 July

Method Blank: Acceptable LCS: Acceptable

MS/MSD: Acceptable Surrogates: Acceptable

Project MDL: Acceptable RL: See below

Field/Lab Duplicates: None

Other QC: Confirmation was required for dieldrin and met criteria.

Qualifier Flags: Endrin, 4,4'-DDT require R.

Comments: Manual integration was performed on several analytes. The case narrative should explain the reason for the manual integration for each analyte and what corrective action is being taken to rely on the instrument integrations.

Surrogates: Control limits for accuracy reported in the summary sheet are too wide and inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits.

Calibration verification: The % recoveries of endrin and endrin aldehyde on both columns are above the upper control limits, and may bias the results of those analytes in the field sample. No flagging is necessary for non-detects. The case narrative should include explanations of acceptability of the field sample results.

Breakdown check: Breakdown of both Endrin and 4,4'-DDT was acknowledged in the case narrative. Breakdown was also reported on calibration verification. No corrective action was indicated. The breakdown may affect the linearity of several analytes in the calibration. The laboratory should explain the acceptability of initial calibration. The endrin and 4,4'-DDT results for these samples should be qualified R.

RL: The lab should explain the difference between lab reporting limit and the quantitation limits required by the QAPP for all analytes except toxaphene.

Sample Results: With the exceptions noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207070
Analytical Method: 8270 **Analyte:** SVOC

Sample Matrix: Soil, 11 samples

Preservation: Yes Holding Time: Met

Instrument Checks: Acceptable Initial Calibration: 25 July 2002, see below

Calibration Verification: 26 July and 30 July 2002, see below

Method Blank: Acceptable LCS: See below

MS/MSD: See below Surrogates: See below

Internal Standards RT: Acceptable IS Area Counts: Acceptable

Project MDL: Acceptable RL: See below

Field/Lab Duplicates: None

Qualifier Flags: See below.

Comments: No initial calibration verification was documented. No calibration for bis (2-chloroisopropyl) ether was documented. The %RSD for all analytes were below 15%, except for 1,2-dichlorobenzene and 2,4-dinitriphenol. According to method requirements, the laboratory should provide alternate evidence of linearity for the two analytes. In addition, several system monitoring compounds in some of the calibration standards were out of control. The case narrative should indicate the rationale for accepting the five point initial calibration and not rejecting the calibration. Some benzoic acid peaks were manually integrated and an explanation for this action and the acceptability of the result should be included in the case narrative.

MS/MSD: The MS/MSD and LSC/LSCD recoveries for 3 & 4-methyl- phenol were flagged E, indicating that the values exceeded calibration limits. No comment was made in the case narrative nor was reanalysis documented. Results for these two analytes should be qualified estimated, J. The control limit for precision reported in the summary sheets is inconsistent with the QAPP requirements. The laboratory should review the limit based on the most recent data and reestablish the limit.

Surrogates: The recoveries of surrogate p-terphenyl exceeded laboratory control limits but met LDCG limits. The balance of the surrogates met control limits. However, the control limits reported in the summary sheet are too wide and inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits. No surrogate was included in the calibration for 3 & 4-methylphenol.

RL: The lab should explain the difference between lab reporting limits and the quantitation limits required by the QAPP. Also, the extraction log shows identical sample weights for all samples but reporting limits for the individual samples vary by as much as 50% for a given analyte.

Sample Results: With the exceptions noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207070
Analytical Method: 8260 **Analyte:** VOC

Sample Matrix: Soil, 11 samples

Preservation: Yes

Holding Time: Met

Instrument Checks: Acceptable

Initial Calibration: 4/29/02

Calibration Verification: 7/15 and 7/16/02

Method Blank: Acceptable

LCS: See below

MS/MSD: See below

Surrogates: Acceptable

Internal Standards RT: Acceptable

IS Area Counts: Acceptable

Project MDL: Acceptable

RL: See below

Field/Lab Duplicates: None

Other QC: None

Qualifier Flags: None

Comments: Manual integration was performed on several analytes in control samples and calibration standards. The case narrative should explain the reason for the manual integration for each analyte in control samples and standards that are prepared in the laboratory, and what corrective action is being taken to rely on the instrument integrations.

ICAL: The percent relative standard deviation (%RSD) for all target analytes were at or below the method specified 15% except for the following 11 analytes: bromomethane, chloroethane, acetone, carbon disulfide, 2-butanone, cis-1,3-dichloropropene, trans-1,3-dichloropropene, 4-methyl-2-pentanone, 2-hexanone, dibromochloromethane, and bromoform. Since these are analytes of interest, the laboratory should show that the calibration is linear for these analytes of interest based on the SW8260 alternate acceptance criteria for linearity.

The quantitation reports for all the calibration verification concentrations show qualifiers (#) indicating out-of-ranges. The case narrative for volatile organic compounds should explain the significance of these qualifiers and the acceptability of the results.

