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UPPER GREAT LAKES CONNECTING CHANNELS INTERLABORATORY PERFORMANCE EVALUATION STUDY QM-7: CHLORINATED HYDROCARBONS AND PCBs IN AMPULES AND WATER - FINAL REPORT

by
R. Szawiola, W. Horn and H.B. Lee

Research and Applications Branch
National Water Research Institute
Canada Centre for Inland Waters
Burlington, Ontario L7R 4A6
and the Quality Management Work Group
October 1987

UPPER GREAT LAKES CONNECTING CHANNELS

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Sent to the QMWG for review and approval

MANAGEMENT PERSPECTIVE

The Upper Great Lakes Connecting Channels (UGLCC) have been designated as "Areas of Concern" by the International Joint Commission. A Canada-U.S. binational study, involving the identification and assessment of the environmental impacts of toxic substances, in those areas was initiated in 1984. In order to assist analytical laboratories, which are contributing data to the UGLCC study, to generate reliable and accurate data during the study, a Quality Management Work Group was formed and 13 interlaboratory performance evaluation studies were implemented.

This report summarizes and evaluates the results from the seventh interlaboratory performance evaluation study, QM-7 which consisted of the analysis of total PCBs and 13 chlorinated hydrocarbons in ampules and water. Results were received from seven Canadian and five U.S. laboratories out of 16 participants. With the exception of one or two laboratories, the ampule results were satisfactory and comparable. Data for the water samples, were not as precise and accurate as the ampules, and indicated a difficulty in compound recovery.

Dr. J. Lawrence
Director
Research and Applications Branch

PERSPECTIVE DE GESTION

Les canaux reliant les Grands Lacs d'amont ont été désignés "zone problème" par la Commission mixte internationale. Une étude binationale canado-américaine, comportant la détermination et l'évaluation des impacts environnementaux des substances toxiques dans cette zone, a été entreprise en 1984. Afin d'aider les laboratoires d'analyse qui fournissent des données pour l'étude à produire des données fiables et exactes, un groupe de travail sur la gestion de la qualité a été créé et 13 études interlaboratoires d'évaluation de rendement ont été mises sur pied.

Ce rapport résume et évalue les résultats de la septième évaluation de performance interlaboratoires, QM-7, qui consistait en l'analyse des PCB totaux et de 13 hydrocarbures chlorés en ampoules et dans l'eau. Sept laboratoires canadiens et cinq américains sur 16 laboratoires participants ont envoyé des résultats. A l'exception d'un ou deux laboratoires, les résultats en ampoule étaient satisfaisants et comparables. Les données pour les échantillons d'eau n'étaient pas aussi précises et exactes que les données recueillies dans les ampoules et révélaient une difficulté dans la récupération des composés.

ABSTRACT

The Upper Great Lakes Connecting Channels (UGLCC) study recognizes Quality Assurance/Quality Control (QA/QC) aspects as crucial elements to the overall utility of study results. As part of the QA/QC program, thirteen interlaboratory performance evaluation studies were designed and conducted by the Quality Management Work Group.

This report describes the results from the seventh interlaboratory performance evaluation study, QM-7, which consisted of the analysis of chlorinated hydrocarbons and total PCBs in ampules and water. Results were received from 12 out of 16 participating laboratories (seven Canadian, five U.S.).

Generally, the results for the standard solutions were accurate and precise. Precision for the water samples was not as good and accuracy was much worse. The interlaboratory median ranged from 82-108% of the design values for the ampules versus 46-154% for the water samples.

Except for total PCBs most laboratories had difficulties recovering chlorinated hydrocarbons from water samples. Only one laboratory provided satisfactory data for all the parameters requested and a few laboratories reported detection limits that were above the design values.

RESUME

L'étude sur les canaux reliant les Grands Lacs d'amont considère les aspects assurance de qualité/contrôle de qualité comme des éléments cruciaux pour l'utilité globale des résultats. Dans le cadre du programme assurance de qualité contrôle de qualité, 13 études interlaboratoires d'évaluation de rendement ont été mises sur pied par le groupe de travail sur la gestion de la qualité.

Ce rapport donne les résultats de la septième étude, QM-7, qui consistait en l'analyse des hydrocarbures chlorés et des PCB totaux en ampoules et dans l'eau. Douze des seize laboratoires participants ont envoyé des résultats (7 laboratoires canadiens et 5 américains).

En général, les résultats obtenus dans les solutions normalisées étaient exacts et précis. La précision des résultats obtenus sur les échantillons d'eau n'était pas aussi satisfaisante et encore moins précises. La médiane interlaboratoires s'écartait de 82 à 108 % des valeurs nominales pour les ampoules, comparativement à 46-154 % pour les échantillons d'eau.

La plupart des laboratoires ont eu de la difficulté à récupérer les hydrocarbures chlorés sauf les PCB totaux, dans les échantillons d'eau. Seul un laboratoire a obtenu des données satisfaisantes pour tous les paramètres exigés et quelques-uns ont signalé des limites de détection qui étaient en-deçà des valeurs nominales.

INTRODUCTION

The Upper Great Lakes Connecting Channels (UGLCC) have been designated as "Areas of Concern" by the International Joint Commission (IJC). To identify and deal with the environmental problems, a three year binational study was initiated in 1984, involving Canadian and U.S. environmental and resource agencies, to study the St. Marys, St. Clair and Detroit Rivers, and Lake St. Clair. The study involves identifying, quantifying and determining the environmental impacts of conventional and toxic substances from various sources.

The UGLCC study recognizes Quality Assurance/Quality Control (QA/QC) aspects as crucial elements to the overall utility of study results. As part of the QA/QC program, 13 interlaboratory performance evaluation (QC) studies were designed and conducted by the Quality Management Work Group. The goal of these QC studies is to assist analytical laboratories, which are producing data for the UGLCC study, to generate reliable, accurate data and to assess their overall performance during the study. A total of some 100 parameters (organic, inorganic and physical properties) in three types of matrices (water, sediment and biota) will be assessed.

This seventh interlaboratory study, QM-7, was initiated on February 28, 1986. It involved the analysis of chlorinated hydrocarbons and total PCBs in ampules and water. The original deadline for reporting results was set for May 15, 1986. However, since several laboratories were late in reporting, the study was not closed until September 30, 1986.

STUDY PROFILE

From the returned questionnaires, the following 16 laboratories affirmed their participation in this study: U001, U013, U014, U063, U072, U075, U077, U079, U086, U091, U092, U093, U049, U057, U078 and U090. By the time the study was closed (September 30, 1986), the last four laboratories had not submitted any results. See the list of participants at the end of this report.

Since erratic in-house standards have been shown to be major sources of error in organic analysis, this study was designed to evaluate the accuracy of the participants' calibration standards for total PCBs and chlorinated hydrocarbons.

In order to evaluate the overall laboratory performance for the analysis of PCBs and chlorinated hydrocarbons in water, this study also included the analysis of four water samples (two supplied by NWRI and two from the laboratory's own organic-free supply) for the same parameters.

Each laboratory was provided with eight ampules and two one-litre samples of naturally occurring surface water. Four of the ampules (701-704) were to be analyzed by direct injection, two of the ampules (705, 706) were to be used to spike the two water samples provided and the remaining two ampules (707, 708) were to be used to spike two samples of the laboratory's own organic-free water. The four spiked water samples were to be extracted and along with the four ampules, analyzed for PCBs and 13 chlorinated hydrocarbons according to each laboratory's in-house procedures.

The 13 chlorinated hydrocarbons were:

1,4-dichlorobenzene (1,4-DCB), 1,3-dichlorobenzene (1,3-DCB), 1,2-dichlorobenzene (1,2-DCB), 1,3,5-trichlorobenzene (1,3,5-TCB), 1,2,4-trichlorobenzene (1,2,4-TCB), 1,2,3,-trichlorobenzene (1,2,3-TCB), 1,2,4,5-tetrachlorobenzene (1,2,4,5-TeCB), 1,2,3,4-tetrachlorobenzene (1,2,3,4-TeCB), pentachlorobenzene (PeCB), hexachlorobenzene (HCB), hexachloroethane (HCE), hexachlorobutadiene (HCBD) and octachlorostyrene (OCS).

All standard solutions and test samples were prepared by the Quality Assurance Project Team, Research and Applications Branch of the National Water Research Institute (NWRI). Stock solutions of individual Aroclors were obtained from US EPA and those for the individual chlorinated hydrocarbons were prepared gravimetrically from primary grade standards of purity greater than 98%. Working solutions were prepared by combining dilutions of the individual stock solutions or by making straight dilutions. The design values of the working solutions as well as the interlaboratory medians for each parameter are presented in Table 2. The design values were checked against in-house quality control samples from other QC studies by two analysts on different dates. Ampules 701, 702, 703 and 704 were identical to those used in study QM-1 (ampules 102, 104, 110 and 111, respectively). The interlaboratory medians of all the parameters for these samples from both studies were within 20% and confirmed the design values.

In order to provide some indication of analytical precision, the samples were sent out in blind duplicate pairs as shown in Table 1.

