Appendix D
Data Validation Reports

Data Validation Procedures

Dundalk Marine Terminal Sediment and Surface Water Data Validation Process

The purpose of the independent data validation process for the Dundalk Marine Terminal (DMT) Sediment and Surface Water Study is to assess the effect of the overall analytical process on the usability of the data. The validation process includes the verification and interpretation of analytical data, which provides the end user with a more complete understanding of the quality and defensibility of the laboratory data. The two major categories of data evaluation are laboratory performance and matrix interferences. Evaluation of laboratory performance is a check for compliance with the analytical methods and regulatory requirements; either the laboratory did, or did not, analyze the samples within the limits of the established analytical method. Evaluation of matrix interferences is more subtle and involves the analysis of several areas of results including surrogate spike recoveries, matrix spike recoveries, and reproducibility of duplicate sample results.

Before the final analytical results were released by the laboratory, both the sample and QC data were carefully reviewed to verify sample identity, instrument calibration, detection limits, dilution factors, numerical computations, accuracy of transcriptions, and chemical interpretations. Additionally, the QC data were reduced and the resulting data were reviewed to ascertain whether they were within the laboratory-defined limits for accuracy and precision. Any non-conforming data were discussed in the laboratory's data package case narrative.

The hardcopy data packages (SDG-Sample Delivery Group) were reviewed by Validata, LLC, an independent validation firm that applied the review criteria detailed in the DMT Quality Assurance Project Plan (CH2M HILL, 2006), U.S. Environmental Protection Agency (USEPA) data validation guidance from USEPA Region III, and New Jersey Department of Environmental Protection (NJDEP) guidelines for hexavalent chromium (Cr[VI]) analysis. The following guidelines were used:

- USEPA. 1993. Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses. April. Washington, D.C. (individual method requirements and guidelines).
- USEPA Region III. 1995. Innovative Approaches to Data Validation. June. Washington, D.C.
- USEPA. 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. EPA 540-R-04-004. October. Washington, D.C.
- NJDEP. 2005. Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium, SOP No. 5.A.10, Revision 2. Trenton, New Jersey.

Areas of review included (when applicable to the method) holding time compliance, calibration verification, blank results, matrix spike precision and accuracy, method accuracy as demonstrated by laboratory control samples (LCS), field duplicate results, surrogate

recoveries, internal standard performance, and interference checks. Additionally, the validators re-calculated the final laboratory quantitations to verify proper reporting of analyte concentrations, spike recoveries, and calibrations. A data review worksheet and summary report were completed for each of these data packages and any non-conformances documented on individual SDG summary forms. This data review and validation process is independent of the laboratory's data checks and focuses on the usability of the data to support the project data interpretation and decision-making processes.

Data that were not within the acceptance limits were appended with a qualifying flag, which consists of a single or double-letter abbreviation that indicates the nature of the identified non-conformance. This data set along with the validation flags were uploaded into the Locus© database. Although the qualifying flags are appended to data records during the database query process, they are also included in the final data summary table deliverable so that the data will not be used indiscriminately. These also include secondary, or the multi-digit "sub-qualifier" flags (reason codes), which are entered into the database. These secondary flags help to define the validation reasons for the primary flags. The following USEPA Region III primary flags were used to qualify the data for this study:

- (No Code) = Confirmed Identification.
- B = Not detected substantially above the level reported in laboratory or field blank.
- R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
- N = Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling events.
- J = Analyte present. Reported value may not be accurate or precise.
- K = Analyte present. Reported value may be biased high. Actual value is expected lower.
- L = Analyte present. Reported value may be biased low. Actual value is expected higher.
- UL = Not detected, quantitation limit is probably higher.
- Q = No analytical result.
- NJ = Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
- U = The analyte was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
- R = The data are unusable. Analyte may or may not be present in the sample.
- UJ = The analyte was analyzed for, but not detected. The associated detection limit is an estimate and may be inaccurate or imprecise.
- X = Result was excluded. The data are associated with re-runs and dilutions and are excluded because another useable result exists. (There can only be a single valid result per parameter per sample.) This qualifier may be used in conjunction with a sub-qualifier (i.e. XMS, XLCS, as a sub-qualifier for rejection.

Data Validation Report (May 2007)

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: June 21, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT21/1037227/1039760/1038546/1037483 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
5/8/2007	050807-H2-SD-00.50	5049015	E160.3, Lloyd Kahn, SW6010
5/8/2007	050807-H3-SD-00.50	5049017	E160.3, Lloyd Kahn, SW6010
5/8/2007	050807-H4-SD-00.50	5049019	E160.3, Lloyd Kahn, SW6010
5/9/2007	050907-H1-SD-00.50	1001915	E160.3, SW9030
5/9/2007	050907-H1-SD-00.50	5050155	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/9/2007	050907-H1-SD-00.50	5050156	EPA Draft AVS-SEM, SW6010, SW7471
5/9/2007	050907-I1-SD-00.50-A	5050144	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/9/2007	050907-I1-SD-00.50-B	1001911	E160.3, SW9030
5/9/2007	050907-I1-SD-00.50-B	5050145	EPA Draft AVS-SEM, SW6010, SW7471
5/9/2007	050907-I2-SD-00.50-A	5050146	E160.3, Lloyd Kahn, SW6010
5/9/2007	050907-I2-SD-00.50-B	5050147	E160.3, SM3500-FeB
5/9/2007	050907-I2-SD-00.50-C	1001912	E160.3, SW9030
5/9/2007	050907-I2-SD-00.50-C	5050148	EPA Draft AVS-SEM, SW6010, SW7471
5/9/2007	050907-I3-SD-00.50-A	5050149	E160.3, Lloyd Kahn, SW6010
5/9/2007	050907-I3-SD-00.50-A	5050151	EPA Draft AVS-SEM, SW6010, SW7471
5/9/2007	050907-I3-SD-00.50-B	5050150	E160.3, SM3500-FeB
5/9/2007	050907-I3-SD-00.50-C	1001913	E160.3, SW9030
5/9/2007	050907-I4-SD-00.50-A	5050152	E160.3, Lloyd Kahn, SW6010
5/9/2007	050907-I4-SD-00.50-B	5050153	E160.3, SM3500-FeB
5/9/2007	050907-I4-SD-00.50-C	1001914	E160.3, SW9030
5/9/2007	050907-I4-SD-00.50-C	5050154	EPA Draft AVS-SEM, SW6010, SW7471
5/11/2007	051107-E1-SD-00.50	1002589	E160.3, SW9030
5/11/2007	051107-E1-SD-00.50	5052948	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/11/2007	051107-E1-SD-00.50	5052949	EPA Draft AVS-SEM, SW6010, SW7471
5/11/2007	051107-E1-SD-00.50-D	1002590	E160.3, SW9030
5/11/2007	051107-E1-SD-00.50-D	5052950	E160.3, Lloyd Kahn, SM3500-FeB, SW6010

5/11/2007	051107-E1-SD-00.50-D	5052951	EPA Draft AVS-SEM, SW6010, SW7471
5/11/2007	051107-G3-SD-00.50	1002587	E160.3, SW9030
5/11/2007	051107-G3-SD-00.50	5052944	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/11/2007	051107-G3-SD-00.50	5052945	EPA Draft AVS-SEM, SW6010, SW7471
5/11/2007	051107-G4-SD-00.50	1002588	E160.3, SW9030
5/11/2007	051107-G4-SD-00.50	5052946	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/11/2007	051107-G4-SD-00.50	5052947	EPA Draft AVS-SEM, SW6010, SW7471
5/11/2007	051107-H2-SD-00.50	1002584	E160.3, SW9030
5/11/2007	051107-H2-SD-00.50	5052938	E160.3, SM3500-FeB
5/11/2007	051107-H2-SD-00.50	5052939	EPA Draft AVS-SEM, SW6010, SW7471
5/11/2007	051107-H3-SD-00.50	1002585	E160.3, SW9030
5/11/2007	051107-H3-SD-00.50	5052940	E160.3, SM3500-FeB
5/11/2007	051107-H3-SD-00.50	5052941	EPA Draft AVS-SEM, SW6010, SW7471
5/11/2007	051107-H4-SD-00.50	1002586	E160.3, SW9030
5/11/2007	051107-H4-SD-00.50	5052942	E160.3, SM3500-FeB
5/11/2007	051107-H4-SD-00.50	5052943	EPA Draft AVS-SEM, SW6010, SW7471
5/12/2007	051207-D2-SD-00.50	1002592	E160.3, SW9030
5/12/2007	051207-D2-SD-00.50	5053555	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/12/2007	051207-D2-SD-00.50	5053559	EPA Draft AVS-SEM, SW6010, SW7471
5/12/2007	051207-G1-SD-00.50	1002591	E160.3, SW9030
5/12/2007	051207-G1-SD-00.50	5053553	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/12/2007	051207-G1-SD-00.50	5053554	EPA Draft AVS-SEM, SW6010, SW7471
5/12/2007	051207-G2-SD-00.50	1002594	E160.3, SW9030
5/12/2007	051207-G2-SD-00.50	5053563	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/12/2007	051207-G2-SD-00.50	5053564	EPA Draft AVS-SEM, SW6010, SW7471

Validation Level

The level of validation for this SDG is level 4 for chromium. The remaining analyses were not validated in accordance with project validation requirements.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Sample Summary Table

The Sample Summary Table provided in Appendix A contains all data for this SDG, including any qualifiers applied during review of the data.

Validation Qualifiers

Appendix B contains the qualifiers and any validation comments used for this project.

Chain-of-Custody Documentation

The chain-of-custody documentation was complete. The cooler temperature ranged from 3.1 – 14 °C. No action was taken during validation since the samples were collected and delivered to the laboratory on the same day, with insufficient time for all of the samples to cool to <2 °C. Samples originally listed on the custody documentation beginning with 050807 and 051007 were revised to 051107.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

All samples were qualified K and assigned secondary qualifier MSDH to indicate elevated matrix spike duplicate recovery. Samples 051207-D2-SD-00.50, 051207-G2-SD-00.50 and 051207-G1-SD-00.50 were qualified as estimated and assigned secondary qualifier SDIL to indicate serial dilution exceedance. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 051107-E1-SD-00.50/051107-E1-SD-00.50-D were collected and analyzed with acceptable results. The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met.

Field blanks

There were no field duplicate pairs collected for this data set.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: June 7, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT23/1037479/1038043 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
5/12/2007, 5/13/2007	051207-D2-PW-00.50	5053531	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007, 5/13/2007	051207-D2-PW-00.50	5053535	SW6010
5/12/2007, 5/13/2007	051207-G1-PW-00.50	5053529	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007, 5/13/2007	051207-G1-PW-00.50	5053530	SW6010
5/12/2007, 5/13/2007	051207-G2-PW-00.50	5053539	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007, 5/13/2007	051207-G2-PW-00.50	5053540	SW6010
5/12/2007, 5/10/2007	050907-H1-PW-00.50	5050123	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007, 5/10/2007	050907-H1-PW-00.50	5050124	SW6010
5/12/2007, 5/10/2007	050907-I1-PW-00.50	5050115	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007, 5/10/2007	050907-I1-PW-00.50	5050116	SW6010
5/12/2007, 5/10/2007	050907-I2-PW-00.50	5050117	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007, 5/10/2007	050907-I2-PW-00.50	5050118	SW6010
5/12/2007, 5/10/2007	050907-I3-PW-00.50	5050119	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007, 5/10/2007	050907-I3-PW-00.50	5050120	SW6010
5/12/2007, 5/10/2007	050907-I4-PW-00.50	5050121	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007, 5/10/2007	050907-I4-PW-00.50	5050122	SW6010

Validation Level

The level of validation for this SDG is level 4 for all analyses in the dataset.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Sample Summary Table

The Sample Summary Table provided in Appendix A contains all data for this SDG, including any qualifiers applied during review of the data.

Validation Qualifiers

Appendix B contains the qualifiers and any validation comments used for this project.

Chain-of-Custody Documentation

The chain-of-custody documentation was not in the original data package and was provided upon request from the laboratory, a copy is provided in the Communication section of this report. The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sediment partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation. The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided upon request from the laboratory.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Dissolved Organic Carbon by E415.1

Samples 051207-G1-PW-00.50, 051207-D1-PW-00.50 and 051207-G2-PW-00.50 were qualified as L and assigned secondary qualifier MSL to indicate low matrix spike recovery. Samples 051207-G1-PW-00.50,

051207-D1-PW-00.50 and 051207-G2-PW-00.50 were qualified as J and assigned secondary qualifier LDP to indicate low matrix spike recovery. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Samples reported below the reporting limit were flagged with secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Divalent Manganese by 7199

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Sulfide by E376.2

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Ferrous Iron by SM3500-FeB

Samples 050907-I1-PW-00.50, 050907-I2-PW-00.50, 050907-I3-PW-00.50, 050907-I4-PW-00.50 and 050907-H1-PW-00.50 were qualified as K and assigned secondary qualifiers MSH and MSDH to indicate elevated matrix spike and spike duplicate recovery. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Ammonia Nitrogen by E350.3

Samples 051207-G1-PW-00.50, 051207-D2-PW-00.50, 051207-G2-PW-00.50 were qualified as K and assigned secondary qualifier MSDH, qualified J and assigned MSDP and qualified J/UJ and assigned secondary qualifier LDP for elevated matrix spike recovery, matrix spike/spike duplicate precision and laboratory duplicate precision, respectively. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: June 5, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT24/1037677 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
5/10/2007	051007-H1-SW-03.00	5051325	EPA 415.1, SW6010, SW6010B, SW7199
5/10/2007	051007-H1-SW-03.00	5051326	SW6010
5/10/2007	051007-H1-SW-15.00	5051323	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/10/2007	051007-H1-SW-15.00	5051324	SW6010
5/10/2007	051007-H1-SW-28.00	5051321	EPA 415.1, SW6010, SW6010B, SW7199
5/10/2007	051007-H1-SW-28.00	5051322	SW6010
5/10/2007	051007-H2-SW-03.00	5051331	EPA 415.1, SW6010, SW6010B, SW7199
5/10/2007	051007-H2-SW-03.00	5051332	SW6010
5/10/2007	051007-H2-SW-16.00	5051329	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/10/2007	051007-H2-SW-16.00	5051330	SW6010
5/10/2007	051007-H2-SW-30.00	5051327	EPA 415.1, SW6010, SW6010B, SW7199
5/10/2007	051007-H2-SW-30.00	5051328	SW6010
5/10/2007	051007-H3-SW-03.00	5051337	EPA 415.1, SW6010, SW6010B, SW7199
5/10/2007	051007-H3-SW-03.00	5051338	SW6010
5/10/2007	051007-H3-SW-16.00	5051335	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/10/2007	051007-H3-SW-16.00	5051336	SW6010
5/10/2007	051007-H3-SW-30.00	5051333	EPA 415.1, SW6010, SW6010B, SW7199
5/10/2007	051007-H3-SW-30.00	5051334	SW6010

Validation Level

The level of validation for this SDG is level 4 for all analyses in the dataset.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Sample Summary Table

The Sample Summary Table provided in Appendix A contains all data for this SDG, including any qualifiers applied during review of the data.

Validation Qualifiers

Appendix B contains the qualifiers and any validation comments used for this project.

Chain-of-Custody Documentation

TThe chain-of-custody documentation was complete. The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the data package.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Dissolved Organic Carbon by E415.1

All results were qualified as estimated and assigned secondary qualifier TD to indicate the dissolved organic carbon results were greater than the total organic carbon results. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Total Organic Carbon by E415.1

All results were qualified as estimated and assigned secondary qualifier TD to indicate the dissolved organic carbon results were greater than the total organic carbon results. All results with the exception of 051007-H1-SW-03.00 were flagged with secondary qualifier IB to indicate the result was below the reporting limit. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Ferrous Iron by SM3500-FeB

Samples reported below the reporting limit were flagged with secondary qualifier IB. All samples were qualified as K and assigned secondary qualifiers MSDH and MSH to indicate the matrix spike recovered above the control limits. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Trivalent Chromium by SW6010B

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: June 5, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT25/1037678 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
5/10/2007	051007-H4-SW-03.00	5051343	EPA 415.1, SW6010, SW6010B, SW7199
5/10/2007	051007-H4-SW-03.00	5051344	SW6010
5/10/2007	051007-H4-SW-18.00	5051341	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/10/2007	051007-H4-SW-18.00	5051342	SW6010
5/10/2007	051007-H4-SW-34.00	5051339	EPA 415.1, SW6010, SW6010B, SW7199
5/10/2007	051007-H4-SW-34.00	5051340	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium. Other analyses were not validated per the Project Manager and Project Chemist.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Sample Summary Table

The Sample Summary Table provided in Appendix A contains all data for this SDG, including any qualifiers applied during review of the data.

Validation Qualifiers

Appendix B contains the qualifiers and any validation comments used for this project.

Chain-of-Custody Documentation

The chain-of-custody documentation was complete. The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the data package.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Metals by SW6010B

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicates were not collected for this dataset.

Field Blanks

Field blanks were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: June 5, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT27/1037704 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
5/10/2007	051007-I1-SW-02.10	5051475	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/10/2007	051007-I1-SW-02.10	5051476	SW6010
5/10/2007	051007-I2-SW-03.00	5051479	EPA 415.1, SW6010, SW6010B, SW7199
5/10/2007	051007-I2-SW-03.00	5051480	SW6010
5/10/2007	051007-I2-SW-07.00	5051477	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/10/2007	051007-I2-SW-07.00	5051478	SW6010
5/10/2007	051007-I3-SW-03.00	5051485	EPA 415.1, SW6010, SW6010B, SW7199
5/10/2007	051007-I3-SW-03.00	5051486	SW6010
5/10/2007	051007-I3-SW-05.30	5051483	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/10/2007	051007-I3-SW-05.30	5051484	SW6010
5/10/2007	051007-I3-SW-08.50	5051481	EPA 415.1, SW6010, SW6010B, SW7199
5/10/2007	051007-I3-SW-08.50	5051482	SW6010
5/10/2007	051007-I4-SW-03.00	5051489	EPA 415.1, SW6010, SW6010B, SW7199
5/10/2007	051007-I4-SW-03.00	5051490	SW6010
5/10/2007	051007-I4-SW-06.00	5051487	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/10/2007	051007-I4-SW-06.00	5051488	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium. Other analyses were not validated per the Project Manager and Project Chemist.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Sample Summary Table

The Sample Summary Table provided in Appendix A contains all data for this SDG, including any qualifiers applied during review of the data.

Validation Qualifiers

Appendix B contains the qualifiers and any validation comments used for this project.

Chain-of-Custody Documentation

The chain-of-custody documentation was complete. The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the datapackage.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Metals by SW6010B

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicates were not collected for this dataset.

Field blanks

Field blanks were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: June 5, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT28/1037956 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. Microseeps was subcontracted by LLI to provide divalent manganese analysis. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
5/11/2007	051107-E1-SW-03.00	5052916	EPA 415.1, SW6010, SW6010B, SW7199
5/11/2007	051107-E1-SW-03.00	5052917	SW6010
5/11/2007	051107-E1-SW-03.00-D	5052918	EPA 415.1, SW6010, SW6010B, SW7199
5/11/2007	051107-E1-SW-03.00-D	5052919	SW6010
5/11/2007	051107-E1-SW-21.50	5052914	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/11/2007	051107-E1-SW-21.50	5052915	SW6010
5/11/2007	051107-E1-SW-41.00	5052912	EPA 415.1, SW6010, SW6010B, SW7199
5/11/2007	051107-E1-SW-41.00	5052913	SW6010
5/11/2007	051107-G3-SW-03.00	5052904	EPA 415.1, SW6010, SW6010B, SW7199
5/11/2007	051107-G3-SW-03.00	5052905	SW6010
5/11/2007	051107-G3-SW-22.00	5052902	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/11/2007	051107-G3-SW-22.00	5052903	SW6010
5/11/2007	051107-G3-SW-41.50	5052900	EPA 415.1, SW6010, SW6010B, SW7199
5/11/2007	051107-G3-SW-41.50	5052901	SW6010
5/11/2007	051107-G4-SW-03.00	5052910	EPA 415.1, SW6010, SW6010B, SW7199
5/11/2007	051107-G4-SW-03.00	5052911	SW6010
5/11/2007	051107-G4-SW-14.50	5052908	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/11/2007	051107-G4-SW-14.50	5052909	SW6010
5/11/2007	051107-G4-SW-27.00	5052906	EPA 415.1, SW6010, SW6010B, SW7199
5/11/2007	051107-G4-SW-27.00	5052907	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium, hexavalent chromium and divalent manganese. Other analyses were not validated per the overall project validation frequency requirements.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Sample Summary Table

The Sample Summary Table provided in Appendix A contains all data for this SDG, including any qualifiers applied during review of the data.