RL: The lab should explain the difference between lab reporting limit and the quantitation limits required by the QAPP. No MRL analysis for the soil matrix was provided.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207070
Analytical Method: 8260 **Analyte:** VOC

Sample Matrix: Soil, 11 samples

Preservation: Yes

Holding Time: Met

Instrument Checks: Acceptable

Initial Calibration: 4/29/02

Calibration Verification: 7/15 and 7/16/02

Method Blank: Acceptable

LCS: See below

MS/MSD: See below

Surrogates: Acceptable

Internal Standards RT: Acceptable

IS Area Counts: Acceptable

Project MDL: Acceptable

RL: See below

Field/Lab Duplicates: None

Other QC: None

Qualifier Flags: None

Comments: Manual integration was performed on several analytes in control samples and calibration standards. The case narrative should explain the reason for the manual integration for each analyte in control samples and standards that are prepared in the laboratory, and what corrective action is being taken to rely on the instrument integrations.

ICAL: The percent relative standard deviation (%RSD) for all target analytes were at or below the method specified 15% except for the following 11 analytes: bromomethane, chloroethane, acetone, carbon disulfide, 2-butanone, cis-1,3-dichloropropene, trans-1,3-dichloropropene, 4-methyl-2-pentanone, 2-hexanone, dibromochloromethane, and bromoform. Since these are analytes of interest, the laboratory should show that the calibration is linear for these analytes of interest based on the SW8260 alternate acceptance criteria for linearity.

The quantitation reports for all the calibration verification concentrations show qualifiers (#) indicating out-of-ranges. The case narrative for volatile organic compounds should explain the significance of these qualifiers and the acceptability of the results.

RL: The lab should explain the difference between lab reporting limit and the quantitation limits required by the QAPP. No MRL analysis for the soil matrix was provided.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207070
Analytical Method: 8260 **Analyte:** VOC

Method Blank: Method blank was contaminated with acetone and methylene chloride above the MDL.

Surrogates: The surrogate recoveries reported in the summary sheet are acceptable. However, the control limits reported in the summary sheet are too wide and inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits. The lab should explain the low surrogate recoveries, in the order of 10%, recorded for the Method Reporting Limit (MRL) analysis.

MS/MSD: Recoveries for carbon disulfide, 2-butanone, 4-methyl-2-pentanone, 2-hexanone, and trans-1,3-dichloropropene were slightly outside of control limits. There was no significant impact on the data and the data are usable. The control limit for precision reported in the summary sheets is inconsistent with the QAPP requirements.

Laboratory Control Samples (LCS): The recoveries of all analytes were within the specified control limits except for acetone, carbon disulfide, and 2-hexanone in one of blank spikes where the recoveries were slightly out side of control limits. Control limits for both accuracy and precision reported in the summary sheets are too wide and inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits.

Sample Results: With the exceptions noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207133

Analytical Method: 8330 **Analyte:** Explosives and Nitroglycerine

Sample Matrix: Soil, 8 samples

Preservation: Yes Holding Time: Met

Instrument Checks: N/A Initial Calibration: 18 July 2002

Calibration Verification: 18 July and 28 July 2002

Method Blank: Acceptable LCS: Acceptable

MS/MSD: See below Surrogate: See below

Project MDL: Acceptable RL: Acceptable

Field/Lab Duplicates: None

Other QC: All sample results were non-detect and no confirmation was required.

Qualifier Flags: R for nitroglycerine where surrogate recovery was below 10% per Louisville District Chemistry Guidelines (LDCG).

Comments: Manual integration was performed in control samples and calibration standards. The case narrative should explain the reason for the manual integration as well as what corrective action is being taken to rely on the instrument integrations.

Control limits for accuracy reported in the summary sheets are inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits.

MS/MSD: Recoveries for several analytes exceeded lab control limits but were within LDCG limits. Recoveries for three analytes in the LCS were also slightly above acceptance criteria. No qualifiers were required.

Surrogates: Surrogate recovery was zero for the analyses of nitroglycerine. The R flag is required for all nitroglycerine results. The lower control limit reported in the summary sheet is below the QAPP requirement and inconsistent with that reported on the raw data sheets. The laboratory should review the limits based on the most recent data and reestablish limits. The recoveries of surrogate 4-nitroanaline varied widely from as low as 0% to as high as 1650% for the balance of the analytes. The laboratory should address the lack of surrogate control for this method.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207133

Analytical Method: 8330 **Analyte:** Explosives and Nitroglycerine

RL: The lab should explain the difference between lab reporting limit and the quantitation limits required by the QAPP. No MRL analysis for the soil matrix was provided.

Laboratory Control Sample: Recovery of 1,3-dinitrobenzene, 4-amino-2,6-dinitrotoluene, and o-nitrotoluene exceeded lab QC limits but met QAPP requirements.

Sample Results: With the exceptions noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207133

Analytical Method: General Chemistry **Analyte:** Hexavalent chromium, total cyanide, Nitrate/nitrite nitrogen, sulfide, nitrocellulose

Sample Matrix: Soil, 1 sample

Preservation: Met Holding Time: Met

Initial Calibration: Acceptable Calibration Verification: Acceptable

Method Blank: Acceptable LCS: See below.

MS/MSD: See below.

Project MDL: Acceptable RL: Acceptable

Lab Duplicates: Duplicate analyses were made on associated field samples for total cyanide and nitrate/nitrite nitrogen. The sample concentration was non-detect for total cyanide and nitrocellulose. Duplicate results for nitrate/nitrite nitrogen exceeded acceptance criteria.

Qualifier Flags: Results for nitrate/nitrite nitrogen and sulfide should be rejected because no LCS was analyzed in the analytical batch for these analytes.