RESULTS AND DISCUSSION

Analytical Methodology

In this study, all standard solutions in ampules 701-704 were analyzed by direct injection into a gas chromatograph using an electron-capture detector and a suitable column. Water samples prepared from ampules 705-708 were analyzed similarly after appropriate extraction, cleanup and solvent replacement. Of the 11 laboratories submitting results for water samples (one laboratory did not analyze the water samples), nine used dichloromethane and two used hexane extraction procedures. Six of the participants used Snyder columns and Kuderna-Danish evaporators for evaporative concentration of the extract while five used rotary evaporators. Six laboratories used Florisil cleanup and fractionation, two used silica gel, one used alumina, one used gel permeation chromatography and one injected their extract without any cleanup. Five laboratories used single column systems for analysis, six used dual columns and one used triple columns. Only two laboratories analyzed total PCBs and the chlorinated hydrocarbons on different columns. Four laboratories of twelve used only packed column systems while the rest used fused silica capillary columns or a combination of both. All 12 laboratories used electron capture for detection. See Table 3 for details of methodologies.

Data Evaluation

All raw data submitted by the participants are listed by parameter in the data summary (Appendix II).

In order to evaluate the precision and accuracy of the PCB and chlorinated hydrocarbon results in this study, the percent recoveries (reported vs design values and reported vs interlaboratory medians) were calculated (Table 4).

To provide a semi-quantitative evaluation of the results, the recoveries were designated as very low, low, satisfactory, high or very high as follows:

% Recovery	Designation
≥150	very high
149-125	high
124-76	satisfactory
75-51	low
≤50	very low

See Table 5 for a summary of each laboratory's results.

General Comments

Only one of the 12 reporting laboratories submitted their data by the originally set deadline (U014). Computer printouts of the raw data were sent out to all reporting laboratories for verification in October 1986. All laboratories returned their results verified. A final data summary was sent out to the participating laboratories, the Quality Management Work Group, the work group chairmen and the MC and AIC chairmen on November 20, 1986.

The number of laboratories reporting data for each parameter varied from three for 1,2,4,5-TeCB to twelve for PCB (average was circa 6). Only two laboratories reported data for all 14 parameters (U086 and U072), but about half the data submitted by laboratory U072 were "less thans". One laboratory reported PCB data only (U079) and another analyzed ampules 701-704 only for three parameters (U091). Laboratory U063 could not resolve the TeCB isomers, otherwise it analyzed all the parameters requested. The remaining seven laboratories reported results for three to 12 parameters.

The interlaboratory medians for ampules 701-704 were in good agreement with the design value (within ±10%) except for 1,3,5-TCB and 1,2,4,5-TeCB (82% and 84% recovery, respectively). The means were also within ±10% of the design value except for 1,3,5-TCB (73% recovery), 1,2,4,5-TeCB (84%), HCE (88%), 1,2-DCB (357%), HCE (271%) and HCBD (180%). In comparison with QM-1 (ampules 102, 104, 110, 111) the results from this study show a minor improvement in recovery for the interlaboratory means and marked improvement for the interlaboratory medians in relation to the design value. In the earlier study, both the interlaboratory medians and means for only

PCBs, HCE, HCBD and the three DCB isomers were within ±10% of the design values. The remaining eight parameters fell between 88% (HCB) and 58% (1,2,4,5-TeCB) recovery of the design value. Because of the small number of participants, deletion of data sets can significantly change the means and even the medians. After rejection of obvious outlying data, there is an improvement in the variation of the data. Both the medians and the means were within ±10% of the design value and the relative standard deviations were better than 20% in most cases indicating that both the comparability and accuracy of these interlab data were satisfactory.

The PCB results in the fortified water samples were satisfactory except for those indicated in the lab-specific comments (following section). The interlab median recoveries for PCB in all water samples ranged from 75% to 90% of the design values. The chlorinated hydrocarbon results for the spiked water samples were worse. The interlab median recoveries ranged from circa 50% for the DCB's, HCE and HCBD to circa 90% for OCS. Less than quantitative recoveries of the chlorinated hydrocarbons from the fortified water samples were not unexpected because of the volatility of most chlorinated hydrocarbons, resulting in evaporative losses. The high water solubilities of some chlorinated hydrocarbons also caused poor extraction recoveries. To minimize evaporative losses, EPA Method 612 recommends the use of a Kuderna-Danish evaporator equipped with a three stage Snyder column for the evaporative concentration of organic solutions containing chlorinated hydrocarbons. However, some participants concentrated their sample extracts by using a rotary evaporator under reduced pressure which further aggravates evaporative losses. By rejecting outlying data, the means fell within ±10% of the interlaboratory medians.

There is a large difference in ECD sensitivities for chlorinated hydrocarbons which is dependent, to a certain extent, on the number of chlorine atoms present. The detection limits reported for the water samples vary from approximately 600 to 5 ng/L (average 140 ng/L) for DCB to 10 to 0.2 ng/L (average 2 ng/L) for OCS. Lab U072 had detection limits higher than the design values for the water samples for many parameters. As it is, their methodology for chlorinated hydrocarbons is considered unsuitable for the monitoring of such compounds in natural water samples. Laboratory U013 did not report any detection limits.

LAB SPECIFIC COMMENTS

<u>U001</u> This laboratory reported results for all parameters except 1,2,4,5-TeCB and HCE. Precision for duplicate pairs of the ampules (701-704) was better than ±10% while for duplicate pairs of the spiked water samples (705-708) precision was erratic, ranging from ±1% for 1,2-DCB to ±49% for 1,3-DCB. Based on % recovery of the design value, accuracy for ampules 701-704 was average (range 62-111%). Eight recoveries out of 24 were low while 16 were designated as satisfactory. Accuracy for the

spiked waters was worse (recovery ranging from 26.5-188%). Out of 48 results only seven were satisfactory while 20 were very low, 17 were low and four were very high.

U013 Partial results were reported for PCBs, PeCB, HCB and OCS. Samples 707 and 708 were not analyzed at all. Precision for ampules 701-704 was better than ±10% and for spiked waters 705 and 706, precision was within ±12%. Of the 14 results reported, only five recoveries were satisfactory. Four recoveries were low, four were very low (all four for OCS) and one was high. Recovery ranged from 21% to 133%. No detection limits were reported.

U014 Results were reported for all parameters except 1,3,5- and 1,2,3-TCB, 1,2,4,5- and 1,2,3,4-TeCB, PeCB and OCS which were not available. Precision for ampules 701-704 was very good (±4%) and for spiked waters 705-708, it was better than ±10% except for 1,2,4-TCB and HCBD for 707 and 708 (±13% and ±19%, respectively). Of 16 results reported for the ampules, 14 recoveries were satisfactory. Two were very high. Recoveries ranged from 90-154%. Accuracy for the spiked waters was much worse. Out of 32 results, only four recoveries were satisfactory. Two were low and ten were very low. Range of recoveries was 17-96%. The 16 results which were reported as "less than" were based on detection limits which were above this study's design values.

U063 This laboratory had difficulties in both precision and accuracy. The "less thans" were originally reported as dashes. After telephone contact, the laboratory stated that dashes were equivalent to "less thans". Precision for ampules 701-704 was within ±10% except for 1,2-DCB (±47%) and HCB (±13%). Precision for the water spikes (705-708) was much worse. The duplicate pairs could not be correlated to each other. Accuracy for the ampules was very poor (range 42-1840% recovery). Only eight recoveries out of 24 results were satisfactory while seven were low, one very low, and eight were very high. Accuracy for the spiked waters was even worse (range <1 - 2220% recovery). Recoveries were calculated on the less thans based on the laboratory's detection limits and the design values. Out of 48 results, only seven recoveries were satisfactory. Four recoveries were low, 11 were very low, three were high and nine were very high. Twelve of the 14 "less thans" were below the design values of this study and therefore were designated as false negatives. The other two "less thans" were based on the laboratory's detection limits which were above the design values of this study. The two TeCB isomers were not resolved. The data reported for the sum of these two compounds was not used.

<u>U072</u> Although this laboratory submitted results for all the parameters requested, most of the results for the spiked waters (705-708) were "less thans". Originally the "less thans" had been left blank. It was only after telephone contact that the laboratory stated that the blanks were equivalent to "less thans". Precision for the ampules was within ±16% except for HCBD (±28%), while for the spiked waters it was erratic even though comparisons between the data were limited. Accuracy for the ampules was excellent as all 28 recoveries were designated satisfactory (range 79-113%). For the spiked waters, only four recoveries were satisfactory out of 56 results reported. Eight were very low, four were low and 40 were "less thans" (range <5 - 108%). Four of the "less thans" (PCBs, HCE and HCBD) were below this study's design values and were designated as false negatives. Two of the "less thans" were based on detection limits that were within range of the design values (1,2,3,4-TeCB and PeCB). The other 34 "less thans" were based on detection limits that were much higher than the design values of this study.

<u>U075</u> This laboratory reported results for PCBs and partial results for HCB and OCS. For the 14 results submitted, precision was ±7% but accuracy was very poor (recovery ranged from <20-366%). Only two recoveries were satisfactory while eight were very high. Four results were reported as "less than". Two of the "less thans" which were based on the laboratory's detection limits were in

the range of this study's design values. The other two "less thans" (707, 708) were below the design values (actually <20% recovery) and were designated as false negatives.

U077 This laboratory reported results only for PCBs, HCB and OCS. All the other parameters were not routinely analyzed. Precision for ampules 701-704 was excellent (±1%) and for spiked waters 705-708 it was very good (better than ±11%) except PCBs for 705-706 (±26%). For the limited amount of data reported (18 results) accuracy was satisfactory for the ampules but average for the spiked water (range was 78-135% recovery). Eight recoveries were satisfactory, one was low and three were high.

U079 PCB was the only parameter reported for this study. All the other parameters were not routinely analyzed. Precision for the six values reported was within ±18% and accurcy was average (range was 85-162% recovery). Three recoveries were satisfactory, two high and one very high.