Validation Qualifiers

Appendix B contains the qualifiers and any validation comments used for this project.

Chain-of-Custody Documentation

The chain-of-custody documentation was complete. The cooler temperature exceeded the upper limit of 6 °C, however, data were not qualified since the samples were collected and shipped with ice and arrived at the laboratory on the same day, with insufficient time to cool to the recommended temperature range. The COC did not contain the preservative used for the metals samples, however, the laboratory provided the pH log in the data package and all sample pH values were below 2.

The COC was corrected to the sample identification beginning with 051107 instead of originally written 050807 or 051007. The final results sheets contained the correct identification.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010B

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Divalent Manganese by SW7199modified

No qualification of data was made. Sample P0705267-01 was flagged with secondary qualifier IB to indicate the result was below the reporting limit. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pairs 051107-E1-SW-03.00/051107-E1-SW-03.00-D (total) and 051107-E1-SW-03.00/051107-E1-SW-03.00-D (filtered) were collected and analyzed with acceptable results. The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met.

Field blanks

There were no field blanks collected in this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: June 9, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT29/1037954/1037961 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
5/12/2007	051107-E1-PW-00.50	5052889	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007	051107-E1-PW-00.50	5052890	SW6010
5/12/2007	051107-E1-PW-00.50-D	5052891	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007	051107-E1-PW-00.50-D	5052892	SW6010
5/12/2007	051107-G3-PW-00.50	5052885	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007	051107-G3-PW-00.50	5052886	SW6010
5/12/2007	051107-G4-PW-00.50	5052887	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007	051107-G4-PW-00.50	5052888	SW6010
5/12/2007	051107-H2-PW-00.50	5052879	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007	051107-H2-PW-00.50	5052880	SW6010
5/12/2007	051107-H3-PW-00.50	5052881	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007	051107-H3-PW-00.50	5052882	SW6010
5/12/2007	051107-H4-PW-00.50	5052883	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007	051107-H4-PW-00.50	5052884	SW6010
5/14/07	Centrifuge Blank	5052952	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/14/07	Centrifuge Blank	5052953	SW6010

Validation Level

The level of validation for this SDG is level 4 for chromium and hexavalent chromium. All other analyses were not validated due to the frequency requirements for this project.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Sample Summary Table

The Sample Summary Table provided in Appendix A contains all data for this SDG, including any qualifiers applied during review of the data.

Validation Qualifiers

Appendix B contains the qualifiers and any validation comments used for this project.

Chain-of-Custody Documentation

The cooler temperatures ranged from 2.5 °C to 8.5 °C. Data were not qualified for elevated temperature since the samples were collected and delivered to the laboratory on the same day, with insufficient time for the samples to cool below 6 °C.

The chain-of-custody documentation was not in the original data package and was provided upon request from the laboratory, a copy is provided in the Communication section of this report. The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sediment partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation. The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided upon request from the laboratory.

Samples on the custody documentation that were listed as beginning with 050807 or 051007 were corrected per the CH2M Hill field team to read as 051107.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Several results were flagged with secondary qualifier IB to indicate the concentrations were below the reporting limit. There was insufficient sample available to analyze a laboratory duplicate and matrix spike, therefore the laboratory analyzed a laboratory control sample and laboratory control sample duplicate (LCS/LSCD) with acceptable results. The chromium results were flagged with secondary qualifier NMS to indicate a site specific MS was not run for this dataset. No further action was taken during validation for the LCS/LCSD in lieu of the laboratory duplicate and matrix spike. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Trivalent Chromium by SW6010B

Sample 051107-H3-PW-00.50 (filtered) was flagged with secondary qualifier IB to indicate the concentrations were below the reporting limit. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 051107-E1-PW-00.50/051107-E1-PW-00.50-D were collected and analyzed with acceptable results. The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters was used for the evaluation which is based on the Region III criteria for Inorganic Analyses. All results met this criteria.

Field blanks

Field blank samples were not collected for this dataset.

A centrifuge blank was collected and analyzed by the laboratory. The blank results were all non-detected.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: May 31, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT30/1038049 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
5/12/2007	051207-D2-SW-03.00	5053593	EPA 415.1, SW6010, SW6010B, SW7199
5/12/2007	051207-D2-SW-03.00	5053594	SW6010
5/12/2007	051207-D2-SW-22.00	5053585	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007	051207-D2-SW-22.00	5053589	SW6010
5/12/2007	051207-D2-SW-42.00	5053583	EPA 415.1, SW6010, SW6010B, SW7199
5/12/2007	051207-D2-SW-42.00	5053584	SW6010
5/12/2007	051207-G1-SW-03.00	5053599	EPA 415.1, SW6010, SW6010B, SW7199
5/12/2007	051207-G1-SW-03.00	5053600	SW6010
5/12/2007	051207-G1-SW-17.00	5053597	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007	051207-G1-SW-17.00	5053598	SW6010
5/12/2007	051207-G1-SW-32.00	5053595	EPA 415.1, SW6010, SW6010B, SW7199
5/12/2007	051207-G1-SW-32.00	5053596	SW6010
5/12/2007	051207-G2-SW-03.00	5053605	EPA 415.1, SW6010, SW6010B, SW7199
5/12/2007	051207-G2-SW-03.00	5053606	SW6010
5/12/2007	051207-G2-SW-19.50	5053603	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/12/2007	051207-G2-SW-19.50	5053604	SW6010
5/12/2007	051207-G2-SW-37.00	5053601	EPA 415.1, SW6010, SW6010B, SW7199
5/12/2007	051207-G2-SW-37.00	5053602	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium. Other analyses were not validated per the Project Manager and Project Chemist.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Sample Summary Table

The Sample Summary Table provided in Appendix A contains all data for this SDG, including any qualifiers applied during review of the data.

Validation Qualifiers

Appendix B contains the qualifiers and any validation comments used for this project.

Chain-of-Custody Documentation

The chain-of-custody documentation was complete. The cooler temperature exceeded the upper limit of 6 °C, however, data were not qualified since the samples were collected and shipped with ice and arrived at the laboratory on the same day, with insufficient time to cool to the recommended temperature range. The preservation was not listed on the COC for the metals samples, however, the laboratory provided the pH log in the data package and all sample pH values were below 2.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010B

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

There were no field duplicates collected in this dataset.

Field blanks

There were no field blanks collected in this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: June 21, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT32/1038154/1038360/1038593/1038058 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. Four mercury results were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
5/13/2007	051307-B3-SD-00.50	1002595	E160.3, SW9030
5/13/2007	051307-B3-SD-00.50	5053659	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/13/2007	051307-B3-SD-00.50	5053663	EPA Draft AVS-SEM, SW6010, SW7471
5/13/2007	051307-B4-SD-00.50	1002597	E160.3, SW9030
5/13/2007	051307-B4-SD-00.50	5053667	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/13/2007	051307-B4-SD-00.50	5053668	EPA Draft AVS-SEM, SW6010, SW7471
5/13/2007	051307-B4-SD-00.50-D	1002598	E160.3, SW9030
5/13/2007	051307-B4-SD-00.50-D	5053669	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/13/2007	051307-B4-SD-00.50-D	5053670	EPA Draft AVS-SEM, SW6010, SW7471
5/13/2007	051307-D3-SD-00.50	1002599	E160.3, SW9030
5/13/2007	051307-D3-SD-00.50	5053671	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/13/2007	051307-D3-SD-00.50	5053672	EPA Draft AVS-SEM, SW6010, SW7471
5/14/2007	051407-D1-SD-00.50	1003144	E160.3, SW9030
5/14/2007	051407-D1-SD-00.50	5054462	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/14/2007	051407-D1-SD-00.50	5054463	EPA Draft AVS-SEM, SW6010, SW7471
5/14/2007	051407-E2-SD-00.50	1003149	E160.3, SW9030
5/14/2007	051407-E2-SD-00.50	5054470	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/14/2007	051407-E2-SD-00.50	5054471	EPA Draft AVS-SEM, SW6010, SW7471
5/14/2007	051407-F1-SD-00.50	1003146	E160.3, SW9030
5/14/2007	051407-F1-SD-00.50	5054466	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/14/2007	051407-F1-SD-00.50	5054467	EPA Draft AVS-SEM, SW6010, SW7471
5/14/2007	051407-F2-SD-00.50	1003145	E160.3, SW9030
5/14/2007	051407-F2-SD-00.50	5054464	E160.3, Lloyd Kahn, SM3500-FeB, SW6010

5/14/2007	051407-F2-SD-00.50	5054465	EPA Draft AVS-SEM, SW6010, SW7471
5/14/2007	051407-F3-SD-00.50	1003147	E160.3, SW9030
5/14/2007	051407-F3-SD-00.50	5054468	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/14/2007	051407-F3-SD-00.50	5054469	EPA Draft AVS-SEM, SW6010, SW7471
5/15/2007	051507-C1-SD-00.50	1003733	E160.3, SW9030
5/15/2007	051507-C1-SD-00.50	5055516	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/15/2007	051507-C1-SD-00.50	5055517	EPA Draft AVS-SEM, SW6010, SW7471
5/15/2007	051507-C2-SD-00.50	1003735	E160.3, SW9030
5/15/2007	051507-C2-SD-00.50	5055518	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/15/2007	051507-C2-SD-00.50	5055519	EPA Draft AVS-SEM, SW6010, SW7471
5/15/2007	051507-C3-SD-00.50	1003737	E160.3, SW9030
5/15/2007	051507-C3-SD-00.50	5055520	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/15/2007	051507-C3-SD-00.50	5055521	EPA Draft AVS-SEM, SW6010, SW7471
5/15/2007	051507-C4-SD-00.50	1003739	E160.3, SW9030
5/15/2007	051507-C4-SD-00.50	5055522	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/15/2007	051507-C4-SD-00.50	5055523	EPA Draft AVS-SEM, SW6010, SW7471
5/16/2007	051607-37-SD-00.50	1004093	E160.3, SW9030
5/16/2007	051607-37-SD-00.50	5056712	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/16/2007	051607-37-SD-00.50	5056713	EPA Draft AVS-SEM, SW6010, SW7471
5/16/2007	051607-37A-SD-00.50	1004094	E160.3, SW9030
5/16/2007	051607-37A-SD-00.50	5056714	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/16/2007	051607-37A-SD-00.50	5056715	EPA Draft AVS-SEM, SW6010, SW7471
5/16/2007	051607-37B-SD-00.50	1004095	E160.3, SW9030
5/16/2007	051607-37B-SD-00.50	5056716	E160.3, Lloyd Kahn, SM3500-FeB, SW6010
5/16/2007	051607-37B-SD-00.50	5056717	EPA Draft AVS-SEM, SW6010, SW7471

Validation Level

The level of validation for this SDG is level IV for all chromium results, and all analyses only for samples 051307-B3-SD-00.50, 051307-B4-SD-00.50, 051307-B4-SD-00.50-D and 051307-D3-SD-00.50. The remaining samples/results were not validated per the project validation frequency requirements.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Sample Summary Table

The Sample Summary Table provided in Appendix A contains all data for this SDG, including any qualifiers applied during review of the data.

Validation Qualifiers

Appendix B contains the qualifiers and any validation comments used for this project.

Chain-of-Custody Documentation

The chain-of-custody documentation was complete. The cooler temperature ranged from 3.5 to 10 °C, however, data were not qualified since the samples were collected and shipped with ice and arrived at the laboratory on the same day, with insufficient time to cool to the recommended temperature range.

Major Deficiencies

Validate mercury results were rejected due to non-recovery of the matrix spike, matrix spike duplicate and also the post-digestion spike.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Acid Volatile Sulfide by EPA Draft AVS-SEM9

Validated samples were qualified as estimated and assigned footnote MSDP to indicate matrix spike/spike duplicate relative precision difference exceedance. The laboratory was contacted regarding incorrectly reported AVS results that did not match the raw data. The laboratory indicated they reported an incorrect batch and sent revisions for samples 5053663, 5055519, 5055521, 5055523, 5056713, 5056715 and 5056717. A copy of the email dialogue is provided in the communication section of this report. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Total Organic Carbon by Lloyd Kahn

Validated samples were qualified as L and assigned footnote MSL to indicate low matrix spike recovery and J and secondary qualifier LDP to indicate laboratory duplicate precision exceedance. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Ferrous Iron by SM2500-FeB

The laboratory reported several results incorrectly and was contacted by the validator. The results were revised and resubmitted. The email documentation of this issue is provided in the Communication section of this report. The laboratory re-analyzed the samples grossly outside of the holding time and the results differed from the originally reported results. Since the holding time was significantly exceeded, the reran data was not provided in the dataset and would have been rejected during data validation. No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

SEM Metals by SW6010

Mercury: All validated samples [051307-B3-SD-00.50, 051307-B4-SD-00.50, 051307-B4-SD-00.50-D and 051307-D3-SD-00.50] were rejected, R, and assigned secondary qualifier MSL to indicate non-recovery of the mercury (MS -6%, MSD -6%). The rejection of data is for non-recovery of mercury in this matrix using the AVS extraction, as demonstrated by the non-recovery of the matrix spike, matrix spike duplicate and also the post spike samples. The laboratory intended on adding *"Due to the nature of the Acid Volatile Sulfide extraction, mercury does not recover in this procedure. This non-recovery of mercury is due to precipitation of mercury in the presence of the soil matrix on the hydrochloric acid (HCL) use during this procedure"* to the result forms, however, when asked for the location of the footnote in the data, it was later noted by the laboratory that this footnote had not been added. The email documentation of this issue is provided in the Communication section of this report.

The following qualification was made to the SEM metals:

For samples 051307-B4-SD-00.50, 051307-B4-SD-00.50-D and 051307-D3-SD-00.50: copper was qualified as L and assigned secondary qualifiers MSL and MSDL to indicate low matrix spike/spike duplicate recovery and qualified J with secondary qualifier MSDP for matrix spike/spike duplicate precision exceedance. Nickel was qualified as K and assigned secondary qualifier MSH to indicate elevated matrix spike recovery.

For sample 051307-B3-SD-00.50, copper was qualified as K and assigned secondary qualifier MSH to indicate elevated matrix spike recovery. Sample 051307-B3-SD-00.50 was also qualified as estimated and assigned secondary qualifier SDIL to indicate serial dilution percent difference recovery for copper, lead, nickel and zinc.

Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 82%.

Acid Soluble Sulfide by SW9030

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 051307-B4-SD-00.50/051307-B4-SD-00.50-D were collected and analyzed, with the following analytes exceeding the control limits:

Analyte	Sample	Duplicate	%RPD	Acceptable
Ferrous Iron	2.9U mg/kg	65.7 mg/kg	182	no
Nickel	.0898 umoles/g	.397 umoles/g	126	no

The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was used.

No qualification was made during validation for field duplicate precision exceedances per Region III guidance.

Field blanks

There were no field blanks collected in this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified, with the exception of SEM mercury, in which 82% of the data was deemed usable. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: June 14, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT34/1038054/1038151 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
5/14/2007	051307-B3-PW-00.50	5053626	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW7199
5/14/2007	051307-B3-PW-00.50	5053630	SW6010
5/14/2007	051307-B4-PW-00.50	5053634	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW7199
5/14/2007	051307-B4-PW-00.50	5053635	SW6010
5/14/2007	051307-B4-PW-00.50-D	5053636	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW7199
5/14/2007	051307-B4-PW-00.50-D	5053637	SW6010
5/14/2007	051307-D3-PW-00.50	5053638	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW7199
5/14/2007	051307-D3-PW-00.50	5053639	SW6010
5/15/2007	051407-D1-PW-00.50	5054440	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW7199
5/15/2007	051407-D1-PW-00.50	5054441	SW6010
5/15/2007	051407-E2-PW-00.50	5054448	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW7199
5/15/2007	051407-E2-PW-00.50	5054449	SW6010
5/15/2007	051407-F1-PW-00.50	5054444	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW7199
5/15/2007	051407-F1-PW-00.50	5054445	SW6010
5/15/2007	051407-F2-PW-00.50	5054442	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW7199
5/15/2007	051407-F2-PW-00.50	5054443	SW6010
5/15/2007	051407-F3-PW-00.50	5054446	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW7199
5/15/2007	051407-F3-PW-00.50	5054447	SW6010
5/15/2007	DMT-EB-051407-02	5054450	E150.1, E350.3, E376.2, EPA 415.1, SM3500-FeB, SW6010, SW7199
5/15/2007	DMT-EB-051407-02	5054451	SW6010

Validation Level

The level of validation for this SDG is level 4 for chromium and hexavalent chromium. The remaining analyses were not validated per the project frequency requirements.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Sample Summary Table

The Sample Summary Table provided in Appendix A contains all data for this SDG, including any qualifiers applied during review of the data.

Validation Qualifiers

Appendix B contains the qualifiers and any validation comments used for this project.

Chain-of-Custody Documentation

The chain-of-custody documentation was not in the original data package and was provided upon request from the laboratory, a copy is provided in the Communication section of this report. The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided upon request from the laboratory. The cooler temperature exceeded the upper limit of 6 °C, however, data were not qualified since the samples were collected and shipped with ice and arrived at the laboratory on the same day, with insufficient time to cool to the recommended temperature range.

The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sediment partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Samples 051307-B4-PW-00.50-D and 051307-B4-PW-00.50 were qualified as estimated for filtered and total chromium, and assigned secondary qualifier TD to indicate the dissolved concentration was greater than the total concentration. Result concentrations below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Trivalent Chromium by SW6010B

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 051307-B4-PW-00.50/051307-B4-PW-00.50-D were collected and analyzed with acceptable results with the exception of filtered chromium which had an RPD of 51%. No action was taken during validation for field precision exceedances. The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters was used for the evaluation which is based on the Region III criteria for Inorganic Analyses.

Field blanks

Field blank sample DMT-EB-051407-02 was collected for this dataset. The results were non-detected for the analyses validated.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: June 7, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT35/1038059 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
5/13/2006	051307-B3-SW-03.00	5053679	EPA 415.1, SW6010, SW6010B, SW7199
5/13/2006	051307-B3-SW-03.00	5053680	SW6010
5/13/2006	051307-B3-SW-07.00	5053681	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/13/2006	051307-B3-SW-07.00	5053685	SW6010
5/13/2006	051307-B4-SW-03.00	5053677	EPA 415.1, SW6010, SW6010B, SW7199
5/13/2006	051307-B4-SW-03.00	5053678	SW6010
5/13/2006	051307-B4-SW-06.00	5053673	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/13/2006	051307-B4-SW-06.00	5053674	SW6010
5/13/2006	051307-B4-SW-06.00-D	5053675	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/13/2006	051307-B4-SW-06.00-D	5053676	SW6010
5/13/2006	051307-D3-SW-03.00	5053693	EPA 415.1, SW6010, SW6010B, SW7199
5/13/2006	051307-D3-SW-03.00	5053694	SW6010
5/13/2006	051307-D3-SW-23.00	5053691	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/13/2006	051307-D3-SW-23.00	5053692	SW6010
5/13/2006	051307-D3-SW-40.00	5053689	EPA 415.1, SW6010, SW6010B, SW7199
5/13/2006	051307-D3-SW-40.00	5053690	SW6010

Validation Level

The level of validation for this SDG is level 4 for chromium and hexavalent chromium.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Sample Summary Table

The Sample Summary Table provided in Appendix A contains all data for this SDG, including any qualifiers applied during review of the data.