Comments: No MS/MSD was analyzed for sulfide.

Initial Calibration verification (ICV): The appropriate initial calibration verification standards were successfully analyzed with each analytical batch for hexavalent chromium and total cyanide. Two sets of calibration data are included that may be documentation for nitrate/nitrite nitrogen and nitrocellulose, respectively. The laboratory should include clear identification of the target analyte when the same instrument method file is used for the analysis of more than one chemical species. Sulfide is a titrimetric method and data for the standardization of the titrant was provided. Subsequent continuing calibration verification standards confirmed that the analyses remained in control.

MRL Check Standard: The QAPP Addendum for the Phase II Remedial Investigations of Demolition Area 2 does not list project quantitation levels for hexavalent chromium. No soil MRL standard was reported for total cyanide, nitrate/nitrite nitrogen, or sulfide.

Laboratory Control Sample: The recoveries of hexavalent chromium, total cyanide and nitrocellulose were within the specified control limits. Nitrate/nitrite nitrogen, and sulfide LCS analyses were not performed.

Sample Results: With the exceptions noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207133
Analytical Method: 7471 **Analyte:** Mercury

Sample Matrix: Soil, 8 samples

Preservation: Yes Holding Time: Met

Instrument Checks: Initial Calibration: 26 July 2002

Calibration Verification: 26 July 2002

Method Reporting Limit (MRL) Check Standard: Acceptable

Method Blank: Acceptable LCS: Acceptable

MS/MSD: Acceptable

Project MDL: Not provided RL: Acceptable

Field/Lab Duplicates: Acceptable

Qualifier Flags: None

Comments: MDL values for the aqueous matrix were reported.

Summary sheet for method detection and reporting limits from March 2002 was included in the data package. The case narrative states that the calibration standards were verified against an independent check standard. No supporting documentation was included in the data package.

Sample Results: With the exceptions and qualifications as noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207133
Analytical Method: 6010 **Analyte:** Metals

Sample Matrix: Soil, 8 Samples

Preservation: Yes Holding Time: Met

Instrument Checks: Initial Calibration: 19 July 2002 See below

Calibration Verification: 19 July 2002

Method Reporting Limit (MRL) Check Standard: See below

Method Blank: See below LCS: Acceptable

MS/MSD: See below.

Project MDL: Not provided RL: See below.

Dilution Test: Acceptable Post Digestion Test: Acceptable

Field/Lab Duplicates: See below

Interference Check Standard (ICS): See below

Qualifier Flags: Various

Comments: While the initial calibration was acceptable, only a blank and one standard were used for calcium, magnesium, sodium and potassium. For the balance of the metals, a blank and two standards were used for calibration. LDCG requires a blank and three standards containing all analytes for initial calibration and qualification as rejected in the absence of this level of calibration.

MRL: The case narrative states that for ICP run 020728, aluminum, antimony, iron, magnesium, manganese, silver, sodium, and vanadium were not within the 30% true value. The LDCG requires that if the MDL check was run at the end of the analysis and the results were acceptable, the suspect data should not be rejected, but qualified as estimated. The laboratory should confirm that this requirement has been met.

Blanks: The preparation blank showed contained barium, copper, manganese, and sodium above the control limit. Continuing calibration blanks showed the presence of iron, magnesium, and vanadium at values less than the MRL. The lab should confirm that all positives have been flagged U when less than 5 times the blank concentration according to LDCG.

MDL: MDL values were reported for the aqueous matrix.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207133
Analytical Method: 6010 **Analyte:** Metals

MS/MSD: The matrix spike recoveries failed control limits for antimony, arsenic, potassium, and thallium. Post-digestion spike recoveries for these analytes met acceptance criteria. No qualifiers were required.

RL: The lab should explain the difference between lab reporting limit and the quantitation limits required by the QAPP for calcium, sodium and thallium.

Sample Duplicate: Duplicate analysis results failed acceptance criteria for calcium and copper, requiring qualification of all results for these analytes as estimated, J.

ICS: the ICS indicated interference for barium, beryllium, cadmium, manganese, vanadium, and zinc, requiring qualification of all results for these analytes as J.

Sample Results: With the exceptions and qualifications as noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207133
Analytical Method: 8330 **Analyte:** Nitroguanidine

Sample Matrix: Soil, 1 sample

Preservation: Yes

Holding Time: Met

Instrument Checks: N/A

Initial Calibration: 18 March 2002

Calibration Verification: 31 July 2002.

Method Blank: Acceptable

LCS: Acceptable

MS/MSD: Acceptable

Surrogate: See below

Project MDL: Acceptable

RL: Acceptable

Field/Lab Duplicates: None

Other QC: None

Qualifier Flags: R for nitroguanidine per LDCG.

Comments: No surrogate was included in this set of analyses. The LDCG requires that all nitroguanidine results be qualified R.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207133
Analytical Method: 8082 **Analyte:** PCB

Sample Matrix: Soil, 1 sample

Preservation: Yes Holding Time: Met

Initial Calibration: 27 July 2002

Calibration Verification: 27 July 2002.

Method Blank: Acceptable LCS: Acceptable

MS/MSD: See below Surrogates: Acceptable

Project MDL: Acceptable RL: Acceptable

Field/Lab Duplicates: None

Other QC: No confirmation was required because all sample results were non-detect.