U086 This laboratory submitted results for all the parameters requested. Precision for ampules 701-704 was excellent (<±2%) except for PCB (±11%). The spiked waters (705-708) also had good precision (±10%) with the exception of 1,4-DCB (±31%). Accuracy for the ampules was very good with a range of 88-156% recovery.

Out of 28 results, 26 recoveries were satisfactory, one PCB result was high and the other PCB result was very high. Accuracy for the spiked waters was not as good (range 53-123% recovery). Only 29 out of 56 results were designated satisfactory while 27 recoveries were low.

<u>U091</u> This laboratory analyzed ampules 701-704 only for PCBs, HCB and OCS. All six results reported had a precision of better than ±4% and accuracy that was very good (±10% of the design value). None of the water samples provided were analyzed.

<u>U092</u> Results for all the parameters were reported by this laboratory except for the three DCB isomers which are not routinely analyzed. Precision for ampules 701-704 was within ±6% while for the spiked waters (705-708) it was more variable, ranging from 0% for a number of parameters to ±27% for HCBD. Accuracy was better than average for the ampules (range 34-116% recovery). Out of 22 results reported, 16 recoveries were satisfactory, four were designated low and two were very low. Accuracy for the spiked waters was not as good (range 32-269% recovery). Nineteen out of 44 results were satisfactory, 13 recoveries were low, five were very low, one was high, four were very high and two were reported as "less thans". The "less thans" were within range of the design value of this study.

U093 This laboratory reported partial results for PCBs and complete results for all the other parameters except the three DCB isomers which are not routinely analyzed. Precision was ±6% for ampules 701-704 except PCBs (±20%). For the spiked waters, precision was erratic with a range of 0% for a number of results to ±67% for OCS. There may have been a problem with the OCS result for sample 706. Accuracy was satisfactory for the ampules (range 64-111% recovery) except 1,3,5-TCB (38% recovery). Only four out of 22 results were not satisfactory. Two recoveries were low and two were very low. Out of 40 results reported for the spiked waters, only nine recoveries were satisfactory, while 18 were very low, nine were low and one very high (range 21-107%). Three recoveries were reported as "ND" parameters whose design values were above this laboratory's detection limits. These three results were therefore designated as false negatives.

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LIST OF PARTICIPANTS

Detroit Wastewater Treatment Plant, Detroit, Michigan

EPS, Wastewater Technology Centre, Burlington, Ontario

Michigan Department of Natural Resources, Lansing, Michigan

Michigan Department of Public Health, Lansing, Michigan

NWRI/Environmental Contaminants Division, Burlington, Ontario

Ontario Ministry of the Environment (DW section), Rexdale, Ontario

Ontario Ministry of the Environment (TO section), Rexdale, Ontario

Ontario Ministry of the Environment, Thunder Bay, Ontario

US EPA, Large Lakes Research Station, Grosse Ile, Michigan

US Geological Survey, Arvada, Colorado

Water Quality National Laboratory, Burlington, Ontario

Zenon Environmental, Burlington, Ontario

The following laboratories requested and received samples, but did not submit any results:

Barringer Magenta, Rexdale, Ontario

IEC Beak Consultants, Mississauga, Ontario (Volunteer lab)

Mann Testing Laboratories, Mississauga, Ontario

US Army Corps of Engineers, Detroit, Michigan

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TABLE 1. Samples distributed for study QM-7.

Sample	Description
701	2:1 Mixture of Aroclors 1254/1260 in isooctane
702	Same as 701
703	Mixture of 13 chlorinated hydrocarbons in isooctane
704	Same as 703
705	Mixture of Aroclors 1254/1260 and 13 chlorinated hydrocarbons in acetone (Level 1)
706	Same as 705
707	Mixture of Aroclors 1254/1260 and 13 chlorinated hydrocarbons in acetone (Level 2)
708	Same as 707

TABLE 2. Design values and interlaboratory medians for PCB and chlorinated hydrocarbons.

Parameter	Design Value	Interlab Median (pg/μL) 701	702	Design Value	Interlab Median 703	704
PCB	180	192	198	-	-	-
1,4-DCB	-	-	-	152	160	160
1,3-DCB	-	-	-	143	130	140
1,2-DCB	-	-	-	158	170	170
1,3,5-TCB	-	-	-	32.0	25.6	27.0
1,2,4-TCB	-	-	-	30.0	27.0	28.0
1,2,3-TCB	-	-	-	31.2	28.5	29.0
1,2,4,5-TeCB	-	-	-	15.2	12.5	13.0
1,2,3,4-TeCB	-	-	-	14.7	14.0	15.0
PeCB	-	-	-	14.8	14.0	14.0
HCB	-	-	-	7.77	7.0	7.32
HCE	-	-	-	6.02	6.00	6.00
HCBD	-	-	-	7.42	8.00	8.00
OCS	-	-	-	15.6	14.0	14.0

Parameter	Design Value	Interlab Median (ng/L) 705	706	Design Value	Interlab Median 707	708
PCB	60.0	53.4	56.1	300	232	229
1,4-DCB	40.5	32.0	50.0	203	130	101
1,3-DCB	19.0	10.1	13.4	95.2	40.2	47.5
1,2-DCB	21.0	31.5	31.8	105	78.0	74.0
1,3,5-TCB	10.7	7.58	8.40	53.5	17.3	19.3
1,2,4-TCB	20.0	15.0	14.2	100	54.7	55.0
1,2,3-TCB	10.4	8.00	7.90	51.7	36.0	38.5
1,2,4,5-TeCB	10.1	16.6	14.5	50.3	34.0	36.0
1,2,3,4-TeCB	9.8	5.98	6.70	48.9	30.0	26.6
PeCB	4.9	3.75	3.80	24.7	19.0	21.5
HCB	5.2	4.80	4.60	25.9	20.0	19.8
HCE	22.0	12.5	14.0	110	66.0	60.0
HCBD	21.8	11.0	9.0	109	52.0	48.0
OCS	5.2	5.00	5.10	26.0	25.0	21.5

TABLE 3. Analytical methodology for PCB and chlorinated hydrocarbons.

Lab No	Sample Preparation	Separation	Detection
U001	DCM extraction, rotavapor concentration, auto-injection and peak integration	PCB-3% OV101 (PCB 1248:1254: 1260-1:1:1) OC-30m SPB-5 FSCC	EC EC
U013	DCM extraction, Snyder column concentration, gel permeation cleanup, H_2SO_4 and activated Cu treatment, auto-injection and auto data reduction	60m DB-5 FSCC (PCB-mixed congener stds)	EC
U014	DCM extraction, Snyder column concentration, Florisil cleanup and fractionation (A-6% ethyl ether in hexane, B-50% ethyl ether in hexane), auto-injection and auto data reduction	dual:25 m x 0.2mm 5% phenyl methyl silicone FSCC :25 m x 0.22 mm SIL 19 CB FSCC (PCB-1242:1254:1260 -1:1:1	EC EC
U063	DCM extraction, rotavapour concentration, silica gel cleanup, fractionation, (A-hexane, B-benzene), manual injection	DB-5 FSCC (PCB-no details given)	EC
U072	DCM extraction, Snyder column concentration, Florisil fractionation (A-6% diethyl ether in pet. ether, B-15% diethyl ether in pet. ether), auto data collection	triple: 3% SE30 on Gas Chrom Q, :1.5% OV17 + 1.95% QF1 on Gas Chrom Q :4% SE30 + 6% OV210 on Gas Chrom Q (PCB-peak matching)	EC EC EC
U075	Hexane extraction, rotavapor concentration, silica gel cleanup and fractionation, auto-injection and auto data collection	DB-5 FSCC (PCB-no detail given)	EC
U077	Hexane extraction, Snyder column concentration, alumina cleanup, silica gel cleanup and fractionation (A-hexane, B-benzene), manual injection	dual 1.8 m x 4 mm 3% SP-2100 on Supelcoport :1.5% SP-2250+1.95% SP-2401 on Supelcoport (PCB-peak matching)	EC EC
U079	DCM extraction, Snyder column concentration, Florisil cleanup and fractionation (A-6% ethyl ether in hexane, B-15% ethyl ether in hexane, C-50% ethyl ether in hexane)	dual 1.8 m x 4 mm :1.5% SP-2250+1.95% SP-2401 on Supelcoport :3% OV-1 on Supelcoport (PCB - peak matching)	EC EC

TABLE 3. Analytical methodology for PCB and chlorinated hydrocarbons. continued

Lab No	Sample Preparation	Separation	Detection
U086	DCM extraction, Snyder column concentration, Florisil cleanup, auto-injection and auto data collection	dual 25 m x 0.2 mm :OV-1 FSCC :SE-54 FSCC (PCB- individual congeners)	 EC EC
U091	Water samples not analyzed	4 m x 2 mm 3% Dexsil 300 on Chromosorb W, HP (PCB-no detail given)	 EC
U092	DCM extraction, rotary flash concentration, Florisil cleanup, auto-injection and auto data system	dual 30 m x 0.25 mm :SPB-1 FSCC :DB-1701 FSCC (PCB - total PCB)	 EC EC
U093′	DCM extraction, rotary flash concentration, Florisil cleanup and fractionation	PCB-1.5% OV17+1.95% QF-1 on Gas Chrom Q (1254:1260-4:1) OC-dual 30 m x 0.25 mm :DB-1 FSCC :DB-1701 FSCC	 EC EC EC

TABLE 4. % Recovery of the design value and the interlaboratory median.