Validation Qualifiers

Appendix B contains the qualifiers and any validation comments used for this project.

Chain-of-Custody Documentation

The chain-of-custody documentation was complete with the exception of filtered bottle 051307-SW-D3-40.00 which was labeled as 051307-SW-DW-30.00 and corrected by the laboratory. The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the data package. The cooler temperature ranged from 3.5 – 15 C. No action was taken since the samples were delivered to the laboratory on the same day as collection with insufficient time to cool to <6 C. Ice was present as documented on the sample receipt log.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

No qualification of data was made. Results reported below the reporting limit were flagged with secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Trivalent Chromium by SW6010B

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 051307-B4-SW-06.00/051307-B4-SW-06.00-D were collected and analyzed with acceptable results, all results were non-detected. The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters was used for the evaluation which is based on the Region III criteria for Inorganic Analyses.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: June 7, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT36/1038155 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
5/14/2007	051407-D1-SW-03.00	5054476	EPA 415.1, SW6010, SW6010B, SW7199
5/14/2007	051407-D1-SW-03.00	5054477	SW6010
5/14/2007	051407-D1-SW-18.00	5054474	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/14/2007	051407-D1-SW-18.00	5054475	SW6010
5/14/2007	051407-D1-SW-34.00	5054472	EPA 415.1, SW6010, SW6010B, SW7199
5/14/2007	051407-D1-SW-34.00	5054473	SW6010
5/14/2007	051407-F1-SW-03.00	5054482	EPA 415.1, SW6010, SW6010B, SW7199
5/14/2007	051407-F1-SW-03.00	5054483	SW6010
5/14/2007	051407-F1-SW-18.00	5054480	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/14/2007	051407-F1-SW-18.00	5054481	SW6010
5/14/2007	051407-F1-SW-34.00	5054478	EPA 415.1, SW6010, SW6010B, SW7199
5/14/2007	051407-F1-SW-34.00	5054479	SW6010
5/14/2007	051407-F2-SW-03.00	5054488	EPA 415.1, SW6010, SW6010B, SW7199
5/14/2007	051407-F2-SW-03.00	5054489	SW6010
5/14/2007	051407-F2-SW-15.00	5054486	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/14/2007	051407-F2-SW-15.00	5054487	SW6010
5/14/2007	051407-F2-SW-42.00	5054484	EPA 415.1, SW6010, SW6010B, SW7199
5/14/2007	051407-F2-SW-42.00	5054485	SW6010

Validation Level

The level of validation for this SDG is level 4 for chromium and hexavalent chromium.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Sample Summary Table

The Sample Summary Table provided in Appendix A contains all data for this SDG, including any qualifiers applied during review of the data.

Validation Qualifiers

Appendix B contains the qualifiers and any validation comments used for this project.

Chain-of-Custody Documentation

The chain-of-custody documentation was complete. The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the data package.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

No qualification of data was made. Sample 051407-D1-SW-03.00 was flagged as IB to indicate the result was below the reporting limit. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Trivalent Chromium by SW6010B

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: June 7, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT37/1038156 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
5/14/2007	051407-E2-SW-03.00	5054500	EPA 415.1, SW6010, SW6010B, SW7199
5/14/2007	051407-E2-SW-03.00	5054501	SW6010
5/14/2007	051407-E2-SW-22.00	5054498	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/14/2007	051407-E2-SW-22.00	5054499	SW6010
5/14/2007	051407-E2-SW-42.50	5054496	EPA 415.1, SW6010, SW6010B, SW7199
5/14/2007	051407-E2-SW-42.50	5054497	SW6010
5/14/2007	051407-F3-SW-03.00	5054494	EPA 415.1, SW6010, SW6010B, SW7199
5/14/2007	051407-F3-SW-03.00	5054495	SW6010
5/14/2007	051407-F3-SW-16.00	5054492	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/14/2007	051407-F3-SW-16.00	5054493	SW6010
5/14/2007	051407-F3-SW-30.00	5054490	EPA 415.1, SW6010, SW6010B, SW7199
5/14/2007	051407-F3-SW-30.00	5054491	SW6010
5/14/2007	DMT-EB-051407-01	5054502	EPA 415.1, SM3500-FeB, SW6010, SW6010B, SW7199
5/14/2007	DMT-EB-051407-01	5054503	SW6010

Validation Level

The level of validation for this SDG is level 4 for all analyses in the dataset.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Sample Summary Table

The Sample Summary Table provided in Appendix A contains all data for this SDG, including any qualifiers applied during review of the data.

Validation Qualifiers

Appendix B contains the qualifiers and any validation comments used for this project.

Chain-of-Custody Documentation

The chain-of-custody documentation for this dataset was complete. The preservative was not identified on the custody form for the metals analysis, however the preservation logs for the chromium analysis were provided in the data package.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Total and Dissolved Organic Carbon by E415.1

Several sample results were flagged with secondary qualifier IB to indicate the concentration of TOC or DOC was below the reporting limit. Samples 051407-E2-SW-03.00, 051407-F3-SW-03.00 and 051407-F3-SW-16.00 were qualified as B and assigned secondary qualifier EBL for DOC to indicate associated equipment blank contamination. Samples 051407-E2-SW-03.00 and DMT-EB-051407-01 were qualified as estimated and assigned secondary qualifier TD to indicate the dissolved concentration was greater than the total concentration.

Samples 051407-E2-SW-03.00, 051407-F3-SW-16.00, 051407-F3-SW-03.00, 051407-E2-SW-22.00 and 051407-E2-SW-42.00 were qualified as B and assigned secondary qualifier EBL for TOC to indicate associated equipment blank contamination. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

No qualification of data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Ferrous Iron by SM3500-FeB

Several sample results were flagged with secondary qualifier IB to indicate the concentration was below the reporting limit. All samples were qualified as L and assigned secondary qualifiers MSL and MSDL to indicate low matrix spike and spike duplicate recovery (42%, 42%). Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

Data Validation Report (August 2007)

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 4, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT54 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/8/2007	080807-B3-SD-01.50	5123517	SM20-2540-G, SW6010
8/8/2007	080807-B3-SD-03.00	5123518	SM20-2540-G, SW6010
8/8/2007	080807-B4-SD-01.50	5123513	SM20-2540-G, SW6010
8/8/2007	080807-B4-SD-03.00	5123514	SM20-2540-G, SW6010
8/8/2007	080807-C4-SD-01.50	5123515	SM20-2540-G, SW6010
8/8/2007	080807-C4-SD-03.00	5123516	SM20-2540-G, SW6010
8/8/2007	080807-D4-SD-01.30	5123511	SM20-2540-G, SW6010
8/8/2007	080807-D4-SD-03.00	5123512	SM20-2540-G, SW6010
8/8/2007	080807-E3-SD-01.50	5123519	SM20-2540-G, SW6010
8/8/2007	080807-E3-SD-03.00	5123520	SM20-2540-G, SW6010
8/8/2007	080807-E4-SD-01.50	5123521	SM20-2540-G, SW6010
8/8/2007	080807-E4-SD-03.00	5123522	SM20-2540-G, SW6010
8/11/2007	081107-H3-SD-01.50	5126200	SM20-2540-G, SW6010
8/11/2007	081107-H3-SD-03.00	5126201	SM20-2540-G, SW6010
8/11/2007	081107-H4-SD-01.50	5126205	SM20-2540-G, SW6010
8/11/2007	081107-H4-SD-03.00	5126206	SM20-2540-G, SW6010

Validation Level

The level of validation for this SDG is level IV for chromium.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody documentation was complete. .

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Metals by SW6010

No qualification of data was made. Samples reported as J by the laboratory were assigned secondary qualifier IB to indicate the value was below the reporting limit. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 6, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT55 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/9/2007	080907-D1-SD-01.50	5124651	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/9/2007	080907-D1-SD-03.00	5124652	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/9/2007	080907-E1-SD-01.50	5124649	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/9/2007	080907-E1-SD-03.00	5124650	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/9/2007	080907-E2-SD-01.50	5124641	SM20-2540-G, SW6010
8/9/2007	080907-E2-SD-03.00	5124642	SM20-2540-G, SW6010
8/9/2007	080907-H1-SD-01.50	5124653	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/9/2007	080907-H1-SD-03.00	5124654	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/9/2007	080907-I2-SD-01.50	5124645	SM20-2540-G, SW6010
8/9/2007	080907-I2-SD-03.00	5124646	SM20-2540-G, SW6010
8/9/2007	080907-I3-SD-01.50	5124643	SM20-2540-G, SW6010
8/9/2007	080907-I3-SD-03.00	5124644	SM20-2540-G, SW6010
8/9/2007	080907-I4-SD-01.30	5124647	SM20-2540-G, SW6010
8/9/2007	080907-I4-SD-02.60	5124648	SM20-2540-G, SW6010
8/11/2007	081107-B2-SD-01.10	5126207	SM20-2540-G, SW6010
8/11/2007	081107-B2-SD-02.40	5126208	SM20-2540-G, SW6010
8/11/2007	081107-F3-SD-01.70	5126212	SM20-2540-G, SW6010
8/11/2007	081107-F3-SD-03.00	5126213	SM20-2540-G, SW6010
8/9/2007	080907-H1-SD-01.50	5124653	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/9/2007	080907-H1-SD-03.00	5124654	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/9/2007	080907-I2-SD-01.50	5124645	SM20-2540-G, SW6010
8/9/2007	080907-I2-SD-03.00	5124646	SM20-2540-G, SW6010

Validation Level

The level of validation for this SDG is level IV for chromium, ferrous iron and TOC to fulfill the project validation frequency requirements of full validation of ten percent of the total samples/analyses.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Metals by SW6010

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Total Organic Carbon by Lloyd Kahn

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Ferrous Iron by SM3500-FeB

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

MEMORANDUM

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 7, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT57 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/10/2007	081007-D3-SD-01.50	5125821	SM20-2540-G, SW6010
8/10/2007	081007-D3-SD-03.00	5125822	SM20-2540-G, SW6010
8/10/2007	081007-B1-SD-01.30	5125833	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/10/2007	081007-B1-SD-03.00	5125834	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/10/2007	081007-C1-SD-01.30	5125829	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/10/2007	081007-C1-SD-01.30-D	5125832	SM20-2540-G, SM3500-FeB
8/10/2007	081007-C1-SD-02.80	5125830	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/10/2007	081007-C1-SD-02.80-D	5125831	Lloyd Kahn, SM20-2540-G, SW6010
8/10/2007	081007-D2-SD-01.50	5125823	SM20-2540-G, SW6010
8/10/2007	081007-D2-SD-03.00	5125824	SM20-2540-G, SW6010
8/10/2007	081007-G1-SD-01.60	5125827	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/10/2007	081007-G1-SD-03.00	5125828	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/10/2007	081007-H2-SD-01.50	5125825	SM20-2540-G, SW6010
8/10/2007	081007-H2-SD-03.00	5125826	SM20-2540-G, SW6010
8/13/2007	081307-C2-SD-01.50	5126687	SM20-2540-G, SW6010
8/13/2007	081307-C2-SD-02.50	5126688	SM20-2540-G, SW6010
8/13/2007	081307-C3-SD-01.50	5126685	SM20-2540-G, SW6010
8/13/2007	081307-C3-SD-02.90	5126686	SM20-2540-G, SW6010
8/13/2007	081307-G4-SD-01.50	5126683	SM20-2540-G, SW6010
8/13/2007	081307-G4-SD-03.00	5126684	SM20-2540-G, SW6010

Validation Level

The level of validation for this SDG is level IV for chromium only. The remaining analyses were not validated in this dataset due to the project validation frequency requirements.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete with the exception of sampling date listed as 080107 which were corrected to 081007, for 081007–B1-SD-01.50 and 081007–B1-SD-03.00. Also the sample IDs were listed as being collected 8/9/07 and were revised to 8/10/07 for 081007–D3-SD-01.50 and 081007–D3-SD-03.00. The cooler temperature ranged from 2.1 – 7.2 °C. No action was taken during validation since the samples were collected and sent to the laboratory on the same day, with ice present as noted by the laboratory, providing insufficient time for the samples to cool within range.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Metals by SW6010

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 081007–B1-SD-01.50/081007–B1-SD-01.50-D were collected and analyzed with the following results:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium	1440 mg/Kg	1800 mg/Kg	22.2%	Yes

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 7, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT58 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/11/2007	081107-37-SD-01.50	5126180	SM20-2540-G, SW6010
8/11/2007	081107-37-SD-03.00	5126181	SM20-2540-G, SW6010
8/11/2007	081107-37A-SD-01.50	5126182	SM20-2540-G, SW6010
8/11/2007	081107-37A-SD-03.00	5126183	SM20-2540-G, SW6010
8/11/2007	081107-37B-SD-01.70	5126178	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/11/2007	081107-37B-SD-03.00	5126179	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/11/2007	081107-F1-SD-01.50	5126173	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/11/2007	081107-F1-SD-03.00	5126174	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/11/2007	081107-F4-SD-01.50	5126184	SM20-2540-G, SW6010
8/11/2007	081107-F4-SD-01.50-D	5126186	SM20-2540-G, SW6010
8/11/2007	081107-F4-SD-03.00	5126185	SM20-2540-G, SW6010
8/11/2007	081107-F4-SD-03.00-D	5126187	SM20-2540-G, SW6010
8/12/2007	081207-I1-SD-01.50	5126216	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/12/2007	081207-I1-SD-03.00	5126217	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010

Validation Level

The level of validation for this SDG is level IV for chromium only. The remaining analyses were not validated in this dataset due to the project validation frequency requirements.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Metals by SW6010

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pairs 081107–F4-SD-01.50/081107–F4-SD-01.50-D and 081107–F4-SD-03.00/081107–F4-SD-03.00-D were collected and analyzed with the following results:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium (F4-SD-01.50)	120 mg/Kg	159 mg/Kg	28%	Yes
Chromium(F4-SD-03.00)	55.1 mg/Kg	54 mg/Kg	2%	Yes

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 5, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT60 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/13/2007	081307-A1-SD-01.40	5126671	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/13/2007	081307-A1-SD-03.00	5126672	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/13/2007	081307-A2-SD-01.40	5126665	SM20-2540-G, SW6010
8/13/2007	081307-A2-SD-03.00	5126666	SM20-2540-G, SW6010
8/13/2007	081307-A3-SD-01.50	5126667	SM20-2540-G, SW6010
8/13/2007	081307-A3-SD-03.00	5126668	SM20-2540-G, SW6010
8/13/2007	081307-A4-SD-01.50	5126669	SM20-2540-G, SW6010
8/13/2007	081307-A4-SD-03.00	5126670	SM20-2540-G, SW6010
8/13/2007	081307-F2-SD-01.50	5126677	SM20-2540-G, SW6010
8/13/2007	081307-F2-SD-03.00	5126678	SM20-2540-G, SW6010
8/13/2007	081307-G2-SD-01.30	5126675	SM20-2540-G, SW6010
8/13/2007	081307-G2-SD-03.00	5126676	SM20-2540-G, SW6010
8/13/2007	081307-G3-SD-01.50	5126673	SM20-2540-G, SW6010
8/13/2007	081307-G3-SD-03.00	5126674	SM20-2540-G, SW6010

Validation Level

The level of validation for this SDG is level IV for chromium only. The remaining analyses were not validated in this dataset due to the project validation frequency requirements.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete with the exception of samples 081307-F2-SD-01.50 and 081307-F2-SD-03.00 which were originally not included on the custody form. The laboratory notes the client resubmitted the COC. Additionally the laboratory notes the samples IDs were corrected from 081307-A3-SD-01.50 to 081307-A4-SD-01.50 and 081307-A3-SD-03.00 to 081307-A4-SD-03.00.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Metals by SW6010

All samples were qualified as K and assigned secondary qualifiers MSH and MSDH to indicate elevated matrix spike recovery. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 11, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT61 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. Two copper results were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/14/2007	081407-H1-SD-00.50	5128089	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/14/2007	081407-H1-SD-00.50	5128090	EPA Draft AVS-SEM, SW6010
8/14/2007	081407-H2-SD-00.50	5128091	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/14/2007	081407-H2-SD-00.50	5128092	EPA Draft AVS-SEM, SW6010
8/14/2007	081407-H3-SD-00.50	5128093	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/14/2007	081407-H3-SD-00.50	5128094	EPA Draft AVS-SEM, SW6010
8/14/2007	081407-H4-SD-00.50	5128095	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/14/2007	081407-H4-SD-00.50	5128096	EPA Draft AVS-SEM, SW6010
8/15/2007	081507-G1-SD-00.50	5129714	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/15/2007	081507-G1-SD-00.50	5129715	EPA Draft AVS-SEM, SW6010
8/15/2007	081507-I1-SD-00.50	5129706	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/15/2007	081507-I1-SD-00.50	5129707	EPA Draft AVS-SEM, SW6010
8/15/2007	081507-I2-SD-00.50	5129708	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/15/2007	081507-I2-SD-00.50	5129709	EPA Draft AVS-SEM, SW6010
8/15/2007	081507-I3-SD-00.50	5129710	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/15/2007	081507-I3-SD-00.50	5129711	EPA Draft AVS-SEM, SW6010
8/15/2007	081507-I4-SD-00.50	5129712	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/15/2007	081507-I4-SD-00.50	5129713	EPA Draft AVS-SEM, SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and AVS/SEM metals only. The remaining analyses were not validated based on the project validation frequency requirements for the sediment matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete, revised COCs were provided in the hardcopy data package. The methods originally listed on the COC were revised per CH2M Hill, a copy of the email documentation is provided in the Communication section of this report. The cooler temperature ranged from 1.1 to 7.1 °C. No qualification was made to the data since the samples were collected and shipped to the laboratory on the same day, ice was present as noted in the laboratory receipt log, and there was insufficient time for the samples to cool to the recommended range of 2±4°C.

Major Deficiencies

Two results for copper (081507-I1-SD-00.50 and 081507-I3-SD-00.50) were rejected due to severely low matrix spike recovery (-126%, 122%) and were also assigned secondary qualifiers MSL, MSDL.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

AVS/SEM Metals (Cd, Ce, Fe, Pb, Ni, Zn) by EPA-821-R-91-100 Draft AVS-SEM/6010

All results for all samples were qualified as estimated and assigned secondary qualifier MSDP to indicate matrix spike/spike duplicate relative percent difference exceedance.

All copper results with the exception samples 081507-I1-SD-00.50 and 081507-I3-SD-00.50, as summarized in the Major deficiency section, were qualified as L or UL and assigned secondary qualifiers MSL and MSDL to indicate low matrix spike recovery.

All cadmium, nickel and zinc results were qualified as L or UL and assigned secondary qualifiers MSL and MSDL to indicate low matrix spike recovery.

All nickel results were qualified as estimated and assigned secondary qualifier LDP to indicate laboratory duplicate precision exceedance.

All copper and lead results were qualified as estimated and assigned secondary qualifier SDIL to indicate serial dilution precision exceedance.

Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 96%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified with the exception of two copper results which were rejected as noted above. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 15, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT61 Sulfide provided by Columbia Analytical Services (CAS), Rochester New York, as subcontracted by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No results were rejected as a result of the data validation process. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/14/2007	081407-H1-SD-00.50	5128089	SW9030B
8/14/2007	081407-H2-SD-00.50	5128091	SW9030B
8/14/2007	081407-H3-SD-00.50	5128093	SW9030B
8/14/2007	081407-H4-SD-00.50	5128095	SW9030B
8/15/2007	081507-G1-SD-00.50	5129714	SW9030B
8/15/2007	081507-I1-SD-00.50	5129706	SW9030B
8/15/2007	081507-I2-SD-00.50	5129708	SW9030B
8/15/2007	081507-I3-SD-00.50	5129710	SW9030B
8/15/2007	081507-I4-SD-00.50	5129712	SW9030B

Validation Level

The level of validation for this SDG is level IV for acid soluble sulfide to fulfill the project validation frequency requirements for the sediment matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete.

Major Deficiencies

There were no major deficiencies noted for the dataset.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Acid Soluble Sulfide by SW9030B

All samples were qualified as estimated and assigned footnote LDP to indicate laboratory duplicate precision exceedance. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 19, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT62 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/15/2007	081407-H1-PW-00.50	5128105	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/15/2007	081407-H1-PW-00.50	5128106	SW6010
8/15/2007	081407-H2-PW-00.50	5128107	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/15/2007	081407-H2-PW-00.50	5128108	SW6010
8/15/2007	081407-H3-PW-00.50	5128109	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/15/2007	081407-H3-PW-00.50	5128110	SW6010
8/15/2007	081407-H4-PW-00.50	5128111	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/15/2007	081407-H4-PW-00.50	5128112	SW6010
8/16/2007	081507-G1-PW-00.50	5129662	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/16/2007	081507-G1-PW-00.50	5129663	SW6010
8/16/2007	081507-I1-PW-00.50	5129648	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/16/2007	081507-I1-PW-00.50	5129649	SW6010
8/16/2007	081507-I2-PW-00.50	5129650	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/16/2007	081507-I2-PW-00.50	5129651	SW6010
8/16/2007	081507-I3-PW-00.50	5129652	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/16/2007	081507-I3-PW-00.50	5129653	SW6010
8/16/2007	081507-I4-PW-00.50	5129654	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/16/2007	081507-I4-PW-00.50	5129658	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 1 to 7.1 °C. No qualification was made for low temperatures (below 2 C) or elevated temperature (greater than 4 C). The samples were delivered to the laboratory on the same day as collection and ice was present in the cooler as documented on the sample receipt documentation and the various coolers did not have sufficient time to cool within range, therefore data were not qualified.

The laboratory noted sample 081507-I2-PW-00.50 was suspected of a leak in one lexan tube "(air bubbles in water in bag)" was noted. No action was taken during validation.

The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the hardcopy report. The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sediment partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

Results reported as J by the laboratory were assigned secondary qualifier IB to indicate the result was below the reporting limit. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

Results reported as J by the laboratory were assigned secondary qualifier IB to indicate the result was below the reporting limit. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 9, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT63 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/14/2007	081407-H1-SW-03.00	5128135	SM20-5310-C, SW6010, SW7199
8/14/2007	081407-H1-SW-03.00	5128136	SW6010
8/14/2007	081407-H1-SW-22.00	5128133	SM20-5310-C, SM3500-FeB, SW6010, SW7199
8/14/2007	081407-H1-SW-22.00	5128134	SW6010
8/14/2007	081407-H1-SW-35.00	5128131	SM20-2340-C, SM20-5310-C, SW6010, SW7199
8/14/2007	081407-H1-SW-35.00	5128132	SW6010
8/14/2007	081407-H2-SW-03.00	5128141	SM20-5310-C, SW6010, SW7199
8/14/2007	081407-H2-SW-03.00	5128142	SW6010
8/14/2007	081407-H2-SW-25.00	5128139	SM20-5310-C, SM3500-FeB, SW6010, SW7199
8/14/2007	081407-H2-SW-25.00	5128140	SW6010
8/14/2007	081407-H2-SW-35.00	5128137	SM20-5310-C, SW6010, SW7199
8/14/2007	081407-H2-SW-35.00	5128138	SW6010
8/14/2007	081407-H3-SW-03.00	5128153	SM20-5310-C, SW6010, SW7199
8/14/2007	081407-H3-SW-03.00	5128154	SW6010
8/14/2007	081407-H3-SW-22.00	5128145	SM20-5310-C, SM3500-FeB, SW6010, SW7199
8/14/2007	081407-H3-SW-22.00	5128149	SW6010
8/14/2007	081407-H3-SW-36.00	5128143	SM20-5310-C, SW6010, SW7199
8/14/2007	081407-H3-SW-36.00	5128144	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium, total organic carbon, hardness, dissolved organic carbon and ferrous iron to meet the project validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete, revised COCs were provided in the hardcopy data package. The methods originally listed on the COC were revised per CH2M Hill, a copy of the email documentation is provided in the Communication section of this report The cooler temperature ranged from 1.1 to 7.1 °C. No qualification was made to the data since the samples were collected and shipped to the laboratory on the same day, ice was present as noted in the laboratory receipt log, and there was insufficient time for the samples to cool to the recommended range of 2±4°C. Hardness for sample 081407-H3-SW-22.00 was not sent to the laboratory, and the laboratory was contacted for an explanation, shown below:

Wendy,

Attached is the revised eCOC for the samples collected 8/14/07. I revised it per our conversation to add ORP to all porewater samples, analyze hardness on the porewater and deepest SW at the "1" locations only, and to remove the date and time from the porewater samples since you will be filling that in when the pore water is actually extracted. Again, I have included the signed scans which I backdated to match the original COC.

We should have everything under control now and barring any complications we should be churning out about 4 locations per day which will be 4 sediments, 4 pore waters, and 12 surface waters (or less depending on the depth).

If you need anything else feel free to call me.

- John

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

Samples 081407-H1-SW-35.00 (both injections), 081407-H1-SW-22.00 (both injections) and 081407-H1-SW-03.00 (second injection only) were qualified as estimated and assigned footnote HTA to indicate the sample holding time was exceeded. All samples were qualified as estimated and assigned footnote MSDP to indicate the matrix spike/spike duplicate precision criteria exceedance. The RPD was 4 and the laboratory limits is 2. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Total Organic Carbon by SM20-5310-C

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Dissolved Organic Carbon by SM20-5310-C

Results reported below the reporting limit by the laboratory were assigned footnote IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Ferrous Iron by SM35-FeB

Results reported below the reporting limit by the laboratory were assigned footnote IB. Samples 081407-H3-SW-22.00 and 081407-H1-SW-22.00 were qualified as L/UL and assigned secondary qualifier MSDL to indicate low matrix spike duplicate recovery. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hardness by SM20-2340-C

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 17, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT64 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/14/2007	081407-H4-SW-03.00	5128159	SM20-5310-C, SW6010, SW7199
8/14/2007	081407-H4-SW-03.00	5128160	SW6010
8/14/2007	081407-H4-SW-20.00	5128157	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/14/2007	081407-H4-SW-20.00	5128158	SW6010
8/14/2007	081407-H4-SW-38.00	5128155	SM20-5310-C, SW6010, SW7199
8/14/2007	081407-H4-SW-38.00	5128156	SW6010
8/15/2007	081507-I1-SW-02.00	5129674	SM20-5310-C, SW6010, SW7199
8/15/2007	081507-I1-SW-02.00	5129675	SW6010
8/15/2007	081507-I1-SW-04.00	5129672	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/15/2007	081507-I1-SW-04.00	5129673	SW6010
8/15/2007	081507-I2-SW-03.00	5129680	SM20-5310-C, SW6010, SW7199
8/15/2007	081507-I2-SW-03.00	5129681	SW6010
8/15/2007	081507-I2-SW-05.50	5129678	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/15/2007	081507-I2-SW-05.50	5129679	SW6010
8/15/2007	081507-I2-SW-09.00	5129676	SM20-5310-C, SW6010, SW7199
8/15/2007	081507-I2-SW-09.00	5129677	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium only, the remaining data were not validated per the project validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. ethods originally listed on the COC were revised per CH2M Hill, a copy of the email documentation is provided in the Communication section of this report The cooler temperature ranged from 1.0 to 7.1 °C. No qualification was made to the data since the samples were collected and shipped to the laboratory on the same day, ice was present as noted in the laboratory receipt log, and there was insufficient time for the samples to cool to the recommended range of 2±4°C. The preservation was not listed on the custody form, however, the laboratory provided the metals ph check in the data package, a copy of which is provided with the result forms.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

Samples 081407-H4-SW-38.00 (both injections) were qualified as estimated and assigned footnote MSDP to indicate matrix spike/spike duplicate precision exceedance (the laboratory limit is 2). Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 11, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT65 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/16/2007	081607-D1-SD-00.50	5130805	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/16/2007	081607-D1-SD-00.50	5130809	EPA Draft AVS-SEM, SW6010
8/16/2007	081607-D2-SD-00.50	5130815	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/16/2007	081607-D2-SD-00.50	5130816	EPA Draft AVS-SEM, SW6010
8/16/2007	081607-E1-SD-00.50	5130813	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/16/2007	081607-E1-SD-00.50	5130814	EPA Draft AVS-SEM, SW6010
8/16/2007	081607-E2-SD-00.50	5130817	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/16/2007	081607-E2-SD-00.50	5130818	EPA Draft AVS-SEM, SW6010
8/17/2007	081707-37-SD-00.50	5132005	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/17/2007	081707-37-SD-00.50	5132006	EPA Draft AVS-SEM, SW6010
8/17/2007	081707-37A-SD-00.50	5132003	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/17/2007	081707-37A-SD-00.50	5132004	EPA Draft AVS-SEM, SW6010
8/17/2007	081707-37B-SD-00.50	5132007	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/17/2007	081707-37B-SD-00.50	5132008	EPA Draft AVS-SEM, SW6010
8/17/2007	081707-F4-SD-00.50	5132009	Lloyd Kahn, SM20-2540-G, SM3500-FeB, SW6010
8/17/2007	081707-F4-SD-00.50	5132010	EPA Draft AVS-SEM, SW6010

Validation Level

The level of validation for this SDG is level IV for chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the sediment matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.8 to 5.4 °C. No qualification was made for low temperatures (below 2 C).

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 18, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT66 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/15/2007	081507-G1-SW-03.00	5129699	SM20-5310-C, SW6010, SW7199
8/15/2007	081507-G1-SW-03.00	5129700	SW6010
8/15/2007	081507-G1-SW-20.00	5129697	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/15/2007	081507-G1-SW-20.00	5129698	SW6010
8/15/2007	081507-G1-SW-35.00	5129695	SM20-5310-C, SW6010, SW7199
8/15/2007	081507-G1-SW-35.00	5129696	SW6010
8/15/2007	081507-I3-SW-03.00	5129687	SM20-5310-C, SW6010, SW7199
8/15/2007	081507-I3-SW-03.00	5129688	SW6010
8/15/2007	081507-I3-SW-05.50	5129685	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/15/2007	081507-I3-SW-05.50	5129686	SW6010
8/15/2007	081507-I3-SW-09.00	5129683	SM20-5310-C, SW6010, SW7199
8/15/2007	081507-I3-SW-09.00	5129684	SW6010
8/15/2007	081507-I4-SW-03.00	5129693	SM20-5310-C, SW6010, SW7199
8/15/2007	081507-I4-SW-03.00	5129694	SW6010
8/15/2007	081507-I4-SW-05.50	5129691	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/15/2007	081507-I4-SW-05.50	5129692	SW6010
8/15/2007	081507-I4-SW-09.00	5129689	SM20-5310-C, SW6010, SW7199
8/15/2007	081507-I4-SW-09.00	5129690	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 1 to 5.3 °C. No qualification was made for low temperatures (below 2 C). The sample name was revised on the COC from 081507-I4-SW-05.00 to -05.50. The sample preservative was not lised on the COC, however, the laboratory provided the pH check in the data package to demonstrate the metals were properly preserved.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

Results reported as J by the laboratory were assigned secondary qualifier IB to indicate the result was below the reporting limit. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

Results reported as J by the laboratory were assigned secondary qualifier IB to indicate the result was below the reporting limit. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 26, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT67 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/17/2007	081607-D1-PW-00.50	5130793	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/17/2007	081607-D1-PW-00.50	5130794	SW6010
8/17/2007	081607-D2-PW-00.50	5130797	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/17/2007	081607-D2-PW-00.50	5130798	SW6010
8/17/2007	081607-E1-PW-00.50	5130795	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/17/2007	081607-E1-PW-00.50	5130796	SW6010
8/17/2007	081607-E2-PW-00.50	5130799	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/17/2007	081607-E2-PW-00.50	5130800	SW6010
8/18/2007	081707-37-PW-00.50	5131993	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/18/2007	081707-37-PW-00.50	5131994	SW6010
8/18/2007	081707-37A-PW-00.50	5131991	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/18/2007	081707-37A-PW-00.50	5131992	SW6010
8/18/2007	081707-37B-PW-00.50	5131995	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/18/2007	081707-37B-PW-00.50	5131996	SW6010
8/18/2007	081707-F4-PW-00.50	5131997	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/18/2007	081707-F4-PW-00.50	5131998	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium, hexavalent chromium, dissolved organic carbon, ammonia, ferrous iron, hardness and oxidation reduction potential to meet the project validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete, revised COCs were provided in the hardcopy data package. The methods originally listed on the COC were revised per CH2M Hill. The cooler temperature ranged from 0.8 to 5.4 °C. No qualification was made to the data for low temperature (outside of the recommended range of 2-6 °C) since the samples were collected and shipped to the laboratory on the same day, ice was present as noted in the laboratory receipt log. The custody documentation were revised to accommodate the porewater generation.

The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the hardcopy report. The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sediment partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

Several samples were qualified as estimated and assigned secondary qualifier TD to indicate the filtered concentration was greater that the total concentration of chromium. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

Samples 081607-37A-PW-00.50 (both injections) and 081607-F4-PW-00.50 (both injections) were qualified as estimated and assigned footnote HTA to indicate the sample holding time was exceeded. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Dissolved Organic Carbon by SM20-5310-C

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Ferrous Iron by SM20 3500 Fe B

All results were qualified as K and assigned secondary qualifiers MSDH to indicate elevated matrix spike duplicate recovery. All results were qualified as estimated and assigned secondary qualifiers MSDP and LDP indicate matrix spike/spike duplicate and laboratory duplicate precision exceedance, respectively. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Ammonia-N SM20 4500 NH3 D

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hardness by SM20 2340 C

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Oxidation Reduction Potentia by ASTM D1498l

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 25, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT68 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/16/2007	081607-D1-SW-03.00	5130835	SM20-5310-C, SW6010, SW7199
8/16/2007	081607-D1-SW-03.00	5130836	SW6010
8/16/2007	081607-D1-SW-20.00	5130833	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/16/2007	081607-D1-SW-20.00	5130834	SW6010
8/16/2007	081607-D1-SW-40.00	5130831	SM20-2340-C, SM20-5310-C, SW6010, SW7199
8/16/2007	081607-D1-SW-40.00	5130832	SW6010
8/16/2007	081607-E1-SW-03.00	5130837	SM20-5310-C, SW6010, SW7199
8/16/2007	081607-E1-SW-03.00	5130838	SW6010
8/16/2007	081607-E1-SW-22.00	5130839	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/16/2007	081607-E1-SW-22.00	5130840	SW6010
8/16/2007	081607-E1-SW-42.00	5130841	SM20-2340-C, SM20-5310-C, SW6010, SW7199
8/16/2007	081607-E1-SW-42.00	5130842	SW6010
8/17/2007	081707-37B-SW-03.00	5132053	SM20-5310-C, SW6010, SW7199
8/17/2007	081707-37B-SW-03.00	5132054	SW6010
8/17/2007	081707-37B-SW-19.00	5132051	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/17/2007	081707-37B-SW-19.00	5132052	SW6010
8/17/2007	081707-37B-SW-35.00	5132049	SM20-2340-C, SM20-5310-C, SW6010, SW7199
8/17/2007	081707-37B-SW-35.00	5132050	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.6 to 5.4 °C. No qualification was made for low temperatures (below 2 C). The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the hardcopy report. The laboratory noted "Per client, the bottles are correct" for "D1-SW-00.30 says D1-SW-03.00 on bottles".

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

The post verification spike for batch 072306090401A was slightly low (75%) resulting in estimated qualification and assignment of secondary qualifier PSL for samples 081707-37B-SW-35.00, 081707-37B-SW-19.00 and 081707-37B-SW-03.00. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 26, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT69 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/16/2007	081607-D2-SW-03.00	5130843	SM20-5310-C, SW6010, SW7199
8/16/2007	081607-D2-SW-03.00	5130844	SW6010
8/16/2007	081607-D2-SW-22.00	5130845	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/16/2007	081607-D2-SW-22.00	5130846	SW6010
8/16/2007	081607-D2-SW-42.00	5130847	SM20-5310-C, SW6010, SW7199
8/16/2007	081607-D2-SW-42.00	5130848	SW6010
8/16/2007	081607-E2-SW-03.00	5130849	SM20-5310-C, SW6010, SW7199
8/16/2007	081607-E2-SW-03.00	5130850	SW6010
8/16/2007	081607-E2-SW-22.00	5130851	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/16/2007	081607-E2-SW-22.00	5130852	SW6010
8/16/2007	081607-E2-SW-42.00	5130853	SM20-5310-C, SW6010, SW7199
8/16/2007	081607-E2-SW-42.00	5130854	SW6010
8/17/2007	081707-F4-SW-03.00	5132059	SM20-5310-C, SW6010, SW7199
8/17/2007	081707-F4-SW-03.00	5132060	SW6010
8/17/2007	081707-F4-SW-10.00	5132057	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/17/2007	081707-F4-SW-10.00	5132058	SW6010
8/17/2007	081707-F4-SW-24.00	5132055	SM20-5310-C, SW6010, SW7199
8/17/2007	081707-F4-SW-24.00	5132056	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.8 to 5.4 °C. No qualification was made for low temperatures (below 2 C). The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the hardcopy report.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

Samples reported as J by the laboratory to indicate the concentration was below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 27, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT70 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/17/2007	081707-37-SW-03.00	5132029	SM20-5310-C, SW6010, SW7199
8/17/2007	081707-37-SW-03.00	5132030	SW6010
8/17/2007	081707-37-SW-14.00	5132027	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/17/2007	081707-37-SW-14.00	5132028	SW6010
8/17/2007	081707-37-SW-37.00	5132025	SM20-5310-C, SW6010, SW7199
8/17/2007	081707-37-SW-37.00	5132026	SW6010
8/17/2007	081707-37A-SW-03.00	5132023	SM20-5310-C, SW6010, SW7199
8/17/2007	081707-37A-SW-03.00	5132024	SW6010
8/17/2007	081707-37A-SW-19.00	5132021	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/17/2007	081707-37A-SW-19.00	5132022	SW6010
8/17/2007	081707-37A-SW-35.00	5132019	SM20-5310-C, SW6010, SW7199
8/17/2007	081707-37A-SW-35.00	5132020	SW6010
8/17/2007	081707-G4-SW-03.00	5132031	SM20-5310-C, SW6010, SW7199
8/17/2007	081707-G4-SW-03.00	5132032	SW6010
8/17/2007	081707-G4-SW-13.00	5132033	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/17/2007	081707-G4-SW-13.00	5132034	SW6010
8/17/2007	081707-G4-SW-24.00	5132035	SM20-5310-C, SW6010, SW7199
8/17/2007	081707-G4-SW-24.00	5132036	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.6 to 2.6 °C. No qualification was made for low temperatures (below 2 C). The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the hardcopy report.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

Samples reported as J by the laboratory to indicate the concentration was below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

Samples 081707-37A-SW-19.00 and 081707-37A-SW-03.00 were qualified as estimated and assigned secondary qualifier HTA to indicate the holding time for analysis was exceeded. The laboratory originally misreported hexavalent chromium as exceeding the holding time for analysis, when the holding time had actually been met for the first injection for sample 081707-37A-SW-19.00. The laboratory was contacted regarding this discrepancy and the result form was revised. A copy of the email is provided in the Communication section of this report. Samples 081707-37A-SW-35.00, 081707-37A-SW-19.00, 081707-37A-SW-03.00, 081707-37-SW-37.00 and 081707-37-SW-14.00 were qualified as estimated and assigned secondary qualifier PSL to indicate the post verification spike recovered low. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 28, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT71 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/19/2007	081807-D3-PW-00.50	5132675	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/19/2007	081807-D3-PW-00.50	5132676	SW6010
8/19/2007	081807-E3-PW-00.50	5132673	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/19/2007	081807-E3-PW-00.50	5132674	SW6010
8/19/2007	081807-G2-PW-00.50	5132669	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/19/2007	081807-G2-PW-00.50	5132670	SW6010
8/19/2007	081807-G3-PW-00.50	5132671	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/19/2007	081807-G3-PW-00.50	5132672	SW6010
8/19/2007	081807-G4-PW-00.50	5132667	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/19/2007	081807-G4-PW-00.50	5132668	SW6010
8/20/2007	081907-D4-PW-00.50	5132730	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/20/2007	081907-D4-PW-00.50	5132731	SW6010
8/20/2007	081907-F1-PW-00.50	5132732	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/20/2007	081907-F1-PW-00.50	5132733	SW6010
8/20/2007	081907-F2-PW-00.50	5132734	SM20-3500-FeB, SM20-4500-S2D, SW6010, SW7199
8/20/2007	081907-F2-PW-00.50	5132735	SW6010
8/20/2007	081907-F3-PW-00.50	5132736	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/20/2007	081907-F3-PW-00.50	5132737	SW6010
8/20/2007	081907-F3-PW-00.50-D	5132738	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-

			C, SW6010, SW7199
8/20/2007	081907-F3-PW-00.50-D	5132739	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.0 to 6 °C. No qualification was made for low temperatures (below 2 C).