Qualifier Flags: None.

Comments: QC was shared with work order #207070, a related set of samples.

Surrogates: The control limits reported in the summary sheet are too wide and inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits.

Sample Results: The reported results for all analytes are non-detect.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207133

Analytical Method: 8081 **Analyte:** Pesticides

Sample Matrix: Soil, 1 sample

Preservation: Yes Holding Time: Met

Breakdown Checks: See below Initial Calibration: 18 July 2002

Calibration Verification: 25 July 2002, see below

Method Blank: Acceptable LCS: See below

MS/MSD: Acceptable Surrogates: Acceptable

Project MDL: Acceptable RL: See below

Field/Lab Duplicates: None

Other QC: All sample results were non-detect and no confirmation was required.

Qualifier Flags: Endrin results should be qualified R.

Comments: Manual integration was performed on several analytes. The case narrative should explain the reason for the manual integration for each analyte and what corrective action is being taken to rely on the instrument integrations.

Surrogates: Control limits for accuracy reported in the summary sheet are too wide and inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits.

Continuing Calibration: Endrin and surrogate decachlorobiphenyl had % Dev exceeding acceptance criteria, providing a negative bias. No documentation of corrective action was provided. Endrin results should be qualified R.

RL: The lab should explain the difference between lab reporting limit and the quantitation limits required by the QAPP for all analytes except toxaphene.

Breakdown check: Endrin % breakdown exceeded 15%. No documentation of correction action was provided. The endrin result for this sample should be qualified R.

LCS: Several analytes had slightly low recoveries according to lab QC limits, but QAPP requirements were met. No significant impact on sample results was found.

Sample Results: The reported results for all analytes were non-detect.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207133
Analytical Method: 8270 **Analyte:** SVOC

Sample Matrix: Soil, 1 sample

Preservation: Yes Holding Time: Met

Instrument Checks: Acceptable Initial Calibration: 23 July and 25 July 2002

Calibration Verification: 31 July 2002. See below

Method Blank: Acceptable LCS: See below

MS/MSD: See below Surrogates: See below

Internal Standards RT: Acceptable IS Area Counts: Acceptable

Project MDL: Acceptable RL: See below

Field/Lab Duplicates: None

Qualifier Flags: See below.

Comments: No calibration for bis (2-chloro isopropyl) ether was documented. The %RSD for all analytes were below 15%, except for 1,2-dichlorobenzene and 2,4-dinitriphenol. According to method requirements, the laboratory should provide alternate evidence of linearity for the two analytes. In addition, several system monitoring compounds in some of the calibration standards were out of control. The case narrative should indicate the rationale for accepting the five point initial calibration and not rejecting the calibration. Some benzoic acid peaks were manually integrated and an explanation for this action and the acceptability of the result should be included in the case narrative. The case narrative states the closing calibrations showed low recoveries for several compounds but no documentation or definition of which compounds failed acceptance criteria was provided.

MS/MSD: The MS/MSD and LSC recoveries for 3 & 4-methyl- phenol were flagged E, indicating that the values exceeded calibration limits. No comment was made in the case narrative nor was reanalysis documented. The case narrative states "QC was shared with work order #207070". However, The extraction and analysis logs indicate that the associated samples are from #207121 without an MS/MSD pair. The associated MS/MSD pair is from an unrelated work order #206088 sample.

Surrogate recovery: The recoveries of surrogate p-terphenyl exceeded laboratory control limits but met LDCG limits. However, the control limits reported in the summary sheet are too wide and inconsistent with the QAPP requirements. The laboratory should review

the limits based on the most recent data and reestablish limits. No surrogate was included in the calibration for 3 & 4-methylphenol.

RL: The lab should explain the difference between lab reporting limit and the quantitation limits required by the QAPP.

Sample Results: With the exceptions noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207133
Analytical Method: 8260 **Analyte:** VOC

Sample Matrix: Soil, 1 sample

Preservation: Yes Holding Time: Met

Instrument Checks: Acceptable Initial Calibration: 4/29/02

Calibration Verification: 4/29/02, 7/24/02 acceptable

Method Blank: See below LCS: Acceptable

MS/MSD: See below Surrogates: See below

Internal Standards RT: Acceptable IS Area Counts: Acceptable

Project MDL: Acceptable RL: See below

Field/Lab Duplicates: None

Other QC: None

Qualifier Flags:

Comments: Manual integration was performed on several analytes in control samples and calibration standards. The case narrative should explain the reason for the manual integration for each analyte in control samples and standards that are prepared in the laboratory, and what corrective action is being taken to rely on the instrument integrations.

Method Blank: Method blank contained acetone and methylene chloride above the MDL.

MS/MSD: The matrix was from a sample in another SpecPro work group. Recoveries were slightly high for acetone and 2-butanone and slightly low for carbon disulfide. No significant impact on results was found.

ICAL: The percent relative standard deviation (%RSD) for all target analytes were at or below the method specified 15% except for the following 11 analytes: bromomethane, chloroethane, 2-butanone, acetone, carbon disulfide, cis-1,3-dichloropropene, trans-1,3-dichloropropene, 4-methyl-2-pentanone, 2-hexanone, dibromochloromethane, and bromoform. Since these are analytes of interest, the laboratory should show that the calibration is linear for these analytes of interest based on the SW8260 alternate acceptance criteria for linearity.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207133
Analytical Method: 8260 **Analyte:** VOC

The quantitation reports for all the calibration verification concentrations show qualifiers (#) indicating out-of-ranges. The case narrative for volatile organic compounds should explain the significance of these qualifiers and the acceptability of the results.