Lab U001

$$\frac{\text{Reported Value}}{\text{Design/Median}} \times 100$$

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	701	702	703	704	701	702	703	704
PCB	111	108	-	-	104	98.7	-	-
1,4-DCB	-	-	79.6	82.9	-	-	75.6	78.8
1,3-DCB	-	-	90.2	93.0	-	-	99.2	95.0
1,2-DCB	-	-	80.4	82.9	-	-	74.7	77.1
1,3,5-TCB	-	-	66.6	73.1	-	-	83.0	86.8
1,2,4-TCB	-	-	62.3	69.7	-	-	69.3	74.6
1,2,3-TCB	-	-	65.4	72.4	-	-	71.6	77.9
1,2,4,5-TeCB	-	-	NA	NA	-	-	NA	NA
1,2,3,4-TeCB	-	-	69.4	72.1	-	-	72.9	70.7
PeCB	-	-	76.4	79.7	-	-	80.7	84.3
HCB	-	-	87.0	90.6	-	-	96.6	96.2
HCE	-	-	NA	NA	-	-	NA	NA
HCBD	-	-	79.5	83.0	-	-	73.8	77.0
OCS	-	-	84.6	87.2	-	-	94.3	97.1

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	705	706	707	708	705	706	707	708
PCB	76.5	93.7	74.3	94.3	85.9	100	96.3	124
1,4-DCB	45.7	83.2	36.5	35.4	57.8	67.4	56.9	71.2
1,3-DCB	32.4	66.8	42.2	36.8	61.0	95.1	100	73.7
1,2-DCB	150	151	34.4	26.5	100	100	46.3	37.6
1,3,5-TCB	154	188	32.3	40.4	218	239	100	112
1,2,4-TCB	59.0	71.0	37.2	44.0	78.7	100	68.0	80.0
1,2,3-TCB	49.4	64.1	45.8	54.0	64.2	84.4	65.8	72.5
1,2,4,5-TeCB	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4-TeCB	44.6	60.5	44.6	51.7	73.0	88.5	72.7	94.9
PeCB	36.1	51.0	56.3	61.9	47.2	65.8	73.2	71.2
HCB	84.6	110	66.4	71.4	91.6	125	86.0	93.7
HCE	NA	NA	NA	NA	NA	NA	NA	NA
HCBD	39.4	56.4	28.4	39.9	78.2	137	59.6	90.6
OCS	64.6	93.5	52.3	61.2	67.2	95.3	54.4	74.0

See Appendix 1 for explanation of codes.

TABLE 4. % Recovery of the design value and the interlaboratory median.

Lab U013

$$\frac{\text{Reported Value}}{\text{Design/Median}} \times 100$$

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	701	702	703	704	701	702	703	704
PCB	117	133	-	-	109	122	-	-
1,4-DCB	-	-	NA	NA	-	-	NA	NA
1,3-DCB	-	-	NA	NA	-	-	NA	NA
1,2-DCB	-	-	NA	NA	-	-	NA	NA
1,3,5-TCB	-	-	NA	NA	-	-	NA	NA
1,2,4-TCB	-	-	NA	NA	-	-	NA	NA
1,2,3-TCB	-	-	NA	NA	-	-	NA	NA
1,2,4,5-TeCB	-	-	NA	NA	-	-	NA	NA
1,2,3,4-TeCB	-	-	NA	NA	-	-	NA	NA
PeCB	-	-	108	101	-	-	114	107
HCB	-	-	92.7	97.8	-	-	103	104
HCE	-	-	NA	NA	-	-	NA	NA
HCBD	-	-	NA	NA	-	-	NA	NA
OCS	-	-	33.3	35.9	-	-	37.1	40.0

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	705	706	707	708	705	706	707	708
PCB	NA	NA	NA	NA	NA	NA	NA	NA
1,4-DCB	NA	NA	NA	NA	NA	NA	NA	NA
1,3-DCB	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DCB	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-TCB	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-TCB	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3-TCB	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4,5-TeCB	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4-TeCB	NA	NA	NA	NA	NA	NA	NA	NA
PeCB	71.4	69.4	NA	NA	93.3	89.5	NA	NA
HCB	63.5	53.8	NA	NA	68.8	60.9	NA	NA
HCE	NA	NA	NA	NA	NA	NA	NA	NA
HCBD	NA	NA	NA	NA	NA	NA	NA	NA
OCS	25.0	21.2	NA	NA	26.0	21.6	NA	NA

See Appendix 1 for explanation of codes.

TABLE 4. % Recovery of the design value and the interlaboratory median.

Lab U014

$$\frac{\text{Reported Value}}{\text{Design/Median}} \times 100$$

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	701	702	703	704	701	702	703	704
PCB	106	101	-	-	99.5	91.6	-	-
1,4-DCB	-	-	118	118	-	-	112	112
1,3-DCB	-	-	154	154	-	-	169	157
1,2-DCB	-	-	120	121	-	-	112	112
1,3,5-TCB	-	-	NAV	NAV	-	-	NAV	NAV
1,2,4-TCB	-	-	90.0	93.3	-	-	100	100
1,2,3-TCB	-	-	NAV	NAV	-	-	NAV	NAV
1,2,4,5-TeCB	-	-	NAV	NAV	-	-	NAV	NAV
1,2,3,4-TeCB	-	-	NAV	NAV	-	-	NAV	NAV
PeCB	-	-	NAV	NAV	-	-	NAV	NAV
HCB	-	-	103	103	-	-	114	109
HCE	-	-	99.7	99.7	-	-	100	100
HCBD	-	-	108	108	-	-	100	100
OCS	-	-	NAV	NAV	-	-	NAV	NAV

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	705	706	707	708	705	706	707	708
PCB	LT	LT	50.0	56.7	LT	LT	64.8	74.2
1,4-DCB	LT	LT	LT	LT	LT	LT	LT	LT
1,3-DCB	LT	LT	LT	LT	LT	LT	LT	LT
1,2-DCB	LT	LT	LT	LT	LT	LT	LT	LT
1,3,5-TCB	NAV	NAV	NAV	NAV	NAV	NAV	NAV	NAV
1,2,4-TCB	LT	LT	48.0	52.0	LT	LT	87.7	94.6
1,2,3-TCB	NAV	NAV	NAV	NAV	NAV	NAV	NAV	NAV
1,2,4,5-TeCB	NAV	NAV	NAV	NAV	NAV	NAV	NAV	NAV
1,2,3,4-TeCB	NAV	NAV	NAV	NAV	NRA	NAV	NAV	NAV
PeCB	NAV	NAV	NAV	NAV	NAV	NAV	NAV	NAV
HCB	96.2	96.2	81.1	81.1	104	109	105	106
HCE	40.9	36.4	19.1	20.9	72.0	57.1	31.8	38.3
HCBD	36.7	32.1	17.4	22.9	72.7	77.8	36.5	52.1
OCS	NAV	NAV	NAV	NAV	NAV	NAV	NAV	NAV

See Appendix 1 for explanation of codes.

TABLE 4. % Recovery of the design value and the interlaboratory median.

Lab U063

$$\frac{\text{Reported Value}}{\text{Design/Median}} \times 100$$

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	701	702	703	704	701	702	703	704
PCB	109	115	-	-	102	105	-	-
1,4-DCB	-	-	118	108	-	-	112	102
1,3-DCB	-	-	54.5	51.7	-	-	60.0	52.9
1,2-DCB	-	-	1842	924	-	-	1712	859
1,3,5-TCB	-	-	98.8	95.3	-	-	123	113
1,2,4-TCB	-	-	102	98.7	-	-	113	106
1,2,3-TCB	-	-	65.4	62.8	-	-	71.6	67.6
1,2,4,5-TeCB	-	-	NR	NR	-	-	NR	NR
1,2,3,4-TeCB	-	-	NR	NR	-	-	NR	NR
PeCB	-	-	65.9	64.6	-	-	69.7	68.3
HCB	-	-	41.7	50.1	-	-	46.3	53.1
HCE	-	-	1148	1105	-	-	1152	1108
HCBD	-	-	678	643	-	-	629	596
OCS	-	-	206	213	-	-	230	238

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	705	706	707	708	705	706	707	708
PCB	101	167	83.0	79.3	114	178	108	104
1,4-DCB	304	264	90.6	(<2)	384	214	142	(<5)
1,3-DCB	LT	LT	14.5	(<26)	LT	LT	34.3	(<53)
1,2-DCB	1000	2219	218	205	667	1465	294	291
1,3,5-TCB	63.3	(<9)	54.6	(<2)	89.3	(<12)	169	(<6)
1,2,4-TCB	105	34.6	51.4	4.39	140	48.7	94.0	7.98
1,2,3-TCB	17.7	(<10)	37.5	(<2)	23.0	(<13)	53.9	(<3)
1,2,4,5-TeCB	NR	NR	NR	NR	NR	NR	NR	NR
1,2,3,4-TeCB	NR	NR	NR	NR	NR	NR	NR	NR
PeCB	22.4	(<10)	43.7	(<2)	29.3	(<13)	56.8	(<2)
HCB	14.4	15.4	51.7	(<2)	15.6	17.4	67.0	(<3)
HCE	138	(<2)	148	(<1)	242	(<4)	247	(<1)
HCBD	90.4	1.93	137	(<1)	179	4.67	287	(<1)
OCS	87.7	162	388	27.4	91.2	165	404	33.1

See Appendix 1 for explanation of codes.