The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the hardcopy report. The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sediment partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

Results reported as J were flagged IB to indicate the concentrations were below the reporting limits. The laboratory used 10 ml of sample due to limited sample amount. No qualification to the data was made for lesser sample amount. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

The laboratory reported both hexavalent chromium results being analyzed outside of the holding time, when upon further review it was noted that the first injection was conducted in hold, the second injection exceeded the 24 hour limit. The laboratory was contacted and the result form was revised to indicate this finding. Therefore the second injection of 081807-G3-PW-00.50 was qualified as UJ and assigned secondary qualifier HTA. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 081907-F3-PW-00.50/081907-F3-PW-00.50-D was collected. All results compared. The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was used.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 13, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT72 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/18/2007	081807-D3-SD-00.50	5132690	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/18/2007	081807-D3-SD-00.50	5132691	EPA Draft AVS-SEM, SW6010
8/18/2007	081807-E3-SD-00.50	5132688	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/18/2007	081807-E3-SD-00.50	5132689	EPA Draft AVS-SEM, SW6010
8/18/2007	081807-G2-SD-00.50	5132684	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/18/2007	081807-G2-SD-00.50	5132685	EPA Draft AVS-SEM, SW6010
8/18/2007	081807-G3-SD-00.50	5132686	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/18/2007	081807-G3-SD-00.50	5132687	EPA Draft AVS-SEM, SW6010
8/18/2007	081807-G4-SD-00.50	5132682	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/18/2007	081807-G4-SD-00.50	5132683	EPA Draft AVS-SEM, SW6010
8/19/2007	081907-D4-SD-00.50	5132745	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/19/2007	081907-D4-SD-00.50	5132746	EPA Draft AVS-SEM, SW6010
8/19/2007	081907-F1-SD-00.50	5132747	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/19/2007	081907-F1-SD-00.50	5132748	EPA Draft AVS-SEM, SW6010
8/19/2007	081907-F2-SD-00.50	5132749	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/19/2007	081907-F2-SD-00.50	5132750	EPA Draft AVS-SEM, SW6010
8/19/2007	081907-F3-SD-00.50	5132751	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/19/2007	081907-F3-SD-00.50	5132752	EPA Draft AVS-SEM, SW6010
8/19/2007	081907-F3-SD-00.50-D	5132753	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/19/2007	081907-F3-SD-00.50-D	5132754	EPA Draft AVS-SEM, SW6010
8/18/2007	081807-E3-SD-00.50	5132689	EPA Draft AVS-SEM, SW6010

Validation Level

The level of validation for this SDG is level IV for chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the sediment matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.7 to 2.9 °C. No qualification was made for low temperatures (below 2 C).

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 081907-F3-SD-00.50/081907-F3-SD-00.50-A were collected and analyzed with the following results:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium	211 mg/Kg	261 mg/Kg	21.2%	Yes

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 27, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT74 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/18/2007	081807-G2-SW-03.00	5132706	SM20-5310-C, SW6010, SW7199
8/18/2007	081807-G2-SW-03.00	5132707	SW6010
8/18/2007	081807-G2-SW-20.00	5132704	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/18/2007	081807-G2-SW-20.00	5132705	SW6010
8/18/2007	081807-G2-SW-37.00	5132702	SM20-5310-C, SW6010, SW7199
8/18/2007	081807-G2-SW-37.00	5132703	SW6010
8/18/2007	081807-G3-SW-03.00	5132712	SM20-5310-C, SW6010, SW7199
8/18/2007	081807-G3-SW-03.00	5132713	SW6010
8/18/2007	081807-G3-SW-25.00	5132710	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/18/2007	081807-G3-SW-25.00	5132711	SW6010
8/18/2007	081807-G3-SW-40.00	5132708	SM20-5310-C, SW6010, SW7199
8/18/2007	081807-G3-SW-40.00	5132709	SW6010
8/19/2007	081907-D4-SW-03.00	5132775	SM20-5310-C, SW6010, SW7199
8/19/2007	081907-D4-SW-03.00	5132776	SW6010
8/19/2007	081907-D4-SW-05.00	5132767	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/19/2007	081907-D4-SW-05.00	5132771	SW6010
8/19/2007	081907-D4-SW-08.50	5132765	SM20-5310-C, SW6010, SW7199
8/19/2007	081907-D4-SW-08.50	5132766	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.7 to 2.9 °C. No qualification was made for low temperatures (below 2 C). The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the hardcopy report.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

Samples reported as J by the laboratory to indicate the concentration was below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

Samples 081807-G2-SW-37.00, 081807-G2-SW-20.00 and 081807-G2-SW-03.00 were qualified as estimated and assigned secondary qualifier HTA to indicate the holding time for analysis was exceeded. The laboratory originally misreported hexavalent chromium as exceeding the holding time for analysis, when the holding time had actually been met for the first injection for sample 081907-D4-SW-03.00. The laboratory was contacted regarding this discrepancy and the result form was revised. A copy of the email is provided in the Communication section of this report. Samples 081907-D4-SW-08.50 and 081907-D4-SW-05.00 were qualified as estimated and assigned secondary qualifier MSDP to indicate the matrix spike/spike duplicate precision criteria were exceeded. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 28, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT75 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/18/2007	081807-D3-SW-03.00	5132724	SM20-5310-C, SW6010, SW7199
8/18/2007	081807-D3-SW-03.00	5132725	SW6010
8/18/2007	081807-D3-SW-25.00	5132722	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/18/2007	081807-D3-SW-25.00	5132723	SW6010
8/18/2007	081807-D3-SW-39.00	5132720	SM20-5310-C, SW6010, SW7199
8/18/2007	081807-D3-SW-39.00	5132721	SW6010
8/18/2007	081807-E3-SW-03.00	5132718	SM20-5310-C, SW6010, SW7199
8/18/2007	081807-E3-SW-03.00	5132719	SW6010
8/18/2007	081807-E3-SW-28.00	5132716	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/18/2007	081807-E3-SW-28.00	5132717	SW6010
8/18/2007	081807-E3-SW-40.00	5132714	SM20-5310-C, SW6010, SW7199
8/18/2007	081807-E3-SW-40.00	5132715	SW6010
8/20/2007	082007-B1-SW-02.00	5133307	SM20-5310-C, SW6010, SW7199
8/20/2007	082007-B1-SW-02.00	5133308	SW6010
8/20/2007	082007-B1-SW-05.00	5133305	SM20-2340-C, SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/20/2007	082007-B1-SW-05.00	5133306	SW6010
8/20/2007	082007-B2-SW-03.00	5133311	SM20-5310-C, SW6010, SW7199
8/20/2007	082007-B2-SW-03.00	5133312	SW6010
8/20/2007	082007-B2-SW-06.00	5133309	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/20/2007	082007-B2-SW-06.00	5133310	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.6 to 8.9 °C. No qualification was made to the data for low temperature (outside of the recommended range of 2-6 °C) since the samples were collected and shipped to the laboratory on the same day, ice was present as noted in the laboratory receipt log. The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the hardcopy report.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

Samples reported as J by the laboratory to indicate the concentration was below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 29, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT76 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/19/2007	081907-F1-SW-03.00	5132781	SM20-5310-C, SW6010, SW7199
8/19/2007	081907-F1-SW-03.00	5132782	SW6010
8/19/2007	081907-F1-SW-25.00	5132779	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/19/2007	081907-F1-SW-25.00	5132780	SW6010
8/19/2007	081907-F1-SW-35.00	5132777	SM20-2340-C, SM20-5310-C, SW6010, SW7199
8/19/2007	081907-F1-SW-35.00	5132778	SW6010
8/19/2007	081907-F1-SW-35.00-D	5132795	SM20-2340-C, SM20-5310-C, SW6010, SW7199
8/19/2007	081907-F1-SW-35.00-D	5132796	SW6010
8/19/2007	081907-F2-SW-03.00	5132787	SM20-5310-C, SW6010, SW7199
8/19/2007	081907-F2-SW-03.00	5132788	SW6010
8/19/2007	081907-F2-SW-25.00	5132785	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/19/2007	081907-F2-SW-25.00	5132786	SW6010
8/19/2007	081907-F2-SW-43.00	5132783	SM20-5310-C, SW6010, SW7199
8/19/2007	081907-F2-SW-43.00	5132784	SW6010
8/19/2007	081907-F3-SW-03.00	5132793	SM20-5310-C, SW6010, SW7199
8/19/2007	081907-F3-SW-03.00	5132794	SW6010
8/19/2007	081907-F3-SW-20.00	5132791	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/19/2007	081907-F3-SW-20.00	5132792	SW6010
8/19/2007	081907-F3-SW-35.00	5132789	SM20-5310-C, SW6010, SW7199
8/19/2007	081907-F3-SW-35.00	5132790	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.7 to 2.9 °C. No qualification was made to the data for low temperature (below the recommended range of 2-6 °C). The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the hardcopy report.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

Samples 081907-F1-SW-35.00, 081907-F1-SW-25.00, 081907-F1-SW-03.00, 081907-F2-SW-43.00, 081907-F2-SW-25.00, 081907-F3-SW-35.00 and 081907-F1-SW-35.00-D were qualified as estimated and assigned secondary qualifier MSDP to indicate the spike/spike duplicate (really the post verification spike for waters) precision was exceeded. Samples 081907-F1-SW-03.00 and 081907-F1-SW-03.00-D were qualified as estimated and assigned secondary qualifier HTA to indicate holding time exceedance. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 081907-F1-SW-35.00/081907-F1-SW-35.00-D (filtered and grab) were collected. All results compared. The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting

limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was used.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

MEMORANDUM

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 24, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT77 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/21/2007	082007-B2-PW-00.50	5133252	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/21/2007	082007-B2-PW-00.50	5133253	SW6010
8/21/2007	082007-B3-PW-00.50	5133242	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/21/2007	082007-B3-PW-00.50	5133243	SW6010
8/21/2007	082007-B4-PW-00.50	5133240	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/21/2007	082007-B4-PW-00.50	5133241	SW6010
8/21/2007	082007-E4-PW-00.50	5133244	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/21/2007	082007-E4-PW-00.50	5133248	SW6010
8/22/2007	082107-B1-PW-00.50	5134485	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/22/2007	082107-B1-PW-00.50	5134486	SW6010
8/22/2007	082107-C1-PW-00.50	5134483	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/22/2007	082107-C1-PW-00.50	5134484	SW6010
8/22/2007	082107-C2-PW-00.50	5134493	SM20-3500-FeB, SM20-4500-HB, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/22/2007	082107-C2-PW-00.50	5134494	SW6010
8/22/2007	082107-C3-PW-00.50	5134491	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/22/2007	082107-C3-PW-00.50	5134492	SW6010
8/22/2007	082107-C4-PW-00.50	5134487	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/22/2007	082107-C4-PW-00.50	5134488	SW6010
8/22/2007	082107-C4-PW-00.50-D	5134489	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D,

			SM20-5310-C, SW6010, SW7199
8/22/2007	082107-C4-PW-00.50-D	5134490	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.6 to 8.9 °C. No qualification was made for low temperatures (below 2 C) or elevated temperature (greater than 4 C). The samples were delivered to the laboratory on the same day as collection and ice was present in the cooler as documented on the sample receipt documentation and the various coolers did not have sufficient time to cool within range, therefore data were not qualified.

The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the hardcopy report. The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sediment partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

Results reported as J by the laboratory were assigned secondary qualifier IB to indicate the result was below the reporting limit. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 082107–C4-PW-00.50/082107–C4-PW-00.50-D were collected and analyzed with the following results:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium (total)	.0095 J mg/L	.0023 U mg/L	0%	Yes
Chromium (filtered)	.0023 U mg/L	.0023 U mg/L	Outside ±1RL	No
Hexavalent Chromium	5 U ug/L	5 U ug/L	0%	Yes

Data were not qualified for the RPD being outside limits per Region III guidance.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 13, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT78 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/20/2007	082007-B2-SD-00.50	5133273	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/20/2007	082007-B2-SD-00.50	5133274	EPA Draft AVS-SEM, SW6010
8/20/2007	082007-B3-SD-00.50	5133263	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/20/2007	082007-B3-SD-00.50	5133264	EPA Draft AVS-SEM, SW6010
8/20/2007	082007-B4-SD-00.50	5133261	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/20/2007	082007-B4-SD-00.50	5133262	EPA Draft AVS-SEM, SW6010
8/20/2007	082007-E4-SD-00.50	5133265	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/20/2007	082007-E4-SD-00.50	5133269	EPA Draft AVS-SEM, SW6010
8/21/2007	082107-B1-SD-00.50	5134514	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/21/2007	082107-B1-SD-00.50	5134515	EPA Draft AVS-SEM, SW6010
8/21/2007	082107-C1-SD-00.50	5134512	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/21/2007	082107-C1-SD-00.50	5134513	EPA Draft AVS-SEM, SW6010
8/21/2007	082107-C2-SD-00.50	5134522	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/21/2007	082107-C2-SD-00.50	5134523	EPA Draft AVS-SEM, SW6010
8/21/2007	082107-C3-SD-00.50	5134520	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/21/2007	082107-C3-SD-00.50	5134521	EPA Draft AVS-SEM, SW6010
8/21/2007	082107-C4-SD-00.50	5134516	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/21/2007	082107-C4-SD-00.50	5134517	EPA Draft AVS-SEM, SW6010
8/21/2007	082107-C4-SD-00.50-D	5134518	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/21/2007	082107-C4-SD-00.50-D	5134519	EPA Draft AVS-SEM, SW6010

Validation Level

The level of validation for this SDG is level IV for chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the sediment matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.6 to 8.9 °C. No qualification was made for elevated temperature since the samples were collected and sent to the laboratory on the same day, with insufficient time for the samples to chill within range.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

Samples 082007-B3-SD-00.50, 082007-B4-SD-00.50 and 082007-E4-SD-00.50 were qualified as K and assigned secondary qualifiers MSH and MSDH to indicate elevated matrix spike recovery. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 082107-C4-SD-00.50/082107-C4-SD-00.50-A were collected and analyzed with the following results:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium	315 mg/Kg	328 mg/Kg	4%	Yes

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 25, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT82 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/22/2007	DMT-EB-082207-02	5135695	SM20-3500-FeB, SM20-4500-HB, SM20-4500-NH3D, SM20-4500-S2D, SM20-5310-C, SW6010, SW7199
8/22/2007	DMT-EB-082207-02	5135696	SW6010
8/23/2007	082207-A1-PW-00.50	5135697	SM20-2340-C, SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
8/23/2007	082207-A1-PW-00.50	5135701	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 1.0 to 2.7 °C. No qualification was made for low temperatures (below 2 C) or elevated temperature (greater than 4 C). The samples were delivered to the laboratory on the same day as collection and ice was present in the cooler as documented on the sample receipt documentation and the various coolers did not have sufficient time to cool within range, therefore data were not qualified.

The preservative was not identified on the custody form, however the preservation logs for the chromium analysis were provided in the hardcopy report. The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sediment partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected and analyzed for this dataset.

Field blanks

Field blank sample DMT-EB-082207-02 was collected for this dataset and all results were undetected.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: September 13, 2007

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT83 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
8/22/2007	082207-A1-SD-00.50	5135713	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/22/2007	082207-A1-SD-00.50	5135714	EPA Draft AVS-SEM, SW6010
8/22/2007	082207-A2-SD-00.50	5135715	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/22/2007	082207-A2-SD-00.50	5135716	EPA Draft AVS-SEM, SW6010
8/22/2007	082207-A3-SD-00.50	5135717	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/22/2007	082207-A3-SD-00.50	5135718	EPA Draft AVS-SEM, SW6010
8/22/2007	082207-A4-SD-00.50	5135719	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
8/22/2007	082207-A4-SD-00.50	5135720	EPA Draft AVS-SEM, SW6010
8/22/2007	082207-A2-SD-00.50	5135716	EPA Draft AVS-SEM, SW6010

Validation Level

The level of validation for this SDG is level IV for chromium only, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the sediment matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.

- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 1.0 to 2.7 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

Data Validation Report (December 2007)

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 7, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT88 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/6/2007	120507-A1-PW-00.50	5228638	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/6/2007	120507-A1-PW-00.50	5228639	SW6010
12/6/2007	120507-D1-PW-00.50	5228644	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/6/2007	120507-D1-PW-00.50	5228645	SW6010
12/6/2007	120507-E1-PW-00.50	5228646	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/6/2007	120507-E1-PW-00.50	5228647	SW6010
12/6/2007	120507-I1-PW-00.50	5228640	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/6/2007	120507-I1-PW-00.50	5228641	SW6010
12/6/2007	120507-I4-PW-00.50	5228642	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/6/2007	120507-I4-PW-00.50	5228643	SW6010

Validation Level

The level of validation for this SDG is level IV for all analyses per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.7 to 3.0 °C. No qualification was made for low cooler temperature.

The laboratory check-in log noted sample 120707-A1-PW-00.50 should be 120707-I4-PW-00.50 per the chain of custody.