RL: The lab should explain the difference between lab reporting limit and the quantitation limits required by the QAPP. No MRL analysis for the soil matrix was provided.

Surrogates: The surrogate recoveries reported in the summary sheet are acceptable. However, the control limits reported in the summary sheet are too wide and inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits. The lab should explain the low surrogate recoveries, in the order of 10%, recorded for the Method Reporting Limit (MRL) analysis, page 1089.

Sample Results: With the exceptions noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207058

Analytical Method: 8330 **Analyte:** Explosives and Nitroglycerine

Sample Matrix: Water, 3 samples

Preservation: Yes Holding Time: Met

Instrument Checks: N/A Initial Calibration: 18 July 2002, see below

Calibration Verification: 18 July and 24 July 2002, see below

Method Blank: Acceptable LCS: Acceptable

MS/MSD: See below Surrogate: See below

Project MDL: Acceptable RL: See below.

Field/Lab Duplicates: None

Other QC: All sample results were non-detect and no confirmation was required.

Qualifier Flags: R for nitroglycerine where surrogate recovery was below 10% per Louisville District Chemistry Guidelines (LDCG).

Comments: Manual integration was performed in control samples and calibration standards. The case narrative should explain the reason for the manual integration as well as what corrective action is being taken to rely on the instrument integrations.

Control limits for accuracy reported in the summary sheets are too wide and inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits.

MS/MSD: The field sample was not spiked because of insufficient sample volume.

Laboratory Control Sample: Two LCS aliquots were extracted and analyzed with the field sample. Neither was spiked with nitroglycerin. Recovery of 1,3-dinitrobenzene in the LCS and recovery of RDX in the LCSD was slightly above the control limit. The other analytes were recovered within the specified control limits. No qualifiers were required.

Surrogates: Surrogate recovery was zero for the analyses of nitroglycerine. The R flag is required for all nitroglycerine results. The surrogate recoveries reported in the summary sheet are acceptable except for samples DA2-SW0950779SW and DA2-SW0950779SW. However, the lower control limit reported in the summary sheet is below the QAPP requirement and inconsistent with that reported on the raw data sheets. The laboratory should review the limits based on the most recent data and reestablish limits. Surrogate

recovery in the blank and the blank spike is above the lab acceptance limit. The laboratory should indicate what corrective actions have been taken to rectify the failures. The recoveries of surrogate 4-nitroanaline varied widely from as low as 7% to as high as 339% . The laboratory should also address the lack of surrogate control for this method.

MRL: The laboratory should explain the difference between the high nitroglycerine MRL concentration of 1 mg/L and the low reporting limit concentration of 0.26 µg/L.

Additional Checks: Two compounds, 2,4-dinitrotoluene and 2,6-dinitrotoluene, are described in the case narrative as co-eluting on both the primary and confirmation columns and being quantitated and reported as 2,4-dinitrotoluene. However, results are shown for both compounds on the Form 1 Analysis Data Sheet. The lab should address this inconsistency.

Sample Results: With the exceptions noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207050
Analytical Method: 8260 **Analyte:** VOC

Sample Matrix: Water, 1 sample

Preservation: Yes Holding Time: Met

Instrument Checks: Acceptable Initial Calibration: 7/12/02

Calibration Verification: 7/19/02 acceptable

Method Blank: See below LCS: See below

MS/MSD: See below Surrogates: Acceptable

Internal Standards RT: Acceptable IS Area Counts: Acceptable

Project MDL: Acceptable RL: See below

Field/Lab Duplicates: None

Other QC: Page 132 of the volatile data package shows that the GPL identification number entry 207050-001 was manually corrected. This particular sample is the only project sample. A supervisor or the project manager must validate the correction to assure that the right sample was analyzed.

Qualifier Flags Applied: See below.

Comments: Manual integration was performed on several analytes in control samples and calibration standards. The case narrative should explain the reason for the manual integration for each analyte in control samples and standards that are prepared in the laboratory, and what corrective action is being taken to rely on the instrument integrations.

Method Blank: Method blank contained acetone and methylene chloride above the MDL.

MS/MSD: Samples from a different batch were spiked. The spike recoveries were acceptable except for acetone. The precision (%RPD) for 2-butanone was above the limits, although the recoveries (accuracies) were both within limits. The 2-butanone data is usable.

LCS/LCSD: The recoveries of all analytes were within control limits specified in the QAPP except for acetone, methylene chloride, and 1,1,2-trichloroethane (TCA) in both spikes and a higher than acceptable recovery for tetrachloroethene (PCE) in the LCS duplicate. The field sample results for PCE and TCA were below the quantitation limit and are not affected by the high bias.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207050
Analytical Method: 8260 **Analyte:** VOC

ICAL: The percent relative standard deviation (%RSD) for all target analytes were at or below the method specified 15% except for the following 5 analytes: bromomethane, methylene chloride, cis-1,3-dichloropropene, trans-1,3-dichloropropene, and dibromochloromethane. Since these are analytes of interest, the laboratory should show that the calibration is linear for these analytes of interest based on the SW8260 alternate acceptance criteria for linearity.