TABLE 4. % Recovery of the design value and the interlaboratory median.

Lab U072 $\frac{\text{Reported Value}}{\text{Design/Median}} \times 100$

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	701	702	703	704	701	702	703	704
PCB	106	103	-	-	99.0	93.7	-	-
1,4-DCB	-	-	92.1	98.7	-	-	87.5	93.8
1,3-DCB	-	-	90.9	97.9	-	-	100	100
1,2-DCB	-	-	94.9	101	-	-	88.2	94.1
1,3,5-TCB	-	-	93.8	106	-	-	117	126
1,2,4-TCB	-	-	90.0	110	-	-	100	118
1,2,3-TCB	-	-	96.2	106	-	-	105	114
1,2,4,5-TeCB	-	-	78.9	98.7	-	-	96.0	115
1,2,3,4-TeCB	-	-	88.4	109	-	-	92.9	107
PeCB	-	-	94.6	101	-	-	100	107
HCB	-	-	113	102	-	-	126	108
HCE	-	-	93	94.7	-	-	93.3	95.0
HCBD	-	-	95.7	101	-	-	88.8	93.8
OCS	-	-	103	103	-	-	114	114

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	705	706	707	708	705	706	707	708
PCB	(<17)	(<17)	15.0	14.3	(<19)	(<18)	19.4	18.8
1,4-DCB	LT	LT	LT	LT	LT	LT	LT	LT
1,3-DCB	LT	LT	LT	LT	LT	LT	LT	LT
1,2-DCB	LT	LT	LT	LT	LT	LT	LT	LT
1,3,5-TCB	LT	LT	LT	LT	LT	LT	LT	LT
1,2,4-TCB	LT	LT	LT	LT	LT	LT	LT	LT
1,2,3-TCB	LT	LT	LT	LT	LT	LT	LT	LT
1,2,4,5-TeCB	LT	LT	LT	LT	LT	LT	LT	LT
1,2,3,4-TeCB	LT	LT	65.4	LT	LT	LT	107	LT
PeCB	LT	LT	72.9	LT	LT	LT	94.7	LT
HCB	LT	LT	77.2	35.5	LT	LT	100	46.6
HCE	50.0	39.1	39.1	(<5)	88.0	61.4	65.2	(<8)
								(<13)
OCS	108	98.1	88.5	69.2	112	100	92.0	83.7

See Appendix 1 for explanation of codes.

TABLE 4. % Recovery of the design value and the interlaboratory median.

Lab U075

$$\frac{\text{Reported Value}}{\text{Design/Median}} \times 100$$

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	701	702	703	704	701	702	703	704
PCB	107	98.9	-	-	101	90.1	-	-
1,4-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,3-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,3,5-TCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2,4-TCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2,3-TCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2,4,5-TeCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2,3,4-TeCB	-	-	NRA	NRA	-	-	NRA	NRA
PeCB	-	-	NRA	NRA	-	-	NRA	NRA
HCB	-	-	NRA	NRA	-	-	NRA	NRA
HCE	-	-	NRA	NRA	-	-	NRA	NRA
HCBD	-	-	NRA	NRA	-	-	NRA	NRA
OCS	-	-	NRA	NRA	-	-	NRA	NRA

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	705	706	707	708	705	706	707	708
PCB	LT	LT	LT(<20)	LT(<20)	LT	LT	LT(<26)	LT(<26)
1,4-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,3-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,3,5-TCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2,4-TCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2,3-TCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2,4,5-TeCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2,3,4-TeCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
PeCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
HCB	223	203	250	227	241	229	324	297
HCE	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
HCBD	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
OCS	366	366	335	320	380	373	349	387

See Appendix 1 for explanation of codes.

TABLE 4. % Recovery of the design value and the interlaboratory median.

Lab U077

$$\frac{\text{Reported Value}}{\text{Design/Median}} \times 100$$

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	701	702	703	704	701	702	703	704
PCB	77.8	77.8	-	-	72.9	70.9	-	-
1,4-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,3-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,3,5-TCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2,4-TCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2,3-TCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2,4,5-TeCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2,3,4-TeCB	-	-	NRA	NRA	-	-	NRA	NRA
PeCB	-	-	NRA	NRA	-	-	NRA	NRA
HCB	-	-	116	116	-	-	129	123
HCE	-	-	NRA	NRA	-	-	NRA	NRA
HCBD	-	-	NRA	NRA	-	-	NRA	NRA
OCS	-	-	96.2	96.2	-	-	107	107

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	705	706	707	708	705	706	707	708
PCB	135	93.3	80.0	73.3	152	99.8	104	96.1
1,4-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,3-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,3,5-TCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2,4-TCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2,3-TCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2,4,5-TeCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2,3,4-TeCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
PeCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
HCB	135	115	104	100	146	130	135	132
HCE	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
HCBD	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
OCS	135	115	104	104	140	118	108	126

See Appendix 1 for explanation of codes.

TABLE 4. % Recovery of the design value and the interlaboratory median.

Lab U079

$$\frac{\text{Reported Value}}{\text{Design/Median}} \times 100$$

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	701	702	703	704	701	702	703	704
PCB	100	129	-	-	93.8	117	-	-
1,4-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,3-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,3,5-TCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2,4-TCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2,3-TCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2,4,5-TeCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2,3,4-TeCB	-	-	NRA	NRA	-	-	NRA	NRA
PeCB	-	-	NRA	NRA	-	-	NRA	NRA
HCB	-	-	NRA	NRA	-	-	NRA	NRA
HCE	-	-	NRA	NRA	-	-	NRA	NRA
HCBD	-	-	NRA	NRA	-	-	NRA	NRA
OCS	-	-	NRA	NRA	-	-	NRA	NRA

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	705	706	707	708	705	706	707	708
PCB	162	127	89.0	84.7	182	135	115	111
1,4-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,3-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,3,5-TCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2,4-TCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2,3-TCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2,4,5-TeCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2,3,4-TeCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
PeCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
HCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
HCE	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
HCBD	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
OCS	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA

See Appendix 1 for explanation of codes.

TABLE 4. % Recovery of the design value and the interlaboratory median.

Lab U086

$$\frac{\text{Reported Value}}{\text{Design/Median}} \times 100$$

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	701	702	703	704	701	702	703	704
PCB	133	156	-	-	125	142	-	-
1,4-DCB	-	-	105	105	-	-	100	100
1,3-DCB	-	-	97.9	97.9	-	-	108	100
1,2-DCB	-	-	108	108	-	-	100	100
1,3,5-TCB	-	-	100	96.9	-	-	125	115
1,2,4-TCB	-	-	93.3	93.3	-	-	104	100
1,2,3-TCB	-	-	89.7	87.8	-	-	98.2	96.6
1,2,4,5-TeCB	-	-	92.1	92.1	-	-	112	108
1,2,3,4-TeCB	-	-	95.2	95.2	-	-	100	93.3
PeCB	-	-	87.8	87.8	-	-	92.9	92.9
HCB	-	-	87.5	87.5	-	-	97.1	92.9
HCE	-	-	89.7	89.7	-	-	90.0	90.0
HCBD	-	-	95.7	94.3	-	-	88.8	87.5
OCS	-	-	89.7	89.7	-	-	100	100

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	705	706	707	708	705	706	707	708
PCB	76.7	73.3	86.7	86.7	86.1	78.4	112	114
1,4-DCB	79.0	123	64.0	64.0	100	100	100	129
1,3-DCB	73.7	73.7	65.1	63.0	139	105	154	126
1,2-DCB	81.0	81.0	74.3	70.5	54.0	53.5	100	100
1,3,5-TCB	78.5	78.5	67.3	67.3	111	100	208	187
1,2,4-TCB	75.0	65.0	70.0	70.0	100	91.6	128	127
1,2,3-TCB	80.8	84.6	73.5	77.4	105	111	106	104
1,2,4,5-TeCB	81.2	79.2	75.5	71.6	49.4	55.2	112	100
1,2,3,4-TeCB	77.6	75.5	73.6	73.6	127	110	120	135
PeCB	85.7	85.7	81.0	81.0	112	111	105	93.0
HCB	92.3	88.5	77.2	84.9	100	100	100	111
HCE	63.6	63.6	65.5	61.8	112	100	109	113
HCBD	68.8	73.4	55.0	53.2	136	178	115	120
OCS	84.6	84.6	84.6	84.6	88.0	86.3	88.0	102

See Appendix 1 for explanation of codes.

TABLE 4. % Recovery of the design value and the interlaboratory median.

Lab U091

$$\frac{\text{Reported Value}}{\text{Design/Median}} \times 100$$

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	701	702	703	704	701	702	703	704
PCB	106	111	-	-	109	122	-	-
1,4-DCB	-	-	NA	NA	-	-	NA	NA
1,3-DCB	-	-	NA	NA	-	-	NA	NA
1,2-DCB	-	-	NA	NA	-	-	NA	NA
1,3,5-TCB	-	-	NA	NA	-	-	NA	NA
1,2,4-TCB	-	-	NA	NA	-	-	NA	NA
1,2,3-TCB	-	-	NA	NA	-	-	NA	NA
1,2,4,5-TeCB	-	-	NA	NA	-	-	NA	NA
1,2,3,4-TeCB	-	-	NA	NA	-	-	NA	NA
PeCB	-	-	NA	NA	-	-	NA	NA
HCB	-	-	103	103	-	-	114	109
HCE	-	-	NA	NA	-	-	NA	NA
HCBD	-	-	NA	NA	-	-	NA	NA
OCS	-	-	103	103	-	-	114	114

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	705	706	707	708	705	706	707	708
PCB	NA	NA	NA	NA	NA	NA	NA	NA
1,4-DCB	NA	NA	NA	NA	NA	NA	NA	NA
1,3-DCB	NA	NA	NA	NA	NA	NA	NA	NA
1,2-DCB	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-TCB	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-TCB	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3-TCB	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4,5-TeCB	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4-TeCB	NA	NA	NA	NA	NA	NA	NA	NA
PeCB	NA	NA	NA	NA	NA	NA	NA	NA
HCB	NA	NA	NA	NA	NA	NA	NA	NA
HCE	NA	NA	NA	NA	NA	NA	NA	NA
HCBD	NA	NA	NA	NA	NA	NA	NA	NA
OCS	NA	NA	NA	NA	NA	NA	NA	NA

See Appendix 1 for explanation of codes.