The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sample partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Dissolved Organic Carbon by SM120 5310C

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

pH by SM20 4500 H/B

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Redox by ASTM D1498

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 7, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT89 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/5/2007	120507-A1-SW-01.50	5228648	SM20-2340-C, SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/5/2007	120507-A1-SW-01.50	5228649	SW6010
12/5/2007	120507-D1-SW-01.50	5228656	SM20-5310-C, SW6010, SW7199
12/5/2007	120507-D1-SW-01.50	5228657	SW6010
12/5/2007	120507-D1-SW-19.00	5228658	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/5/2007	120507-D1-SW-19.00	5228659	SW6010
12/5/2007	120507-D1-SW-37.50	5228660	SM20-2340-C, SM20-5310-C, SW6010, SW7199
12/5/2007	120507-D1-SW-37.50	5228661	SW6010
12/5/2007	120507-E1-SW-01.50	5228662	SM20-5310-C, SW6010, SW7199
12/5/2007	120507-E1-SW-01.50	5228663	SW6010
12/5/2007	120507-E1-SW-17.00	5228664	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/5/2007	120507-E1-SW-17.00	5228665	SW6010
12/5/2007	120507-E1-SW-37.00	5228666	SM20-2340-C, SM20-5310-C, SW6010, SW7199
12/5/2007	120507-E1-SW-37.00	5228667	SW6010
12/5/2007	120507-I1-SW-01.50	5228650	SM20-2340-C, SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/5/2007	120507-I1-SW-01.50	5228651	SW6010
12/5/2007	120507-I4-SW-01.50	5228652	SM20-5310-C, SW6010, SW7199
12/5/2007	120507-I4-SW-01.50	5228653	SW6010
12/5/2007	120507-I4-SW-06.50	5228654	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/5/2007	120507-I4-SW-06.50	5228655	SW6010

Validation Level

The level of validation for this SDG is level IV for all analyses per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.7 to 3.0 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Dissolved Organic Carbon by SM120 5310C

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Total Organic Carbon by SM120 5310C

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hardness by SM20 2340C

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Ferrous Iron by SM20 3500-FeB Modified

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Samples 120507-D1-SW-19.00 (total and filtered), and 120507-E1-SW-19.00 (total and filtered) were qualified as estimated and assigned footnote TD to indicate the filtered concentration was higher than the total concentration. Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 11, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT90 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/6/2007	120607-H1-PW-00.50-D	5230022	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/6/2007	120607-H1-PW-00.50-D	5230023	SW6010
12/7/2007	120607-C1-PW-00.50	5230026	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/7/2007	120607-C1-PW-00.50	5230027	SW6010
12/7/2007	120607-H1-PW-00.50	5230020	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/7/2007	120607-H1-PW-00.50	5230021	SW6010
12/7/2007	120607-H4-PW-00.50	5230024	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/7/2007	120607-H4-PW-00.50	5230025	SW6010
12/7/2007	120607-I2-PW-00.50	5230016	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/7/2007	120607-I2-PW-00.50	5230017	SW6010
12/7/2007	120607-I3-PW-00.50	5230018	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/7/2007	120607-I3-PW-00.50	5230019	SW6010
12/7/2007	120607-H4-PW-00.50	5230025	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.4 to 3.1 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sample partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

No qualification to the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

No qualification of the data was made. Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB.

Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 120607-H1-PW-00.50/120607-H1-PW-00.50-D were collected and analyzed with the acceptable results as follows:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium (total)	0.0174 mg/L	0.0168 mg/L	Within ± RL	Yes

Chromium (filtered)	0.0110 mg/L	0.0110 mg/L	Within ± RL	Yes
Hexavalent chromium	5 U, 5 U ug/L	5 U, 5 U ug/L	Within ± RL	Yes

The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

MEMORANDUM

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 12, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT91 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/6/2007	120607-H1-SW-01.50	5230036	SM20-5310-C, SW6010, SW7199
12/6/2007	120607-H1-SW-01.50	5230037	SW6010
12/6/2007	120607-H1-SW-16.50	5230038	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/6/2007	120607-H1-SW-16.50	5230039	SW6010
12/6/2007	120607-H1-SW-16.50-D	5230048	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/6/2007	120607-H1-SW-16.50-D	5230049	SW6010
12/6/2007	120607-H1-SW-32.50	5230040	SM20-2340-C, SM20-5310-C, SW6010, SW7199
12/6/2007	120607-H1-SW-32.50	5230044	SW6010
12/6/2007	120607-I2-SW-02.00	5230028	SM20-5310-C, SW6010, SW7199
12/6/2007	120607-I2-SW-02.00	5230029	SW6010
12/6/2007	120607-I2-SW-06.00	5230030	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/6/2007	120607-I2-SW-06.00	5230031	SW6010
12/6/2007	120607-I3-SW-02.00	5230032	SM20-5310-C, SW6010, SW7199
12/6/2007	120607-I3-SW-02.00	5230033	SW6010
12/6/2007	120607-I3-SW-06.50	5230034	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/6/2007	120607-I3-SW-06.50	5230035	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.4 to 3.1 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

The matrix spike/spike duplicate relative percent difference (MS/MSD RPD) was 3 (lab limit = 1), resulting in qualification of all hexavalent chromium values as estimated and also assigning secondary qualifier MSDP. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Samples 120607-I2-SW-02.00, 120607-H1-SW-01.50, 120607-H1-SW-16.50 and 120607-H1-SW-16.50-D were qualified as estimated and assigned footnote TD to indicate the filtered value was higher than the total value. The sample ID for 5230032 was incorrectly labeled as 5230030 in the raw data. The laboratory revised the ID on the raw result form, a copy of which is provided in the Communication section of this report. Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pairs 120607-H1-SW-16.50/120607-H1-SW-16.50-D were collected and analyzed with the acceptable results as follows:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium (total)	0.0023 U mg/L	0.0023 U mg/L	Within ± RL	Yes
Chromium (filtered)	0.0027 J mg/L	0.0026 J mg/L	Within ± RL	Yes
Hexavalent chromium	5 U, 5 U ug/L	5 U, 5 U ug/L	Within ± RL	Yes

The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met.

Field blanks

Equipment blank sample were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 9, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT92 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/6/2007	120607-C1-SW-02.00	5230056	SM20-2340-C, SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/6/2007	120607-C1-SW-02.00	5230057	SW6010
12/6/2007	120607-C1-SW-02.00-D	5230058	SM20-2340-C, SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/6/2007	120607-C1-SW-02.00-D	5230059	SW6010
12/6/2007	120607-H4-SW-02.00	5230050	SM20-5310-C, SW6010, SW7199
12/6/2007	120607-H4-SW-02.00	5230051	SW6010
12/6/2007	120607-H4-SW-19.00	5230052	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/6/2007	120607-H4-SW-19.00	5230053	SW6010
12/6/2007	120607-H4-SW-38.00	5230054	SM20-5310-C, SW6010, SW7199
12/6/2007	120607-H4-SW-38.00	5230055	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.

- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.4 to 3.1 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

All samples were qualified as estimated and assigned footnote MSDP to indicate the precision criteria was exceeded. The MSD form in the data package was incorrectly reported. The laboratory revised the form, a copy of which is provided in the Communication section of this report. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Samples 120607-C1-SW-02.00 total and filtered were qualified as estimated and assigned secondary qualifier TD to indicate the filtered value was greater than the total value for chromium. Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB.

Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pairs 120607-C1-SW-02.00/120607-C1-SW-02.00-D were collected and analyzed with the acceptable results as follows:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium (total)	0.0086 J mg/L	0.0079 J mg/L	Within ± RL	Yes
Chromium (filtered)	0.0066 J mg/L	0.0094 J mg/L	Within ± RL	Yes
Hexavalent chromium	5 U, 7 J ug/L	5 U, 6.9 ug/L	Within ± RL	Yes

The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met.

Field blanks

Equipment blank sample were not collected for this dataset.
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Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 8, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT93 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/8/2007	120707-B1-PW-00.50	5231865	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/8/2007	120707-B1-PW-00.50	5231866	SW6010
12/8/2007	120707-B2-PW-00.50	5231867	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/8/2007	120707-B2-PW-00.50	5231868	SW6010
12/8/2007	120707-B3-PW-00.50	5231869	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/8/2007	120707-B3-PW-00.50	5231870	SW6010
12/8/2007	120707-B4-PW-00.50	5231871	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/8/2007	120707-B4-PW-00.50	5231875	SW6010
12/8/2007	120707-C2-PW-00.50	5231863	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/8/2007	120707-C2-PW-00.50	5231864	SW6010
12/8/2007	120707-B1-PW-00.50	5231865	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/8/2007	120707-B1-PW-00.50	5231866	SW6010
12/8/2007	120707-B2-PW-00.50	5231867	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/8/2007	120707-B2-PW-00.50	5231868	SW6010
12/8/2007	120707-B3-PW-00.50	5231869	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/8/2007	120707-B3-PW-00.50	5231870	SW6010
12/8/2007	120707-B4-PW-00.50	5231871	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/8/2007	120707-B4-PW-00.50	5231875	SW6010
12/8/2007	120707-C2-PW-00.50	5231863	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/8/2007	120707-C2-PW-00.50	5231864	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.4 to 3.8 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

All samples were qualified as estimated and assigned secondary qualifier MSDP to indicate matrix spike/matrix spike duplicate precision exceedance. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

The laboratory originally reported the matrix spike and spike duplicate recoveries and the preparation logs with incorrect numbers. The laboratory was contacted and the revised information was sent to the validator. A copy of the revisions is provided in the Communication section of this report.

No qualification of the data was made. Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB.

Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were collected for this dataset.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 7, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT94 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/7/2007	120707-B3-SW-01.50	5231879	SM20-5310-C, SW6010, SW7199
12/7/2007	120707-B3-SW-01.50	5231880	SW6010
12/7/2007	120707-B3-SW-05.50	5231881	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/7/2007	120707-B3-SW-05.50	5231882	SW6010
12/7/2007	120707-B3-SW-10.00	5231883	SM20-5310-C, SW6010, SW7199
12/7/2007	120707-B3-SW-10.00	5231884	SW6010
12/7/2007	120707-B4-SW-01.50	5231885	SM20-5310-C, SW6010, SW7199
12/7/2007	120707-B4-SW-01.50	5231886	SW6010
12/7/2007	120707-B4-SW-05.50	5231887	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/7/2007	120707-B4-SW-05.50	5231888	SW6010
12/7/2007	120707-B4-SW-10.40	5231889	SM20-5310-C, SW6010, SW7199
12/7/2007	120707-B4-SW-10.40	5231890	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.4 to 3.8 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

The ph check logs for the samples were not in the original data package, but were sent to the validator.

No qualification of the data was made. Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 8, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT95 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/7/2007	120707-B1-SW-02.00	5231910	SM20-5310-C
12/7/2007	120707-B1-SW-02.00-R	5231899	SW6010, SW7199
12/7/2007	120707-B1-SW-02.00-R	5231900	SW6010
12/7/2007	120707-B1-SW-06.50	5231911	SM20-2340-C, SM20-3500-FeB, SM20-5310-C
12/7/2007	120707-B1-SW-06.50-D	5231912	SM20-2340-C, SM20-3500-FeB, SM20-5310-C
12/7/2007	120707-B1-SW-07.00-R	5231901	SW6010, SW7199
12/7/2007	120707-B1-SW-07.00-R	5231902	SW6010
12/7/2007	120707-B2-SW-02.00	5231908	SM20-5310-C
12/7/2007	120707-B2-SW-02.00-R	5231895	SW6010, SW7199
12/7/2007	120707-B2-SW-02.00-R	5231896	SW6010
12/7/2007	120707-B2-SW-08.00	5231909	SM20-3500-FeB, SM20-5310-C
12/7/2007	120707-B2-SW-09.00-R	5231897	SW6010, SW7199
12/7/2007	120707-B2-SW-09.00-R	5231898	SW6010
12/7/2007	120707-C2-SW-02.00	5231903	SM20-5310-C
12/7/2007	120707-C2-SW-02.00-R	5231891	SW6010, SW7199
12/7/2007	120707-C2-SW-02.00-R	5231892	SW6010
12/7/2007	120707-C2-SW-05.50	5231904	SM20-3500-FeB, SM20-5310-C
12/7/2007	120707-C2-SW-06.00-R	5231893	SW6010, SW7199
12/7/2007	120707-C2-SW-06.00-R	5231894	SW6010
12/7/2007	DMT-EB-120707-01	5231913	SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/7/2007	DMT-EB-120707-01	5231914	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.4 to 3.8 °C. No qualification was made for low cooler temperature. The laboratory sent the ph check log at a later date to the validator since it had been omitted from the hardcopy data package.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

No qualification of the data was made. Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB.

The MSD form in the data package had an incorrectly assigned lab flag of N. This did not impact the data, and no further action was taken. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were collected for this dataset.

Field blanks

Equipment blank sample DMT-EB-120707-01 (total and filtered) were collected for this dataset. There were no target analytes detected in either of the samples.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

MEMORANDUM

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 14, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT96 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/10/2007	120907-D2-PW-00.50	5232316	12/10/2007
12/10/2007	120907-D2-PW-00.50	5232320	12/10/2007
12/10/2007	120907-D4-PW-00.50	5232312	12/10/2007
12/10/2007	120907-D4-PW-00.50	5232313	12/10/2007
12/10/2007	120907-D4-PW-00.50-D	5232314	12/10/2007
12/10/2007	120907-D4-PW-00.50-D	5232315	12/10/2007
12/10/2007	120907-E2-PW-00.50	5232308	12/10/2007
12/10/2007	120907-E2-PW-00.50	5232309	12/10/2007
12/10/2007	120907-E4-PW-00.50	5232310	12/10/2007
12/10/2007	120907-E4-PW-00.50	5232311	12/10/2007
12/10/2007	120907-D2-PW-00.50	5232316	12/10/2007
12/10/2007	120907-D2-PW-00.50	5232320	12/10/2007
12/10/2007	120907-D4-PW-00.50	5232312	12/10/2007
12/10/2007	120907-D4-PW-00.50	5232313	12/10/2007
12/10/2007	120907-D4-PW-00.50-D	5232314	12/10/2007
12/10/2007	120907-D4-PW-00.50-D	5232315	12/10/2007
12/10/2007	120907-E2-PW-00.50	5232308	12/10/2007
12/10/2007	120907-E2-PW-00.50	5232309	12/10/2007
12/10/2007	120907-E4-PW-00.50	5232310	12/10/2007
12/10/2007	120907-E4-PW-00.50	5232311	12/10/2007

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.5 to 4.2 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Samples 120907-E2-PW-00.05, 120907-E4-PW-00.05, 120907-D4-PW-00.05, 120907-D4-PW-00.05-D and 120907-D2-PW-00.05 were qualified as L/UL and assigned footnote MSL to indicate low matrix spike recovery.

Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pairs 120907-D4-PW-00.05/120907-D4-PW-00.05-D were collected and analyzed as summarized below:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium (total)	0.0023U mg/L	0.0023 U mg/L	Within ± RL	Yes
Chromium (filtered)	0.0242 J mg/L	0.0137 J mg/L	> ± RL	No
Hexavalent chromium	5 U, 5 U ug/L	5 U, 5 U ug/L	Within ± RL	Yes

The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met for all results with the exception of filtered chromium, which exceeded the range of 1 RL unit. No action is required for field duplicate precision exceedance.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 15, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT97 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/9/2007	120907-D4-SW-02.00	5232336	SM20-5310-C, SW6010, SW7199
12/9/2007	120907-D4-SW-02.00	5232337	SW6010
12/9/2007	120907-E2-SW-02.00	5232324	SM20-5310-C, SW6010, SW7199
12/9/2007	120907-E2-SW-02.00	5232325	SW6010
12/9/2007	120907-E2-SW-22.00	5232326	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/9/2007	120907-E2-SW-22.00	5232327	SW6010
12/9/2007	120907-E2-SW-42.00	5232328	SM20-5310-C, SW6010, SW7199
12/9/2007	120907-E2-SW-42.00	5232329	SW6010
12/9/2007	120907-E4-SW-02.00	5232330	SM20-5310-C, SW6010, SW7199
12/9/2007	120907-E4-SW-02.00	5232331	SW6010
12/9/2007	120907-E4-SW-09.00	5232332	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/9/2007	120907-E4-SW-09.00	5232333	SW6010
12/9/2007	120907-E4-SW-13.00	5232334	SM20-5310-C, SW6010, SW7199
12/9/2007	120907-E4-SW-13.00	5232335	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.5 to 4.2 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

Sample 120907-E2-SW-02.00 was qualified as estimated and assigned secondary qualifier LCSH to indicate elevated laboratory control sample recovery. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Samples 120907-E2-SW-02.00, 120907-E4-SW-02.00 and 120907-D4-SW-02.00 were qualified as estimated and assigned footnote TD to indicate the filtered value was greater than the total value.

Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 16, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT98 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/9/2007	120907-D2-SW-02.00	5232348	SM20-5310-C, SW6010, SW7199
12/9/2007	120907-D2-SW-02.00	5232349	SW6010
12/9/2007	120907-D2-SW-22.00	5232350	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/9/2007	120907-D2-SW-22.00	5232351	SW6010
12/9/2007	120907-D2-SW-42.00	5232352	SM20-5310-C, SW6010, SW7199
12/9/2007	120907-D2-SW-42.00	5232353	SW6010
12/9/2007	120907-D4-SW-09.00	5232338	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/9/2007	120907-D4-SW-09.00	5232342	SW6010
12/9/2007	120907-D4-SW-09.00-D	5232346	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/9/2007	120907-D4-SW-09.00-D	5232347	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.

- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.5 to 4.2 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

The laboratory control sample (LCS) recovered above the control limit at 111%R (limits 89.5-110.4). Since all of the associated hexavalent chromium results were nondetected, no qualification to the data was required. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

The pH check log was not sent in the original data package, it was sent to the validator in a separate transmittal. Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Samples 120907-D4-SW-09.00, 120907-D4-SW-09.00-D and 120907-D2-SW-42.00 (total and filtered) were qualified as estimated and assigned footnote TD to indicate the filtered value was greater than the total value.

Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 120907-D4-SW-09.00/120907-D4-SW-09.00-D were collected and analyzed as summarized below:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium (total)	0.0023U mg/L	0.0023 U mg/L	Within ± RL	Yes
Chromium (filtered)	0.0045 J mg/L	0.0029 J mg/L	Within ± RL	No
Hexavalent chromium	5 U, 5 U ug/L	5 U, 5 U ug/L	Within ± RL	Yes

The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 17, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMT99 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/11/2007	121007-37-PW-00.50	5233117	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/11/2007	121007-37-PW-00.50	5233118	SW6010
12/11/2007	121007-37B-PW-00.50	5233121	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/11/2007	121007-37B-PW-00.50	5233122	SW6010
12/11/2007	121007-D3-PW-00.50	5233115	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/11/2007	121007-D3-PW-00.50	5233116	SW6010
12/11/2007	121007-F4-PW-00.50	5233119	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/11/2007	121007-F4-PW-00.50	5233120	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.9 to 3.9 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sample partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

No qualification to the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 17, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU01 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/10/2007	121007-37-SW-02.00	5233141	SM20-5310-C, SW6010, SW7199
12/10/2007	121007-37-SW-02.00	5233142	SW6010
12/10/2007	121007-37-SW-17.00	5233143	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/10/2007	121007-37-SW-17.00	5233144	SW6010
12/10/2007	121007-37-SW-37.00	5233145	SM20-2340-C, SM20-5310-C, SW6010, SW7199
12/10/2007	121007-37-SW-37.00	5233146	SW6010
12/10/2007	121007-37B-SW-02.00	5233129	SM20-5310-C, SW6010, SW7199
12/10/2007	121007-37B-SW-02.00	5233130	SW6010
12/10/2007	121007-37B-SW-02.00-D	5233147	SM20-5310-C, SW6010, SW7199
12/10/2007	121007-37B-SW-02.00-D	5233148	SW6010
12/10/2007	121007-37B-SW-17.00	5233131	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/10/2007	121007-37B-SW-17.00	5233132	SW6010
12/10/2007	121007-37B-SW-35.00	5233133	SM20-5310-C, SW6010, SW7199
12/10/2007	121007-37B-SW-35.00	5233137	SW6010
12/10/2007	121007-D3-SW-02.00	5233123	SM20-5310-C, SW6010, SW7199
12/10/2007	121007-D3-SW-02.00	5233124	SW6010
12/10/2007	121007-D3-SW-22.00	5233125	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/10/2007	121007-D3-SW-22.00	5233126	SW6010
12/10/2007	121007-D3-SW-40.00	5233127	SM20-5310-C, SW6010, SW7199
12/10/2007	121007-D3-SW-40.00	5233128	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.9 to 3.9 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

Samples 121007-37B-SW-35.00, 121007-37-SW-02.00, 121007-37-SW-17.00, 121007-37-SW-37.00 and 121007-37B-SW-02.00-D were qualified as estimated and assigned secondary qualifier MSDP to indicate elevated matrix spike/spike duplicate precision exceedance. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pairs 121007-37B-SW-02.00/121007-37B-SW-02.00-D were collected and analyzed as summarized below:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium (total)	0.0023U mg/L	0.0026 J mg/L	Within ± RL	Yes
Chromium (filtered)	0.0023 U mg/L	0.0026 J mg/L	Within ± RL	Yes
Hexavalent chromium	5 U, 5 U ug/L	5 U, 5 U ug/L	Within ± RL	Yes

The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 17, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU02 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/10/2007	121007-F4-SW-02.00	5233155	SM20-5310-C, SW6010, SW7199
12/10/2007	121007-F4-SW-02.00	5233156	SW6010
12/10/2007	121007-F4-SW-15.00	5233157	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/10/2007	121007-F4-SW-15.00	5233158	SW6010
12/10/2007	121007-F4-SW-25.00	5233159	SM20-5310-C, SW6010, SW7199
12/10/2007	121007-F4-SW-25.00	5233160	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.9 to 3.9 °C. No qualification was made for low cooler temperature. The ph check log was sent to the validator in a separate transmittal.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

All samples were qualified as estimated and assigned secondary qualifier MSDP to indicate elevated matrix spike/spike duplicate precision exceedance. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

No qualification to the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC CJ
Re: Dundalk Marine Terminal Data Validation
Date: January 18, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU03 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/12/2007	121107-37A-PW-00.50	5234197	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/12/2007	121107-37A-PW-00.50	5234198	SW6010
12/12/2007	121107-A2-PW-00.50	5234187	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/12/2007	121107-A2-PW-00.50	5234188	SW6010
12/12/2007	121107-A3-PW-00.50	5234189	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/12/2007	121107-A3-PW-00.50	5234190	SW6010
12/12/2007	121107-A4-PW-00.50	5234191	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/12/2007	121107-A4-PW-00.50	5234192	SW6010
12/12/2007	121107-C3-PW-00.50	5234193	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/12/2007	121107-C3-PW-00.50	5234194	SW6010
12/12/2007	121107-C4-PW-00.50	5234195	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/12/2007	121107-C4-PW-00.50	5234196	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 1.2 to 4.1 °C. No qualification was made for low cooler temperature. The laboratory notes in sample log in that 6 jars extra were sent in the cooler for samples PW-A2-, PW-A3 and PW-A4.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Total and filtered chromium were qualified as estimated and assigned secondary qualifier TD for sample 121107-A3-PW-00.50 to indicate the filtered value was greater than the total value. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 21, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU04 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/11/2007	121107-37a-SW-02.00	5234199	SM20-5310-C, SW6010, SW7199
12/11/2007	121107-37a-SW-02.00	5234200	SW6010
12/11/2007	121107-37a-SW-18.00	5234201	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/11/2007	121107-37a-SW-18.00	5234202	SW6010
12/11/2007	121107-37a-SW-36.00	5234203	SM20-5310-C, SW6010, SW7199
12/11/2007	121107-37a-SW-36.00	5234204	SW6010
12/11/2007	121107-A2-SW-02.00	5234205	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/11/2007	121107-A2-SW-02.00	5234206	SW6010
12/11/2007	121107-A3-SW-02.00	5234207	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/11/2007	121107-A3-SW-02.00	5234208	SW6010
12/11/2007	121107-A4-SW-02.00	5234209	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/11/2007	121107-A4-SW-02.00	5234210	SW6010
12/11/2007	121107-C3-SW-02.00	5234213	SM20-5310-C, SW6010, SW7199
12/11/2007	121107-C3-SW-02.00	5234217	SW6010
12/11/2007	121107-C3-SW-08.00	5234211	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/11/2007	121107-C3-SW-08.00	5234212	SW6010
12/11/2007	121107-C4-SW-02.00	5234223	SM20-5310-C, SW6010, SW7199
12/11/2007	121107-C4-SW-02.00	5234224	SW6010
12/11/2007	121107-C4-SW-02.00-D	5234225	SM20-5310-C, SW6010, SW7199
12/11/2007	121107-C4-SW-02.00-D	5234226	SW6010
12/11/2007	121107-C4-SW-08.00	5234221	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/11/2007	121107-C4-SW-08.00	5234222	SW6010
12/11/2007	DMT-EB-121107-01	5234229	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/11/2007	DMT-EB-121107-01	5234230	SW6010
12/11/2007	DMT-EB-121107-02	5234227	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/11/2007	DMT-EB-121107-02	5234228	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 1.2 to 4.1 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Total and filtered chromium were qualified as estimated and assigned secondary qualifier TD for samples 121107-37a-SW-02.00, 121107-37a-SW-18.00 and 121107-C3-SW-02.00 to indicate the filtered value was greater than the total value. Samples reported as J were flagged with secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 121107-C4-SW-02.00/121107-C4-SW-02.00-D were collected and analyzed as summarized below:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium (total)	0.0023U mg/L	0.0031 J mg/L	Within ± RL	Yes
Chromium (filtered)	0.0023 U mg/L	0.0023 U mg/L	Within ± RL	No
Hexavalent chromium	5 U, 5 U ug/L	5 U, 5 U ug/L	Within ± RL	Yes

The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met.

Field blanks

Equipment blank samples DMT-EB-121107-01 and DMT-EB-121107-02 (total and filtered chromium) were collected for this dataset. All results were nondetected.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

MEMORANDUM

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 18, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU05 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/12/2007	121207-F2-SW-02.00	5235099	SM20-5310-C, SW6010, SW7199
12/12/2007	121207-F2-SW-02.00	5235100	SW6010
12/12/2007	121207-F2-SW-20.00	5235101	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/12/2007	121207-F2-SW-20.00	5235102	SW6010
12/12/2007	121207-F2-SW-40.00	5235103	SM20-2340-C, SM20-5310-C, SW6010, SW7199
12/12/2007	121207-F2-SW-40.00	5235104	SW6010
12/12/2007	121207-G2-SW-02.00	5235093	SM20-5310-C, SW6010, SW7199
12/12/2007	121207-G2-SW-02.00	5235094	SW6010
12/12/2007	121207-G2-SW-18.00	5235095	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/12/2007	121207-G2-SW-18.00	5235096	SW6010
12/12/2007	121207-G2-SW-38.00	5235097	SM20-2340-C, SM20-5310-C, SW6010, SW7199
12/12/2007	121207-G2-SW-38.00	5235098	SW6010
12/12/2007	121207-G4-SW-02.00	5235081	SM20-5310-C, SW6010, SW7199
12/12/2007	121207-G4-SW-02.00	5235085	SW6010
12/12/2007	121207-G4-SW-17.00	5235089	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/12/2007	121207-G4-SW-17.00	5235090	SW6010
12/12/2007	121207-G4-SW-34.00	5235091	SM20-5310-C, SW6010, SW7199
12/12/2007	121207-G4-SW-34.00	5235092	SW6010
12/12/2007	DMT-EB-121207-01	5235105	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/12/2007	DMT-EB-121207-01	5235106	SW6010
12/12/2007	DMT-EB-121207-02	5235107	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
12/12/2007	DMT-EB-121207-02	5235108	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 1.7 to 5.4 °C. No qualification was made for low cooler temperature. The ph check log was not provided in the original data package, however, a copy was sent to the validator under a separate submittal.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

An early email from the lab indicated that many of the analyses were run outside of the 24 hour holding time. The laboratory clarified the issue on the phone with the validator, with the final outcome being only one sample, second injection for 121207-F2-SW-02.00 was qualified as estimated for holding time exceedance. The laboratory was able to piece together the analytical runs and determine which samples were analyzed at which times. A copy of the email documentation is provided in the Communication section of this report.

The following samples were qualified as estimated and assigned footnotes MSDL and MSDP to indicate low matrix spike duplicate recovery and spike duplicate precision exceedance: 121207-G4-SW-02.00, 121207-G4-SW-17.00, 121207-G4-SW-34.00, 121207-G2-SW-02.00, 121207-G2-SW-18.00, 121207-G2-SW-38.00, 121207-F2-SW-02.00 and 121207-F2-SW-20.00.

The following samples were qualified as estimated and assigned footnote MSL to indicate low matrix spike recovery: 121207-F2-SW-40.00, DMT-EB-121207-01 and DMT-EB- 121207-02.

Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Samples reported as J were flagged with secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank samples DMT-EB-121207-01 and DMT-EB-121207-02 were collected for this dataset. All results were nondetected.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

MEMORANDUM

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: January 22, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU06 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
12/13/2007	121207-F2-PW-00.50	5235115	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/13/2007	121207-F2-PW-00.50	5235116	SW6010
12/13/2007	121207-G2-PW-00.50	5235111	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/13/2007	121207-G2-PW-00.50	5235112	SW6010
12/13/2007	121207-G4-PW-00.50	5235113	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/13/2007	121207-G4-PW-00.50	5235114	SW6010
12/13/2007	DMT-EB-121207-03	5235117	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
12/13/2007	DMT-EB-121207-03	5235118	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.

- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 1.7 to 5.4 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sample partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Samples reported as J were flagged with secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank sample DMT-EB-121207-02 was collected for this dataset. All results were nondetected.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

Data Validation Report (February 2008)

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 12, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU07 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/20/2008	021908-H1-PW-00.50	5283445	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/20/2008	021908-H1-PW-00.50	5283446	SW6010
2/20/2008	021908-I1-PW-00.50	5283437	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/20/2008	021908-I1-PW-00.50	5283438	SW6010
2/20/2008	021908-I2-PW-00.50	5283439	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/20/2008	021908-I2-PW-00.50	5283440	SW6010
2/20/2008	021908-I3-PW-00.50	5283441	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/20/2008	021908-I3-PW-00.50	5283442	SW6010
2/20/2008	021908-I4-PW-00.50	5283443	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/20/2008	021908-I4-PW-00.50	5283444	SW6010

Validation Level

The level of validation for this SDG is level IV for all analyses per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 1.7 to 2.7 °C. No qualification was made for low cooler temperature.

The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sample partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB.

Minor deficiencies identified during validation are summarized per analytical method as follows:

Dissolved Organic Carbon by SM120 5310C

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

pH by SM20 4500 H/B

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Redox by ASTM D1498

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Ferrous Iron by SM20 3500-FeB Modified

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hardness by SM20 2340C

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

The preparation log listed incorrect sample amounts for the porewater, they should be 25 milliliters, and were originally submitted as 50 milliliters. The laboratory was contacted and a revised preparation log was requested, a copy of which is provided in the Communication section of this report.

Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Metals by SW6010

Samples 021908-I3-PW-00.50 and 021908-H1-PW-00.50 were qualified as estimated and assigned secondary qualifier TD for calcium and magnesium to indicate the dissolved concentration was higher than the total concentration for these two analyzes. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 13, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU08 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/19/2008	021908-H1-SW-02.50	5283467	SM20-5310-C, SW6010, SW7199
2/19/2008	021908-H1-SW-02.50	5283468	SW6010
2/19/2008	021908-H1-SW-18.00	5283465	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/19/2008	021908-H1-SW-18.00	5283466	SW6010
2/19/2008	021908-H1-SW-34.50	5283463	SM20-2340-C, SM20-5310-C, SW6010, SW7199
2/19/2008	021908-H1-SW-34.50	5283464	SW6010
2/19/2008	021908-I1-SW-02.10	5283447	SM20-2340-C, SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/19/2008	021908-I1-SW-02.10	5283448	SW6010
2/19/2008	021908-I1-SW-02.10-D	5283449	SM20-2340-C, SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/19/2008	021908-I1-SW-02.10-D	5283450	SW6010
2/19/2008	021908-I2-SW-02.50	5283453	SM20-5310-C, SW6010, SW7199
2/19/2008	021908-I2-SW-02.50	5283454	SW6010
2/19/2008	021908-I2-SW-07.00	5283451	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/19/2008	021908-I2-SW-07.00	5283452	SW6010
2/19/2008	021908-I3-SW-02.50	5283455	SM20-5310-C, SW6010, SW7199
2/19/2008	021908-I3-SW-02.50	5283456	SW6010
2/19/2008	021908-I3-SW-07.50	5283457	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/19/2008	021908-I3-SW-07.50	5283458	SW6010
2/19/2008	021908-I4-SW-02.50	5283459	SM20-5310-C, SW6010, SW7199
2/19/2008	021908-I4-SW-02.50	5283460	SW6010
2/19/2008	021908-I4-SW-07.50	5283461	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/19/2008	021908-I4-SW-07.50	5283462	SW6010

Validation Level

The level of validation for this SDG is level IV for all analyses per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 1.2 to 2.7 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Values reported below the report limit were assigned secondary qualifier IB.

Dissolved Organic Carbon by SM120 5310C

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Total Organic Carbon by SM120 5310C

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Hardness by SM20 2340C

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Ferrous Iron by SM20 3500-FeB Modified

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Samples 021908-I1-SW-02.10, 021908-I1-SW-02.10-D and 021908-H1-SW-02.50 were qualified as K and assigned secondary qualifier ICVSH to indicate the CRDL calibration standard recovered above limits. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Metals by SW6010

The following samples (total and filtered results) were qualified as estimated and assigned secondary qualifier TD to indicate the total concentration was less than the dissolved concentration: Calcium and magnesium for 021908-I1-SW-02.10, 021908-I1-SW-02.10-D, 021908-I2-SW-02.50, 021908-I3-SW-07.50, 021908-I4-SW-02.50, 021908-H1-SW-34.50, 021908-H1-SW-18.00, 021908-H1-SW-02.50; calcium for 021908-I3-SW-02.50, and magnesium for 021908-I2-SW-07.00.

Vanadium (total and filtered) results for sample 021908-H1-SW-02.50 were qualified as B and assigned secondary qualifier CCBL to indicate associated continuing calibration blank contamination.

Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 021908-I1-SW-02.10/021908-I1-SW-02.10-D (total and filtered) were collected and met duplicate criteria, with the following exceptions:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Ferrous Iron	0.029 mg/L	0.015 mg/L	outside ± RL	No

The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met. No action is taken during data validation for duplicate precision exceedance.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 29, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU09 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/20/2008	022008-B5-SD-01.00	5284499	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/20/2008	022008-B5-SD-01.00	5284500	EPA Draft AVS-SEM, SW6010
2/20/2008	022008-B5-SD-02.90	5284501	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/20/2008	022008-B5-SD-02.90	5284502	EPA Draft AVS-SEM, SW6010
2/20/2008	022008-J4-SD-01.00	5284503	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/20/2008	022008-J4-SD-01.00	5284504	EPA Draft AVS-SEM, SW6010
2/20/2008	022008-J4-SD-03.00	5284505	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/20/2008	022008-J4-SD-03.00	5284506	EPA Draft AVS-SEM, SW6010

Validation Level

The level of validation for this SDG is level IV for SEM metals, AVS, chromium, total metals, ferrous iron and TOC to fulfill the project validation frequency requirements of full validation of ten percent of the total samples/analyses. To fulfill this requirement, sample 022008-B5-SD-01.00 was validated 100% for all analyses (except chromium, in which all samples in the SDG were fully validated and recalculated).

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.

- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

SEM metals (Cd, Cu, Fe, Pb, Ni, Zn) by SW6010

The AVS/SEM method specifies that the results be reported in dry weight (Section 14.4), however, since this data is sediment data and the data is is a ratio value used to describe the bioavailability at the sampling stations, the moisture is not used in the final result calculation. The laboratory was contacted regarding this issue as well, and noted their standard procedure is to report the AVS and the SEM metals as wet weight, which is what was done for this SDG.

Sample 022008-B5-SD-01.00 was qualified as J and assigned secondary qualifier SDIL for iron, lead, nickel and zinc to indicate the serial dilution precision limits were exceeded.

Sample 022008-B5-SD-01.00 was qualified as L and assigned secondary qualifiers MSL and MSDL for cadmium, copper, lead, and zinc, and L with secondary qualifier MSDL for nickel to indicate low matrix spike and spike duplicate recovery, as applicable. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

All samples were qualified as estimated and assigned footnote LDP to indicate laboratory duplicate precision exceedance. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Total Metals by SW6010

Sample 022008-B5-SD-01.00 was qualified as J and assigned secondary qualifier LDP for magnesium and vanadium to indicate laboratory duplicate precision exceedance. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

AVS by EPA-821-R-91-100

Sample 022008-B5-SD-01.00 was qualified as J and assigned secondary qualifier MSDP to indicate matrix spike duplicate precision exceedance. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Total Organic Carbon by Lloyd Kahn

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Ferrous Iron by SM3500-FeB

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 18, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU11 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/21/2008	022108-B5-SW-02.50	5285657	SM20-5310-C, SW6010, SW7199
2/21/2008	022108-B5-SW-02.50	5285658	SW6010
2/21/2008	022108-B5-SW-07.00	5285655	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/21/2008	022108-B5-SW-07.00	5285656	SW6010
2/21/2008	022108-J1-SW-00.80	5285665	SM20-2340-C, SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/21/2008	022108-J1-SW-00.80	5285666	SW6010
2/21/2008	022108-J2-SW-02.00	5285663	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/21/2008	022108-J2-SW-02.00	5285664	SW6010
2/21/2008	022108-J3-SW-02.20	5285659	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/21/2008	022108-J3-SW-02.20	5285660	SW6010
2/21/2008	022108-J4-SW-01.00	5285661	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/21/2008	022108-J4-SW-01.00	5285662	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperatures ranged from 0.6 to 7.9 °C. No action was taken for low or elevated cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 14, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU12 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/22/2008	022108-B5-PW-00.50	5285645	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/22/2008	022108-B5-PW-00.50	5285646	SW6010
2/22/2008	022108-J1-PW-00.50	5285653	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/22/2008	022108-J1-PW-00.50	5285654	SW6010
2/22/2008	022108-J2-PW-00.50	5285651	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/22/2008	022108-J2-PW-00.50	5285652	SW6010
2/22/2008	022108-J3-PW-00.50	5285647	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/22/2008	022108-J3-PW-00.50	5285648	SW6010
2/22/2008	022108-J4-PW-00.50	5285649	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/22/2008	022108-J4-PW-00.50	5285650	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.6 to 7.5 °C. No qualification was made for low or elevated cooler temperatures outside the recommended range of 4 ± 2°C.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

The preparation log was incorrect in the original data package, which indicated the amount of sample used was 50 milliliters,whereas the correct amount was 25 milliliters. The laboratory was contacted regarding this issue, and a revised preparation form was sent to the validator, a copy of which is provided in the Communciation section of this report.