Two target analytes in the ICV exceed the percent difference of (%D) of 20%. The laboratory needs to provide the rationale for the acceptability of these results in the case narrative.

Calibration verification performed on 19 July 2002 is associated with the analytical batch in which the field sample was analyzed. In this calibration verification check, acetone had a %D of greater than 20%. The results of this analyte, if needed for the project, should be rejected.

Surrogates: Control limits reported in the summary sheet are too wide and inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits.

RL: Recoveries for methylene chloride, carbon disulfide, 4-methyl-2-pentanone, and bromoform exceeded acceptance criteria in the first MRL analysis for 7/19/02. In the second MRL analysis, cis-1.3-dichloropropene also failed acceptance limits. Results for these 5 analytes require qualification as estimated, J.

The quantitation reports for all the calibration verification concentrations show qualifiers (#) indicating out-of-ranges. The case narrative for volatile organic compounds should explain the significance of these qualifiers and the acceptability of the results.

Sample Results: With the exceptions noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207050

Analytical Method: 8330 **Analyte:** Explosives and Nitroglycerine

Sample Matrix: Water, 1 sample

Preservation: Yes Holding Time: Met

Instrument Checks: N/A Initial Calibration: 18 July 2002, see below

Calibration Verification: 18 July and 24 July 2002, see below

Method Blank: Acceptable LCS: Acceptable

MS/MSD: See below Surrogate: See below

Project MDL: Acceptable RL: See below.

Field/Lab Duplicates: None

Other QC: All sample results were non-detect and no confirmation was required.

Qualifier Flags: R for nitroglycerine where surrogate recovery was below 10% per Louisville District Chemistry Guidelines (LDCG).

Comments: Manual integration was performed in control samples and calibration standards. The case narrative should explain the reason for the manual integration as well as what corrective action is being taken to rely on the instrument integrations.

Control limits for accuracy reported in the summary sheets are too wide and inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits.

MS/MSD: The field sample was not spiked because of insufficient sample volume.

Laboratory Control Sample: Two LCS aliquots were extracted and analyzed with the field sample. Neither was spiked with nitroglycerin. Recovery of 1,3-dinitrobenzene in the LCS and recovery of RDX in the LCSD was slightly above the control limit. The other analytes were recovered within the specified control limits. No qualifiers were required.

Surrogates: Surrogate recovery was zero for the analyses of nitroglycerine. The R flag is required for all nitroglycerine results. The recoveries of surrogate 4-nitroanaline varied widely from as low as 7% to as high as 339%. The laboratory should address the lack of surrogate control for this method. The lower control limit reported in the summary sheet is below the QAPP requirement and inconsistent with that reported on the raw data

sheets. The laboratory should review the limits based on the most recent data and reestablish limits.

MRL: The laboratory should explain the difference between the high nitroglycerine MRL concentration of 1 mg/L and the low reporting limit concentration of 0.26 µg/L.

Additional Checks: Two compounds, 2,4-dinitrotoluene and 2,6-dinitrotoluene, are described in the case narrative as co-eluting on both the primary and confirmation columns and being quantitated and reported as 2,4-dinitrotoluene. However, results are shown for both compounds on the Form 1 Analysis Data Sheet. The lab should address this inconsistency.

Sample Results: With the exceptions noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207050

Analytical Method: General Chemistry **Analyte:** Hexavalent chromium, total cyanide, Nitrate/nitrite nitrogen, sulfide, nitrocellulose

Sample Matrix: Water, 1 sample

Preservation: Met Holding Time: Met

Initial Calibration: Acceptable Calibration Verification: Acceptable

Method Blank: Acceptable LCS: See below.

MS/MSD: See below. Surrogates: N/A

Project MDL: Acceptable RL: Acceptable

Field/Lab Duplicates: Duplicate analyses were not made on the field sample for any of the target analytes, but samples from other work orders were replicated in the analytical batches. The sample concentration was non-detect for hexavalent chromium, total cyanide, nitrocellulose, and sulfide.

Qualifier Flags: Results for hexavalent chromium, nitrate/nitrite nitrogen and sulfide should be rejected because no LCS was analyzed in the analytical batch for these analytes.

Comments: No MS/MSD was analyzed for sulfide.

Initial Calibration verification (ICV): The appropriate initial calibration verification standards were successfully analyzed with each analytical batch for hexavalent chromium and total cyanide. Two sets of calibration data are included that may be documentation for nitrate/nitrite nitrogen and nitrocellulose, respectively. The laboratory should include clear identification of the target analyte when the same instrument method file is used for the analysis of more than one chemical species. Sulfide is a titrimetric method and data for the standardization of the titrant was provided. Subsequent continuing calibration verification standards confirmed that the analyses remained in control.

MRL Check Standard: The QAPP Addendum for the Phase II Remedial Investigations of Demolition Area 2 does not list project quantitation levels for hexavalent chromium. No MRL standard was analyzed for total cyanide, nitrate/nitrite nitrogen, or sulfide. The lowest calibration standard for hexavalent chromium was 0.01 mg/L and for total cyanide, 0.005 mg/L.

Laboratory Control Sample: The recoveries of total cyanide and nitrocellulose were within the specified control limits. Hexavalent chromium, nitrate/nitrite nitrogen, and sulfide LCS analyses were not performed.