TABLE 4. % Recovery of the design value and the interlaboratory median.

Lab U092

$$\frac{\text{Reported Value}}{\text{Design/Median}} \times 100$$

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	701	702	703	704	701	702	703	704
PCB	111	103	-	-	104	93.7	-	-
1,4-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,3-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,3,5-TCB	-	-	37.5	34.4	-	-	46.8	40.8
1,2,4-TCB	-	-	100	100	-	-	111	107
1,2,3-TCB	-	-	112	103	-	-	123	110
1,2,4,5-TeCB	-	-	72.4	72.4	-	-	88.0	84.6
1,2,3,4-TeCB	-	-	95.2	102	-	-	100	100
PeCB	-	-	94.6	94.6	-	-	100	100
HCB	-	-	64.4	64.4	-	-	71.4	68.3
HCE	-	-	116	116	-	-	117	117
HCBD	-	-	108	108	-	-	100	100
OCS	-	-	83.3	83.3	-	-	92.9	92.9

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	705	706	707	708	705	706	707	708
PCB	50.0	58.3	66.7	61.7	56.2	62.4	86.4	80.8
1,4-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,3-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,3,5-TCB	(<47)	(<47)	31.8	31.8	(<66)	<60)	98.3	88.1
1,2,4-TCB	125	100	68.0	70.0	167	141	124	127
1,2,3-TCB	269	240	89.0	92.8	350	316	128	125
1,2,4,5-TeCB	248	208	67.6	71.6	151	145	100	100
1,2,3,4-TeCB	81.6	81.6	47.0	47.0	134	119	76.7	86.3
PeCB	102	102	97.2	97.2	133	132	126	112
HCB	96.2	76.9	54.1	50.2	104	87.0	70.0	65.8
HCE	95.5	72.7	82.7	100	168	114	138	183
HCBD	87.2	59.6	59.6	67.0	173	144	125	152
OCS	115	96.2	80.8	80.8	120	98.0	84.0	97.7

See Appendix 1 for explanation of codes.

TABLE 4. % Recovery of the design value and the interlaboratory median.

Lab U093

$$\frac{\text{Reported Value}}{\text{Design/Median}} \times 100$$

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	701	702	703	704	701	702	703	704
PCB	83.3	111	-	-	78.1	101	-	-
1,4-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,3-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,2-DCB	-	-	NRA	NRA	-	-	NRA	NRA
1,3,5-TCB	-	-	37.5	37.5	-	-	46.8	44.5
1,2,4-TCB	-	-	83.3	83.3	-	-	92.6	89.3
1,2,3-TCB	-	-	92.9	96.2	-	-	102	103
1,2,4,5-TeCB	-	-	85.5	78.9	-	-	104	92.3
1,2,3,4-TeCB	-	-	102	102	-	-	107	100
PeCB	-	-	101	101	-	-	107	107
HCB	-	-	64.4	64.4	-	-	71.4	68.3
HCE	-	-	99.7	99.7	-	-	100	100
HCBD	-	-	108	108	-	-	100	100
OCS	-	-	83.3	76.9	-	-	92.9	85.7

Parameter	% Recovery of Design Value				% Recovery of Interlaboratory Median			
	705	706	707	708	705	706	707	708
PCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,4-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,3-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,2-DCB	NRA	NRA	NRA	NRA	NRA	NRA	NRA	NRA
1,3,5-TCB	37.4	28.0	22.4	20.6	52.7	35.7	69.4	57.0
1,2,4-TCB	45.0	105	58.0	58.0	60.0	148	106	105
1,2,3-TCB	76.9	67.3	69.6	71.6	100	88.6	100	96.1
1,2,4,5-TeCB	ND	ND	49.7	45.7	ND	ND	73.5	63.9
1,2,3,4-TeCB	40.8	61.2	61.4	57.3	66.8	89.6	100	105
PeCB	81.6	ND	101	93.1	107	ND	132	107
HCB	19.2	38.5	30.9	30.9	20.8	43.5	40.0	40.5
HCE	45.5	90.9	54.5	47.3	80.0	143	90.9	86.7
HCBD	45.9	41.3	47.7	44.0	90.9	100	100	100
OCS	96.2	269	107	88.5	100	275	112	107

See Appendix 1 for explanation of codes.

TABLE 5. Summary of laboratory results based on the % recovery of the design value. (See page 5.)

Lab	Parameter	Comments on Sample Results
U001	PCB	707 - low
	1,4-DCB	705, 707, 708 - v. low
	1,3-DCB	705, 707, 708 - v. low; 706 - low
	1,2-DCB	705, 706 - v. high; 707, 708 - v. low
	1,3,5-TCB	703, 704 - low; 705, 706 - v. high; 707, 708 - v. low
	1,2,4-TCB	703, 704, 705, 706 - low; 707, 708 - v. low
	1,2,3-TCB	703, 704, 706, 708 - low; 705, 707 - v. low
	1,2,3,4-TeCB	
	PeCB	705 - v. low; 706, 707, 708 - low
	HCB	707, 708 - low
	HCBD	705, 707, 708 - v. low; 706 - low
	OCS	705, 707, 708 - low
U013	PCB	702 - high
	PeCB	705, 706 - low
	HCB	
	OCS	703, 704, 705, 706 - v. low
U014	PCB	707 - v. low; 708 - low; 705, 706 - less than
	1,2,4-TCB	
	1,4-DCB	705, 706, 707, 708 - less than
	1,2-DCB	
	1,3-DCB	703, 704 - v. high; 705, 706, 707, 708 - less than
	HCE	705, 706, 707, 708 - v. low
	HCBD	
U063	PCB	706 - v. high
	1,4-DCB	705, 706 - v. high; 708 - less than
	1,3-DCB	703, 704 - low; 707 - v. low; 705, 706, 708 - less than
	1,2-DCB	703, 704, 705, 706, 707, 708 - v. high
	1,3,5-TCB	705, 707 - low; 706, 708 - less than
	1,2,4-TCB	706, 708 - v. low; 707 - low
	1,2,3-TCB	703, 704 - low; 705, 707 - v. low; 706, 708 - less than
	PeCB	
	HCB	703, 705, 706 - v. low; 704, 707 - low; 708 - less than
	HCE	703, 704 - v. high; 705, 707 - high; 706, 708 - less than
	HCBD	703, 704 - v. high; 706 - v. low; 707 - high; 708 - less than
	OCS	703, 704, 706, 707 - v. high; 708 - v. low

TABLE 5. Summary of % recovery of the design value.
continued

Lab	Parameter	Comments on Sample Results
U072	PCB	707, 708 - v. low; 705, 706 - less than
	1,4-DCB 1,3-DCB 1,2-DCB 1,3,5-TCB 1,2,4-TCB 1,2,3-TCB 1,2,4,5-TeCB	705, 706, 707, 708 - less than
	1,2,3,4-TeCB PeCB	707 - low; 705, 706, 708 - less than
	HCB	708 - v. low; 705, 706 - less than
	HCE	705, 706, 707 - v. low; 708 - less than
	HCBD	705 - low; 706, 707 - v. low; 708 - less than
	OCS	708 - low
U075	PCB	705, 706, 707, 708 - less than
	HCB OCS	705, 706, 707, 708 - v. high
U077	PCB	705 - high; 708 - low
	HCB OCS	705 - high
U079	PCB	702, 706 high; 705 - v. high
U086	PCB	701 - high; 702 - v. high; 706 - low
	1,4-DCB 1,2-DCB 1,3,5-TCB 1,2,3,4-TeCB	707, 708 - low
	1,3-DCB 1,2,4-TCB HCE HCBD	705, 706, 707, 708 - low
	1,2,3-TCB	707 - low
	1,2,4,5-TeCB	708 - low

TABLE 5. Summary of % recovery of the design value.
continued

Lab	Parameter	Comments on Sample Results
U091		(only three parameters analyzed)
U092	PCB	705 - v. low; 706, 707, 708 - low
	1,3,5-TCB	703, 704, 707, 708 - v. low; 705, 706 - less than
	1,2,4-TCB	705 - high; 707, 708 - low
	1,2,3-TCB	705, 706 - v. high
	1,2,4,5-TeCB	705, 706 - v. high; 703, 704, 707, 708 - low
	1,2,3,4-TeCB	707, 708 - v. low
	HCB	703, 704, 707, 708 - low
	HCE	706 - low
	HCBD	706, 707, 708 - low
U093	1,3,5-TCB	703, 704, 705, 706, 707, 708 - v. low
	1,2,4-TCB	705 - v. low; 707, 708 - low
	1,2,3-TCB	706, 707, 708 - low
	1,2,4,5-TeCB	707, 708 - v. low; 705, 706 - ND
	1,2,3,4-TeCB	705 - v. low; 706, 707, 708 - low
	PeCB	706 - ND
	HCB	703, 704 - low; 705, 706, 707, 708 - v. low
	HCBD	705, 706, 707, 708 - v. low
	HCE	705, 708 - v. low; 707 - low
	OCS	706 - v. high

APPENDIX I

GLOSSARY OF TERMS

APPENDIX I

Codes

NAV:	not available
NA:	not analyzed
NRA:	not routinely analyzed
N or ND:	not detected
NR:	not resolved
LT:	value reported as "less than"
False Negative:	a result which is reported as "less than" or "not detected" when the design value is more than three times the laboratory's stated detection limit

APPENDIX II

UGLCC INTERLABORATORY PERFORMANCE EVALUATION STUDY

QM-7: PCB AND CHLORINATED HYDROCARBONS IN AMPULES AND WATER

FINAL DATA SUMMARY

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: TOTAL PCB PG/UL

SAMPLE RESULTS

LAB	701	702
U001	199.	195.
U013	210.0	240.0
U014	191.	181.
U063	195.4	206.7
U072	190.	185.
U075	193.	178.
U077	140.	140.
U079	180.	232.
U086	240.	280.
U091	190.	200.
U092	200.	185.
U093	150.0	200.0

	701	702
TOTAL LABS REPORTING	12	12
TOTAL LABS USED	12	12
MEAN	189.86667	201.89167
STD DEV	25.79631	35.60637
MEDIAN	192.00000	197.50000
DESIGN VALUE	180	180

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,4-DICHLOROBENZENE PG/UL

SAMPLE RESULTS

LAB	703	704
U001	121.	126.
U014	180.	180.
U063	179.	164.
U072	140.	150.
U086	160.	160.
TOTAL LABS REPORTING	5	5
TOTAL LABS USED	5	5
MEAN	156.00000	156.00000
STD DEV	25.50490	19.94994
MEDIAN	160.00000	160.00000
DESIGN VALUE	152	152

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,3-DICHLOROBENZENE PG/UL

SAMPLE RESULTS

LAB	703	704
U001	129.	133.
U014	220.	220.
U063	78.	74.
U072	130.	140.
U086	140.	140.
TOTAL LABS REPORTING	5	5
TOTAL LABS USED	5	5
MEAN	139.40000	141.40000
STD DEV	51.14489	51.94998
MEDIAN	130.00000	140.00000
DESIGN VALUE	143	143

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,2-DICHLOROBENZENE PG/UL

SAMPLE RESULTS

LAB	703	704
U001	127.	131.
U014	190.	190.
U063	2910.	1460.
U072	150.	160.
U086	170.	170.
TOTAL LABS REPORTING	5	5
TOTAL LABS USED	5	5
MEAN	709.40000	422.20000
STD DEV	1230.39498	580.53785
MEDIAN	170.00000	170.00000
DESIGN VALUE	158	158

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,3,5-TRICHLOROBENZENE PG/UL

SAMPLE RESULTS

LAB	703	704
U001	21.3	23.4
U063	31.6	30.5
U072	30.	34.
U086	32.	31.
U092	12.	11.
U093	12.0	12.0
TOTAL LABS REPORTING	6	6
TOTAL LABS USED	6	6
MEAN	23.15000	23.65000
STD DEV	9.47328	10.03868
MEDIAN	25.65000	26.95000
DESIGN VALUE	32.0	32.0

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,2,4-TRICHLOROBENZENE PG/UL

SAMPLE RESULTS

LAB	703	704
U001	18.7	20.9
U014	27.	28.
U063	30.5	29.6
U072	27.	33.
U086	28.	28.
U092	30.	30.
U093	25.0	25.0
TOTAL LABS REPORTING	7	7
TOTAL LABS USED	7	7
MEAN	26.60000	27.78571
STD DEV	3.95854	3.88691
MEDIAN	27.00000	28.00000
DESIGN VALUE	30.0	30.0

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,2,3-TRICHLOROBENZENE PG/UL

SAMPLE RESULTS

LAB	703	704
U001	20.4	22.6
U063	20.4	19.6
U072	30.	33.
U086	28.	28.
U092	35.	32.
U093	29.0	30.0
TOTAL LABS REPORTING	6	6
TOTAL LABS USED	6	6
MEAN	27.13333	27.53333
STD DEV	5.74479	5.35562
MEDIAN	28.50000	29.00000
DESIGN VALUE	31.2	31.2

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,2,4,5-TETRACHLOROBENZENE PG/UL

SAMPLE RESULTS

LAB	703	704
U072	12.	15.
U086	14.	14.
U092	11.	11.
U093	13.0	12.0
TOTAL LABS REPORTING	4	4
TOTAL LABS USED	4	4
MEAN	12.50000	13.00000
STD DEV	1.29099	1.82574
MEDIAN	12.50000	13.00000
DESIGN VALUE	15.2	15.2

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,2,3,4-TETRACHLOROBENZENE PG/UL

SAMPLE RESULTS

LAB	703	704
U001	10.2	10.6
U072	13.	16.
U086	14.	14.
U092	14.	15.
U093	15.0	15.0
TOTAL LABS REPORTING	5	5
TOTAL LABS USED	5	5
MEAN	13.24000	14.12000
STD DEV	1.84065	2.09093
MEDIAN	14.00000	15.00000
DESIGN VALUE	14.7	14.7

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: PENTACHLOROBENZENE PG/UL

SAMPLE RESULTS

LAB	703	704
U001	11.3	11.8
U013	16.0	15.0
U063	9.76	9.56
U072	14.	15.
U086	13.	13.
U092	14.	14.
U093	15.0	15.0
TOTAL LABS REPORTING	7	7
TOTAL LABS USED	7	7
MEAN	13.29429	13.33714
STD DEV	2.15180	2.06066
MEDIAN	14.00000	14.00000
DESIGN VALUE	14.8	14.8

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: HEXACHLOROBENZENE PG/UL

SAMPLE RESULTS

LAB	703	704
U001	6.76	7.04
U013	7.2	7.6
U014	8.	8.
U063	3.24	3.89
U072	8.8	7.9
U077	9.	9.
U086	6.8	6.8
U091	8.	8.
U092	5.	5.
U093	5.0	5.0

TOTAL LABS REPORTING	10	10
TOTAL LABS USED	10	10
MEAN	6.78000	6.82300
STD DEV	1.85686	1.65228
MEDIAN	7.00000	7.32000
DESIGN VALUE	7.77	7.77

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: HEXACHLOROETHANE PG/UL

SAMPLE RESULTS

LAB	703	704
U014	6.	6.
U063	69.1	66.5
U072	5.6	5.7
U086	5.4	5.4
U092	7.	7.
U093	6.0	6.0
TOTAL LABS REPORTING	6	6
TOTAL LABS USED	6	6
MEAN	16.51667	16.10000
STD DEV	25.76637	24.69672
MEDIAN	6.00000	6.00000
DESIGN VALUE	6.02	6.02

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: HEXACHLOROBUTADIENE PG/UL

SAMPLE RESULTS

LAB	703	704
U001	5.90	6.16
U014	8.	8.
U063	50.3	47.7
U072	7.1	7.5
U086	7.1	7.0
U092	8.	8.
U093	8.0	8.0
TOTAL LABS REPORTING	7	7
TOTAL LABS USED	7	7
MEAN	13.48571	13.19429
STD DEV	16.25151	15.23079
MEDIAN	8.00000	8.00000
DESIGN VALUE	7.42	7.42

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: OCTACHLOROSTYRENE PG/UL

SAMPLE RESULTS

LAB	703	704
U001	13.2	13.6
U013	5.2	5.6
U063	32.2	33.3
U072	16.	16.
U077	15.	15.
U086	14.	14.
U091	16.	16.
U092	13.	13.
U093	13.0	12.0
TOTAL LABS REPORTING	9	9
TOTAL LABS USED	9	9
MEAN	15.28889	15.38889
STD DEV	7.11836	7.41492
MEDIAN	14.00000	14.00000
I[illegible]GN VALUE	15.6	15.6

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: TOTAL PCB NG/L

SAMPLE RESULTS

LAB	705	706	707	708
U001	45.9	56.2	223.	283.
U014	< 100.	< 100.	158.	170.
U063	60.8	100.	249.	238.
U072	< 10.	< 10.	45.	43.
U075	< 60.	< 60.	< 60.	< 60.
U077	81.	56.	240.	220.
U079	97.0	76.0	267.	254.
U086	46.	44.	260.	260.
U092	30.	35.	200.	185.
TOTAL LABS REPORTING	9	9	9	9
TOTAL LABS USED	6	6	8	8
MEAN	60.11667	61.20000	204.25000	206.62500
STD DEV	24.92135	23.48957	74.64152	76.22511
MEDIAN	53.40000	56.10000	231.50000	229.00000
[illegible]IGN VALUE	60.0	60.0	300	300

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,4-DICHLOROBENZENE NG/L

SAMPLE RESULTS

LAB	705	706	707	708
U001	18.5	33.7	74.0	71.9
U014	< 100.	< 100.	< 100.	< 100.
U063	123.	107.	184.	< 5.
U072	< 800.	< 800.	< 800.	< 800.
U086	32.	50.	130.	130.
TOTAL LABS REPORTING	5	5	5	5
TOTAL LABS USED	3	3	3	2
MEAN	57.83333	63.56667	129.33333	100.95000
STD DEV	56.83822	38.48718	55.00303	41.08290
MEDIAN	32.00000	50.00000	130.00000	100.95000
DESIGN VALUE	40.5	40.5	203	203