Sample Results Acceptable: With the exceptions noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207050
Analytical Method: 7470 **Analyte:** Mercury

Sample Matrix: Water, 1 sample

Preservation: Yes

Holding Time: Met

Instrument Checks:

Initial Calibration: 19 July 2002

Calibration Verification: 19 July 2002

Method Reporting Limit (MRL) Check Standard: See below.

Method Blank: Acceptable

LCS: Acceptable

MS/MSD: Acceptable

Surrogates: N/A

Project MDL: Not provided

RL: See below.

Field/Lab Duplicates: Acceptable

Qualifier Flags: None

Comments: The QAPP Addendum for the Phase II Remedial Investigations of Demolition Area 2 calls for a project quantitation level of 0.2 µg/L for mercury. The result for this sample was reported at below a quantitation limit (BQL) of 0.35 µg/L. The lowest calibration standard for mercury was 0.2 µg/L, which may be used to set the reporting limit.

Summary sheet for method detection and reporting limits from March 2002 was included in the data package. The case narrative states that the calibration standards were verified against an independent check standard. No supporting documentation was included in the data package.

Sample Results: With the exceptions and qualifications as noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207050
Analytical Method: 6010 **Analyte:** Metals

Sample Matrix: Water, 1 sample

Preservation: Yes Holding Time: Met

Initial Calibration: 19 July 2002 See below

Calibration Verification: 19 July 2002

Method Reporting Limit (MRL) Check Standard: See below

Method Blank: See below LCS: Acceptable

MS/MSD: Acceptable Surrogates: N/A

Project MDL: Acceptable RL: See below.

Dilution Test: See below. Post Digestion Test: See below.

Field/Lab Duplicates: See below

Interference Check Standard (ICS): See below

Qualifier Flags Applied: Various

Comments: While the initial calibration was acceptable, only a blank and one standard were used for calcium, magnesium, sodium and potassium. For the balance of the metals, a blank and two standards were used for calibration. LDCG requires a blank and three standards containing all analytes for initial calibration and qualification as rejected in the absence of this level of calibration.

MRL: The case narrative states that for ICP run 020715 three elements are not within the 30% true value. The data sheet submitted with the package identifies a work order number of 207050 and that sheet lists aluminum (76.6%), cadmium (120.8%), copper (140.8%), magnesium (128%), silver (70.5%), and thallium (151.8%). All these metals are recovered beyond the acceptance criteria of 20%. The LDCG requires that if the MDL check was run at the end of the analysis and the results were acceptable, the suspect data should not be rejected, but qualified as estimated. The laboratory should confirm that this requirement has been met.

Blanks: The initial calibration blank showed no contamination. Continuing calibration blanks showed the presence of copper, magnesium and thallium. The lab should confirm that all positives have been flagged U when less than 5 times the blank concentration according to LDCG.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207050
Analytical Method: 6010 **Analyte:** Metals

Serial Dilutions: Serial dilution results for aluminum, copper and zinc are not acceptable. Post digestion results were not provided. Therefore the results of the field sample for aluminum, copper and zinc are suspect and should be qualified J.

Sample Duplicate: The RPD for aluminum and iron are beyond the acceptance criteria of 25%. The reported RPD of 200% for zinc is incorrect and should be corrected. The matrix precision for all other metals present in the field sample is acceptable.

ICS: the ICS indicated interference for barium, beryllium, cadmium, manganese, zinc, and vanadium, requiring qualification of all results for these analytes as estimated, J.

Additional Checks: Summary sheet for method detection and reporting limits from March 2002 and a quarterly linear range check from March 2002 were included in the data package. The case narrative states that the calibration standards were verified against an independent check standard. No supporting documentation was included in the data package.

Sample Results: With the exceptions and qualifications as noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207050
Analytical Method: 8330 **Analyte:** Nitroguanidine

Sample Matrix: Water, 1 sample

Preservation: Yes

Holding Time: The sample was extracted and analyzed 21 days after receipt. The QAPP requirement is extraction within 7 days, followed by analysis within 40 days for this method. Consequently, the data for nitroguanidine should be rejected. No further verification was performed for this method.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207050
Analytical Method: 8082 **Analyte:** PCB

Sample Matrix: Water, 1 sample

Preservation: Yes

Holding Time: Met

Breakdown Checks: N/A

Initial Calibration: 21 June 2002

Calibration Verification: 19 July 2002.

Method Blank: Acceptable

LCS: Acceptable

MS/MSD: Acceptable See below

Surrogates: See below.

Project MDL: Acceptable

RL: Acceptable

Field/Lab Duplicates: None

Other QC: No confirmation was required because all sample results were non-detect.

Qualifier Flags: None.

Comments: Calibration verification results from the rear column RTX-CLP2 for both PCBs are unacceptable. The case narrative should indicate the effect of this out-of-control event on the results of the field sample.

MS/MSD: The percent recoveries of PCB-1016 and PCB-1260 are both acceptable. The matrix precision as measured by %RPD for both compounds are higher than the acceptable 20%. The lack of precision will have no effect on the results of the field sample because the matrix spikes were performed on a different sample and on an earlier date (14 July 2002) than the field sample analysis, and may not reflect the true matrix of the field sample. No flagging is needed.

Surrogates: The control limits reported in the summary sheet are too wide and inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits.

Reporting Limits: The analysis data sheet for the field sample indicates that the reporting limits for PCB-1221 of 0.81 and PCB-1242 of 0.57. These limits are higher than the project specified limit of 0.5 µg/L. This marginal elevation may not affect the usability of the sample result. The sample did not show the presence of any PCB above the corresponding reporting limits.

Sample Results: The reported results for all analytes are non-detect.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207050
Analytical Method: 8081 **Analyte:** Pesticides

Sample Matrix: Water, 1 sample

Preservation: Yes Holding Time: Met

Breakdown Checks: See below Initial Calibration: 12 July 2002

Calibration Verification: 25 July 2002, see below

Method Blank: Acceptable LCS: See below

MS/MSD: Acceptable Surrogates: Acceptable

Project MDL: Acceptable RL: See below

Field/Lab Duplicates: None

Other QC: All sample results were non-detect and no confirmation was required.

Qualifier Flags: Endrin, 4,4'DDT require R.

Comments: Manual integration was performed on several analytes. The case narrative should explain the reason for the manual integration for each analyte and what corrective action is being taken to rely on the instrument integrations.

Control limits for accuracy reported in the summary sheet are too wide and inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits.

Calibration verification: The % recoveries of endosulfan sulfate in the primary column, and those of heptachlor epoxide, alpha-chlordane, 4,4'-DDD, and 4,4'-DDT exceed control limits, and may bias the results of those analytes in the field sample. No flagging is necessary for non-detects. The case narrative should include explanations of acceptability of the field sample results. Breakdown was reported on calibration verification also.

RL: The lab should explain the difference between lab reporting limit and the quantitation limits required by the QAPP for all analytes except toxaphene.

Breakdown check: Both Endrin and 4,4'-DDT breakdown was acknowledged in the case narrative. No corrective action was indicated. The breakdown may affect the linearity of several analytes in the calibration. The laboratory should explain the acceptability of initial calibration. The endrin and 4,4'-DDT results for this sample should be qualified R.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207050
Analytical Method: 8081 **Analyte:** Pesticides

MS/MSD: Results from another batch were reported. The control limits for accuracy are wider than the project specified limits. The laboratory must use the project-approved limits. The RPD values for five compounds are above 20% denoting a precision problem with the recovery of those analytes.

LCS: The data analysis sheet for BKS55610 shows several P flags that require explanation. Endrin ketone is identified as out of control with an * sign. However, the case narrative identifies only heptachlor epoxide recovery below limits. The case narrative should be expanded to include which analytes in the field samples should be rejected.

Surrogates: The surrogate recoveries reported in the summary sheet are acceptable. However, the control limits reported in the summary sheet are too wide and inconsistent with the ones reported on the raw data sheets as well as QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits.

Sample Results: With the exceptions noted above, the reported results are acceptable.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207050
Analytical Method: 8260 **Analyte:** SVOC

Sample Matrix: Water, 1 sample

Preservation: Yes Holding Time: Met

Instrument Checks: Acceptable Initial Calibration: 25 July 2002

Calibration Verification: 30 July 2002. See below

Method Blank: Acceptable LCS: See below

MS/MSD: See below Surrogates: See below

Internal Standards RT: Acceptable IS Area Counts: Acceptable

Project MDL: Acceptable RL: See below

Field/Lab Duplicates: None

Other QC: It appears that the sample was reanalyzed on 30 July 2002 and those results are presented in the package. The log entries for 30 July 2002 do not include a method blank or a blank spike (LCS). The data for the field sample, GPL ID 207050-001-005-1/2 were reported without appropriate quality control data and should be rejected.

Qualifier Flags: See above.

Comments: No calibration for bis (2-chloro isopropyl) ether was documented. No surrogate was included in the calibration for 3 & 4-methylphenol. The %RSD for all analytes were below 15%, except for 1,2-dichlorobenzene and 2,4-dinitriphenol. According to method requirements, the laboratory should provide alternate evidence of linearity for the two analytes. In addition, several system monitoring compounds in some of the calibration standards were out of control. The case narrative should indicate the rationale for accepting the five point initial calibration and not rejecting the calibration. Some benzoic acid peaks were manually integrated and an explanation for this action and the acceptability of the result should be included in the case narrative.

MS/MSD: As stated in the case narrative, an LCS/LCSD pair was substituted for the MS/MSD pair because of insufficient sample. The control limit for precision reported in the summary sheets is inconsistent with the QAPP requirements. The laboratory should review the limit based on the most recent data and reestablish the limit.

RL: The lab should explain the difference between lab reporting limit and the quantitation limits required by the QAPP.

DATA VERIFICATION REPORT
SUBMITTED BY GPL LABORATORIES
PROJECT NAME: DEMO AREA 2-RAVENNA AAP
Work Order: 207050
Analytical Method: 8260 **Analyte:** SVOC

Surrogates: Recovery of 2-fluorophenol in sample DA2SW0990787SW was slightly low. No impact on result quality was noted. However, the control limits reported in the summary sheet are too wide and inconsistent with the QAPP requirements. The laboratory should review the limits based on the most recent data and reestablish limits.

Sample Results: The data for the field sample, GPL ID 207050-001-005-1/2 were reported without appropriate quality control data and should be rejected.