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,3-DICHLOROBENZENE NG/L

SAMPLE RESULTS

LAB	705	706	707	708
U001	6.15	12.7	40.2	35.0
U014	< 100.	< 100.	< 100.	< 100.
U063	< 25.	< 25.	13.8	< 25.
U072	< 400.	< 400.	< 400.	< 400.
U086	14.	14.	62.	60.
TOTAL LABS REPORTING	5	5	5	5
TOTAL LABS USED	2	2	3	2
MEAN	10.07500	13.35000	38.66667	47.50000
STD DEV	5.55079	.91924	24.13656	17.67767
MEDIAN	10.07500	13.35000	40.20000	47.50000
DESIGN VALUE	19.0	19.0	95.2	95.2

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,2-DICHLOROBENZENE NG/L

SAMPLE RESULTS

LAB	705	706	707	708
U001	31.5	31.8	36.1	27.8
U014	< 100.	< 100.	< 100.	< 100.
U063	210.	466.	229.	215.
U072	< 500.	< 500.	< 500.	< 500.
U086	17.	17.	78.	74.
TOTAL LABS REPORTING	5	5	5	5
TOTAL LABS USED	3	3	3	3
MEAN	86.16667	171.60000	114.36667	105.60000
STD DEV	107.48760	255.06525	101.46183	97.51861
MEDIAN	31.50000	31.80000	78.00000	74.00000
DESIGN VALUE	21.0	21.0	105	105

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,3,5-TRICHLOROBENZENE NG/L

SAMPLE RESULTS

LAB	705	706	707	708
U001	16.5	20.1	17.3	21.6
U063	6.77	< 1.	29.2	< 1.
U072	< 100.	< 100.	< 100.	< 100.
U086	8.4	8.4	36.	36.
U092	< 5.	< 5.	17.	17.
U093	4.0	3.0	12.0	11.0

	705	706	707	708
TOTAL LABS REPORTING	6	6	6	6
TOTAL LABS USED	4	3	5	4
MEAN	8.91750	10.50000	22.30000	21.40000
STD DEV	5.37140	8.74128	9.93076	10.65708
MEDIAN	7.58500	8.40000	17.30000	19.30000
DESIGN VALUE	10.7	10.7	53.3	53.3

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,2,4-TRICHLOROBENZENE NG/L

SAMPLE RESULTS

LAB	705	706	707	708
U001	11.8	14.2	37.2	44.0
U014	< 40.	< 40.	48.	52.
U063	21.0	6.92	51.4	4.39
U072	< 200.	< 200.	< 200.	< 200.
U086	15.	13.	70.	70.
U092	25.	20.	65.	70.
U093	9.0	21.0	58.0	58.0
TOTAL LABS REPORTING	7	7	7	7
TOTAL LABS USED	5	5	6	6
MEAN	16.36000	15.02400	55.43333	49.73167
STD DEV	6.57632	5.72109	12.49539	24.42884
MEDIAN	15.00000	14.20000	54.70000	55.00000
DESIGN VALUE	20.0	20.0	100	100

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,2,3-TRICHLOROBENZENE NG/L

SAMPLE RESULTS

LAB	705	706	707	708
U001	5.14	6.67	23.7	27.9
U063	1.84	< 1.	19.4	< 1.
U072	< 80.	< 80.	< 80.	< 80.
U086	8.4	8.8	38.	40.
U092	28.	25.	46.	48.
U093	8.0	7.0	36.0	37.0
TOTAL LABS REPORTING	6	6	6	6
TOTAL LABS USED	5	4	5	4
MEAN	10.27600	11.86750	32.62000	38.22500
STD DEV	10.25164	8.80490	10.88265	8.30276
MEDIAN	8.00000	7.90000	36.00000	38.50000
DESIGN VALUE	10.4	10.4	51.7	51.7

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,2,4,5-TETRACHLOROBENZENE NG/L

SAMPLE RESULTS

LAB	705	706	707	708
U072	< 70.	< 70.	< 70.	< 70.
U086	8.2	8.0	38.	36.
U092	25.	21.	34.	36.
U093	N	N	25.0	23.0
TOTAL LABS REPORTING	4	4	4	4
TOTAL LABS USED	2	2	3	3
MEAN	16.60000	14.50000	32.33333	31.66667
STD DEV	11.87939	9.19239	6.65833	7.50555
MEDIAN	16.60000	14.50000	34.00000	36.00000
DESIGN VALUE	10.1	10.1	50.3	50.3

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: 1,2,3,4-TETRACHLOROBENZENE NG/L

SAMPLE RESULTS

LAB	705	706	707	708
U001	4.37	5.93	21.8	25.3
U072	< 30.	< 30.	32.	< 30.
U086	7.6	7.4	36.	36.
U092	8.	8.	23.	23.
U093	4.0	6.0	30.0	28.0
TOTAL LABS REPORTING	5	5	5	5
TOTAL LABS USED	4	4	5	4
MEAN	5.99250	6.83250	28.56000	28.07500
STD DEV	2.09894	1.03161	6.03887	5.66473
MEDIAN	5.98500	6.70000	30.00000	26.65000
DESIGN VALUE	9.8	9.8	48.9	48.9

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: PENTACHLOROBENZENE NG/L

SAMPLE RESULTS

LAB	705	706	707	708
U001	1.77	2.50	13.9	15.3
U013	3.5	3.4		
U063	1.10	< .5	10.8	< .5
U072	< 15.	< 15.	18.	< 15.
U086	4.2	4.2	20.	20.
U092	5.	5.	24.	24.
U093	4.0	N	25.0	23.0
TOTAL LABS REPORTING	7	7	7	7
TOTAL LABS USED	6	4	6	4
MEAN	3.26167	3.77500	18.61667	20.57500
STD DEV	1.51010	1.07199	5.57438	3.90587
MEDIAN	3.75000	3.80000	19.00000	21.50000
DESIGN VALUE	4.9	4.9	24.7	24.7

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: HEXACHLOROBENZENE NG/L

SAMPLE RESULTS

LAB	705	706	707	708
U001	4.40	5.74	17.2	18.5
U013	3.3	2.8		
U014	5.	5.	21.	21.
U063	.75	.80	13.4	< .5
U072	< 8.0	< 8.0	20.	9.2
U075	11.58	10.55	64.77	58.74
U077	7.	6.	27.	26.
U086	4.8	4.6	20.	22.
U092	5.	4.	14.	13.
U093	1.0	2.0	8.0	8.0
TOTAL LABS REPORTING	10	10	10	10
TOTAL LABS USED	9	9	9	8
MEAN	4.75889	4.61000	22.81889	22.05500
STD DEV	3.24279	2.82004	16.63670	16.12404
MEDIAN	4.80000	4.60000	20.00000	19.75000
1[illegible]GN VALUE	5.2	5.2	25.9	25.9

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: HEXACHLOROETHANE NG/L

SAMPLE RESULTS

LAB	705	706	707	708
U014	9.	8.	21.	23.
U063	30.3	< .5	163.	< .5
U072	11.	8.6	43.	< 5.0
U086	14.	14.	72.	68.
U092	21.	16.	91.	110.
U093	10.0	20.0	60.0	52.0
TOTAL LABS REPORTING	6	6	6	6
TOTAL LABS USED	6	5	6	4
MEAN	15.88333	13.32000	75.00000	63.25000
STD DEV	8.28744	5.07070	49.34369	36.30771
MEDIAN	12.50000	14.00000	66.00000	60.00000
DESIGN VALUE	22.0	22.0	110	110

QM7 CHS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: HEXACHLOROBUTADIENE NG/L

SAMPLE RESULTS

LAB	705	706	707	708
U001	8.60	12.30	31.0	43.5
U014	8.	7.	19.	25.
U063	19.7	.42	149.	< .5
U072	11.	7.7	38.	< 6.0
U086	15.	16.	60.	58.
U092	19.	13.	65.	73.
U093	10.0	9.0	52.0	48.0
TOTAL LABS REPORTING	7	7	7	7
TOTAL LABS USED	7	7	7	5
MEAN	13.04286	9.34571	59.14286	49.50000
STD DEV	4.86890	5.07214	42.83857	17.76936
MEDIAN	11.00000	9.00000	52.00000	48.00000
DESIGN VALUE	21.8	21.8	109	109

QM7 CMS AND PCBS IN AMPULES AND WATER

PRINTOUT PREPARED: 86/12/01.

PARAMETER: OCTACHLOROSTYRENE NG/L

SAMPLE RESULTS

LAB	705	706	707	708
U001	3.36	4.86	13.6	15.9
U013	1.3	1.1		
U063	4.56	8.44	101.	7.12
U072	5.6	5.1	23.	18.
U075	19.01	19.04	87.19	83.17
U077	7.	6.	27.	27.
U086	4.4	4.4	22.	22.
U092	6.	5.	21.	21.
U093	5.0	14.0	28.0	23.0
TOTAL LABS REPORTING	9	9	9	9
TOTAL LABS USED	9	9	8	8
MEAN	6.24778	7.54889	40.34875	27.14875
STD DEV	5.05669	5.56870	33.65982	23.39510
MEDIAN	5.00000	5.10000	25.00000	21.50000
DESIGN VALUE	5.2	5.2	26.0	26.0