Samples 022108-B5-PW-00.50, 022108-J3-PW-00.50, 022108-J4-PW-00.50, 022108-J2-PW-00.50 and 022108-J1-PW-00.50 were qualified as L or UL and assigned secondary qualifier ICVSL to indicate the initial calibration CRDL standard recovered slightly low (79.5%, range 90-110%). Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC CJ
Re: Dundalk Marine Terminal Data Validation
Date: March 26, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU14 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/21/2008	022108-B5-SD-00.50	5285684	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/21/2008	022108-B5-SD-00.50	5285685	EPA Draft AVS-SEM, SW6010
2/21/2008	022108-B5-SD-00.50-D	5285686	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/21/2008	022108-B5-SD-00.50-D	5285687	EPA Draft AVS-SEM, SW6010
2/21/2008	022108-J1-SD-00.50	5285708	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/21/2008	022108-J1-SD-00.50	5285709	EPA Draft AVS-SEM, SW6010
2/21/2008	022108-J1-SD-01.30	5285680	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/21/2008	022108-J1-SD-01.30	5285681	EPA Draft AVS-SEM, SW6010
2/21/2008	022108-J1-SD-03.00	5285682	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/21/2008	022108-J1-SD-03.00	5285683	EPA Draft AVS-SEM, SW6010
2/21/2008	022108-J2-SD-00.50	5285706	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/21/2008	022108-J2-SD-00.50	5285707	EPA Draft AVS-SEM, SW6010
2/21/2008	022108-J2-SD-01.50	5285688	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/21/2008	022108-J2-SD-01.50	5285689	EPA Draft AVS-SEM, SW6010
2/21/2008	022108-J2-SD-03.00	5285690	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/21/2008	022108-J2-SD-03.00	5285691	EPA Draft AVS-SEM, SW6010
2/21/2008	022108-J3-SD-00.50	5285692	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/21/2008	022108-J3-SD-00.50	5285696	EPA Draft AVS-SEM, SW6010
2/21/2008	022108-J3-SD-01.10	5285700	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/21/2008	022108-J3-SD-01.10	5285701	EPA Draft AVS-SEM, SW6010
2/21/2008	022108-J3-SD-03.00	5285702	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/21/2008	022108-J3-SD-03.00	5285703	EPA Draft AVS-SEM, SW6010
2/21/2008	022108-J4-SD-00.50	5285704	Lloyd Kahn, SM20-2540-G, SM20-3500-FeB, SW6010
2/21/2008	022108-J4-SD-00.50	5285705	EPA Draft AVS-SEM, SW6010

Validation Level

The level of validation for this SDG is level IV for chromium only, to fulfill the validation requirements for the sediment matrix for the project.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.
- NJDEP. 2005. *Standard Operating Procedure for Analytical Data Validation of Hexavalent Chromium*, SOP No. 5.A.10, Revision 2, Trenton, New Jersey.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Chromium by SW6010

All samples were qualified as estimated and assigned footnote LDP to indicate laboratory duplicate precision exceedance. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 022108-B5-SW-00.50/022108-B5-SW-00.50-D (total and filtered) were collected and met duplicate criteria. The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met. No action is taken during data validation for duplicate precision exceedance.

Field blanks

Field blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 31, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU15 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/23/2008	DMT-EB-022308-02	5287045	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/23/2008	DMT-EB-022308-02	5287046	SW6010
2/24/2008	022308-E1-PW-00.50	5287051	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/24/2008	022308-E1-PW-00.50	5287052	SW6010
2/24/2008	022308-E2-PW-00.50	5287053	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/24/2008	022308-E2-PW-00.50	5287054	SW6010
2/24/2008	022308-G2-PW-00.50	5287055	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/24/2008	022308-G2-PW-00.50	5287056	SW6010
2/24/2008	022308-G4-PW-00.50	5287057	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/24/2008	022308-G4-PW-00.50	5287058	SW6010
2/24/2008	022308-H4-PW-00.50	5287047	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/24/2008	022308-H4-PW-00.50	5287048	SW6010
2/24/2008	022308-H4-PW-00.50-D	5287049	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/24/2008	022308-H4-PW-00.50-D	5287050	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.8 to 2.3°C. No qualification was made for low cooler temperatures outside the recommended range of 4 ± 2°C.

The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sample partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Samples 022308-H4-PW-00.50 (filtered), 022308-H4-PW-00.50-D (filtered), 022308-E2-PW-00.50 (filtered), 022308-E2-PW-00.50 (grab), 022308-G2-PW-00.50 (filtered), 022308-G2-PW-00.50 (grab), 022308-G4-PW-00.50 (filtered) and 022308-G4-PW-00.50 (grab) were qualified as B and assigned secondary qualifier CCBL to indicate associated continuing calibration blank contamination.

Results reported as J by the laboratory were assigned secondary qualifier IB to indicate the results were below the reporting limit. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 022308-H4-PW-00.50/022308-H4-PW-00.50-D (total and filtered) were collected and met the duplicate criteria with the following exceptions:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium (filtered)	0.0065 J mg/L	0.0102 J mg/L	Outside ± RL	No

The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was used for evaluation. No qualification is required for field duplicate precision exceedance.

Field blanks

Equipment blank sample DMT-EB-022308-02 was collected for this dataset. All results were nondetected.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 18, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU16 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/23/2008	022308-E1-SW-02.50	5287071	SM20-5310-C, SW6010, SW7199
2/23/2008	022308-E1-SW-02.50	5287072	SW6010
2/23/2008	022308-E1-SW-19.00	5287069	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/23/2008	022308-E1-SW-19.00	5287070	SW6010
2/23/2008	022308-E1-SW-43.50	5287067	SM20-2340-C, SM20-5310-C, SW6010, SW7199
2/23/2008	022308-E1-SW-43.50	5287068	SW6010
2/23/2008	022308-H4-SW-02.50	5287065	SM20-5310-C, SW6010, SW7199
2/23/2008	022308-H4-SW-02.50	5287066	SW6010
2/23/2008	022308-H4-SW-19.00	5287063	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/23/2008	022308-H4-SW-19.00	5287064	SW6010
2/23/2008	022308-H4-SW-40.00	5287061	SM20-5310-C, SW6010, SW7199
2/23/2008	022308-H4-SW-40.00	5287062	SW6010
2/23/2008	DMT-EB-022308-01	5287059	SM20-2340-C, SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/23/2008	DMT-EB-022308-01	5287060	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.8 to 2.3 °C. No action was taken for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

The calibration in the original data was not correctly reported on the Forms to reflect the reprocessing of the curve due to peak tailing. The laboratory was contacted and the correct correlation coefficient (0.999) was provided, a copy of the corrections/clarification is provided in the Communication section of this report. Results reported as J by the laboratory were flagged IB to indicate the value was below the reporting limit.

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank sample DMT-EB-022308-01 (total and filtered) was collected for this dataset. Results were undetected.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC cy
Re: Dundalk Marine Terminal Data Validation
Date: March 17, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU17 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/23/2008	022308-E2-SW-02.50	5287082	SM20-5310-C, SW6010, SW7199
2/23/2008	022308-E2-SW-02.50	5287083	SW6010
2/23/2008	022308-E2-SW-02.50-D	5287084	SM20-5310-C, SW6010, SW7199
2/23/2008	022308-E2-SW-02.50-D	5287085	SW6010
2/23/2008	022308-E2-SW-19.00	5287080	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/23/2008	022308-E2-SW-19.00	5287081	SW6010
2/23/2008	022308-E2-SW-41.00	5287078	SM20-5310-C, SW6010, SW7199
2/23/2008	022308-E2-SW-41.00	5287079	SW6010
2/23/2008	022308-G2-SW-02.50	5287090	SM20-5310-C, SW6010, SW7199
2/23/2008	022308-G2-SW-02.50	5287094	SW6010
2/23/2008	022308-G2-SW-20.00	5287088	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/23/2008	022308-G2-SW-20.00	5287089	SW6010
2/23/2008	022308-G2-SW-39.00	5287086	SM20-2340-C, SM20-5310-C, SW6010, SW7199
2/23/2008	022308-G2-SW-39.00	5287087	SW6010
2/23/2008	022308-G4-SW-02.50	5287102	SM20-5310-C, SW6010, SW7199
2/23/2008	022308-G4-SW-02.50	5287103	SW6010
2/23/2008	022308-G4-SW-17.00	5287100	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/23/2008	022308-G4-SW-17.00	5287101	SW6010
2/23/2008	022308-G4-SW-35.00	5287098	SM20-5310-C, SW6010, SW7199
2/23/2008	022308-G4-SW-35.00	5287099	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.8 to 2.3 °C. No action was taken for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

The calibration in the original data was not correctly reported on the Forms to reflect the reprocessing of the curve due to peak tailing. The laboratory was contacted and the correct correlation coefficient (0.999) was provided, a copy of the corrections/clarification is provided in the Communication section of this report.

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

The hardcopy instrument printout for 02238-G2-SW-20.00 was not provided. The laboratory was contacted and the missing page sent to the validator, a copy of which is provided in the Communication section of this report.

Samples 022308-E2-SW-19.00 and 022308-G2-SW-39.00 were qualified as estimated and assigned secondary footnote TD to indicate the filtered concentration was higher than the total concentration.

Samples 022308-E2-SW-41.00, 022308-E2-SW-19.00, 022308-E2-SW-02.50, 022308-E2-SW-02.50-D, 022308-G4-SW-02.50, 022308-G4-SW-17.00, 022308-G2-SW-39.00, 022308-G2-SW-20.00, 022308-G2-

SW-02.50 and 022308-G4-SW-35.00 were qualified as L or UL and assigned footnote ICVSL to indicate the CRDL standard in the calibration recovered below limits. Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Sample 022308-E2-SW-19.00 was qualified as B and assigned secondary qualifier CCBL to indicate associated blank contamination. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 022308-E2-SW-02.50/022308-E2-SW-02.50-D were collected and analyzed with the acceptable results as follows:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium (total)	0.0023 U mg/L	0.0023 U mg/L	Within ± RL	Yes
Chromium (filtered)	0.0023 U mg/L	0.0023 U mg/L	Within ± RL	Yes
Hexavalent chromium	5 U, 5 U ug/L	5 U, 5 U ug/L	Within ± RL	Yes

The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met.

Field blanks

Equipment blank sample were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 19, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU18 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/25/2008	022408-37-PW-00.50	5287116	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/25/2008	022408-37-PW-00.50	5287120	SW6010
2/25/2008	022408-A1-PW-00.50	5287108	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/25/2008	022408-A1-PW-00.50	5287109	SW6010
2/25/2008	022408-A2-PW-00.50	5287110	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/25/2008	022408-A2-PW-00.50	5287111	SW6010
2/25/2008	022408-A3-PW-00.50	5287112	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/25/2008	022408-A3-PW-00.50	5287113	SW6010
2/25/2008	022408-A4-PW-00.50	5287114	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/25/2008	022408-A4-PW-00.50	5287115	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.6 to 4.9 °C. No qualification was made for low cooler temperatures outside the recommended range of 4 ± 2°C.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Samples 022408-A2-PW-00.50, 022408-A3-PW-00.50, 022408-A4-PW-00.50 and 022408-37-PW-00.50 were qualified as L or UL and assigned secondary qualifier ICVSL to indicate the initial calibration CRDL standard recovered slightly low. Sample 022408-37-PW-00.50 was qualified as B and assigned secondary footnote CCBL to indicate associated continuing calibration blank contamination. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 19, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU19 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/24/2008	022408-37-SW-02.50	5287154	SM20-5310-C, SW6010, SW7199
2/24/2008	022408-37-SW-02.50	5287155	SW6010
2/24/2008	022408-37-SW-19.00	5287152	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/24/2008	022408-37-SW-19.00	5287153	SW6010
2/24/2008	022408-37-SW-38.00	5287150	SM20-2340-C, SM20-5310-C, SW6010, SW7199
2/24/2008	022408-37-SW-38.00	5287151	SW6010
2/24/2008	022408-A2-SW-02.40	5287134	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/24/2008	022408-A2-SW-02.40	5287138	SW6010
2/24/2008	022408-A3-SW-02.30	5287142	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/24/2008	022408-A3-SW-02.30	5287143	SW6010
2/24/2008	022408-A3-SW-02.30-D	5287144	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/24/2008	022408-A3-SW-02.30-D	5287145	SW6010
2/24/2008	022408-A4-SW-02.50	5287148	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/24/2008	022408-A4-SW-02.50	5287149	SW6010
2/24/2008	DMT-EB-022408-01	5287146	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/24/2008	DMT-EB-022408-01	5287147	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.6 to 2.2 °C. No action was taken for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Sample 022408-A3-SW-02.30 (total and filtered) were qualified as estimated and assigned secondary footnote TD to indicate the filtered concentration was higher than the total concentration.

Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 022408-A3-SW-02.30/022408-A3-SW-02.30-D were collected and analyzed with the acceptable results as follows:

Analyte	Sample result:	Duplicate result:	%RPD	Compare
Chromium (total)	0.0023 U mg/L	0.0023 U mg/L	Within ± RL	Yes
Chromium (filtered)	0.0023 U mg/L	0.0023 U mg/L	Within ± RL	Yes
Hexavalent chromium	5 U, 5 U ug/L	5 U, 5 U ug/L	Within ± RL	Yes

The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met.

Field blanks

Equipment blank sample DMT-EB-022408-01 was collected for this dataset. Results were non-detected.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 20, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU20 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/24/2008	022408-A1-SW-01.50	5287132	SM20-5310-C, SW6010, SW7199
2/24/2008	022408-A1-SW-01.50	5287133	SW6010
2/24/2008	022408-A1-SW-04.00	5287124	SM20-2340-C, SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/24/2008	022408-A1-SW-04.00	5287128	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.6 to 2.2 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Samples 022408-A1-SW-04.00 (filtered) and 022408-A1-SW-01.50 (filtered) were qualified as UL and assigned footnote ICVSL to indicate the CRDL standard in the calibration recovered below limits. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank sample were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 21, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU21 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/26/2008	022508-B4-PW-00.50	5287661	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/26/2008	022508-B4-PW-00.50	5287662	SW6010
2/26/2008	022508-D1-PW-00.50	5287651	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/26/2008	022508-D1-PW-00.50	5287652	SW6010
2/26/2008	022508-D1-PW-00.50-D	5287653	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/26/2008	022508-D1-PW-00.50-D	5287654	SW6010
2/26/2008	022508-D2-PW-00.50	5287655	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/26/2008	022508-D2-PW-00.50	5287656	SW6010
2/26/2008	022508-D3-PW-00.50	5287657	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/26/2008	022508-D3-PW-00.50	5287658	SW6010
2/26/2008	022508-D4-PW-00.50	5287659	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/26/2008	022508-D4-PW-00.50	5287660	SW6010
2/26/2008	022508-E4-PW-00.50	5287649	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/26/2008	022508-E4-PW-00.50	5287650	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.

- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.4 to 2.6 °C. No qualification was made for low cooler temperatures outside the recommended range of 4 ± 2°C.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Samples reported as J by the laboratory were assigned secondary qualifier IB to indicate the concentration is below the reporting limit. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 022508-D1-PW-00.50/022508-D1-PW-00.50-D (total and filtered) were collected and met the duplicate criteria. The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 22, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU22 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/25/2008	022508-B4-SW-01.50	5287689	SM20-5310-C, SW6010, SW7199
2/25/2008	022508-B4-SW-01.50	5287690	SW6010
2/25/2008	022508-B4-SW-05.50	5287687	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/25/2008	022508-B4-SW-05.50	5287688	SW6010
2/25/2008	022508-B4-SW-10.00	5287685	SM20-5310-C, SW6010, SW7199
2/25/2008	022508-B4-SW-10.00	5287686	SW6010
2/25/2008	022508-D3-SW-02.50	5287667	SM20-5310-C, SW6010, SW7199
2/25/2008	022508-D3-SW-02.50	5287668	SW6010
2/25/2008	022508-D3-SW-02.50-D	5287669	SM20-5310-C, SW6010, SW7199
2/25/2008	022508-D3-SW-02.50-D	5287670	SW6010
2/25/2008	022508-D3-SW-21.00	5287665	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/25/2008	022508-D3-SW-21.00	5287666	SW6010
2/25/2008	022508-D3-SW-42.50	5287663	SM20-5310-C, SW6010, SW7199
2/25/2008	022508-D3-SW-42.50	5287664	SW6010
2/25/2008	022508-D4-SW-01.50	5287675	SM20-5310-C, SW6010, SW7199
2/25/2008	022508-D4-SW-01.50	5287679	SW6010
2/25/2008	022508-D4-SW-05.00	5287673	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/25/2008	022508-D4-SW-05.00	5287674	SW6010
2/25/2008	022508-D4-SW-10.00	5287671	SM20-5310-C, SW6010, SW7199
2/25/2008	022508-D4-SW-10.00	5287672	SW6010
2/25/2008	DMT-EB-022508-02	5287683	SM20-5310-C, SW6010, SW7199
2/25/2008	DMT-EB-022508-02	5287684	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.4 to 2.6 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

All samples were qualified as L or UL and assigned footnote ICVSL to indicate the CRDL standard in the calibration recovered below limits. Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 022508-D3-SW-02.50/022508-D3-SW-02.50-D (total and filtered) were collected and met the duplicate criteria. The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met.

Field blanks

Equipment blank sample DMT-EB-022508-02 was collected for this dataset. All results were nondetected.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 23, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU23 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/25/2008	022508-D1-SW-02.50	5287703	SM20-5310-C, SW6010, SW7199
2/25/2008	022508-D1-SW-02.50	5287704	SW6010
2/25/2008	022508-D1-SW-20.00	5287701	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/25/2008	022508-D1-SW-20.00	5287702	SW6010
2/25/2008	022508-D1-SW-40.50	5287699	SM20-2340-C, SM20-5310-C, SW6010, SW7199
2/25/2008	022508-D1-SW-40.50	5287700	SW6010
2/25/2008	022508-D2-SW-02.50	5287709	SM20-5310-C, SW6010, SW7199
2/25/2008	022508-D2-SW-02.50	5287710	SW6010
2/25/2008	022508-D2-SW-21.00	5287707	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/25/2008	022508-D2-SW-21.00	5287708	SW6010
2/25/2008	022508-D2-SW-43.50	5287705	SM20-5310-C, SW6010, SW7199
2/25/2008	022508-D2-SW-43.50	5287706	SW6010
2/25/2008	022508-E4-SW-02.00	5287697	SM20-5310-C, SW6010, SW7199
2/25/2008	022508-E4-SW-02.00	5287698	SW6010
2/25/2008	022508-E4-SW-09.00	5287695	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/25/2008	022508-E4-SW-09.00	5287696	SW6010
2/25/2008	022508-E4-SW-15.50	5287693	SM20-5310-C, SW6010, SW7199
2/25/2008	022508-E4-SW-15.50	5287694	SW6010
2/25/2008	DMT-EB-022508-01	5287691	SM20-5310-C, SW6010, SW7199
2/25/2008	DMT-EB-022508-01	5287692	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.4 to 2.6 °C. No qualification was made for low cooler temperature.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

The chromatograms showed slight tailing in all QC. Since the QC was in control and the calibration criteria were met, no action was taken during validation. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

All samples with the exception of 022508-E4-SW-15.50 (grab), 022508-D1-SW-02.50 (grab) and 022508-D1-SW-02.50 (filtered)were qualified as L or UL and assigned footnote ICVSL to indicate the CRDL standard in the calibration recovered below limits. Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank sample DMT-EB-022508-01 was collected for this dataset. All results were nondetected.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 31, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU24 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/27/2008	022608-B3-PW-00.50	5288289	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/27/2008	022608-B3-PW-00.50	5288290	SW6010
2/27/2008	022608-C1-PW-00.50	5288281	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/27/2008	022608-C1-PW-00.50	5288282	SW6010
2/27/2008	022608-C2-PW-00.50	5288283	ASTM D1498, SM20-4500-HB, SW6010, SW7199
2/27/2008	022608-C2-PW-00.50	5288284	SW6010
2/27/2008	022608-C3-PW-00.50	5288285	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/27/2008	022608-C3-PW-00.50	5288286	SW6010
2/27/2008	022608-C4-PW-00.50	5288287	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/27/2008	022608-C4-PW-00.50	5288288	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 2.0 to 3.8°C.

The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sample partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Sample 022608-C2-PW-00.50 (filtered) was qualified as K and assigned secondary qualifier ICVSH to indicate the CRDL standard recovered above limits.

Results reported as J by the laboratory were assigned secondary qualifier IB to indicate the results were below the reporting limit. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

MEMORANDUM

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 16, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU25 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/26/2008	022608-B2-SW-03.00	5288312	SM20-5310-C, SW6010, SW7199
2/26/2008	022608-B2-SW-03.00	5288313	SW6010
2/26/2008	022608-B2-SW-09.00	5288310	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/26/2008	022608-B2-SW-09.00	5288311	SW6010
2/26/2008	022608-B3-SW-03.00	5288308	SM20-5310-C, SW6010, SW7199
2/26/2008	022608-B3-SW-03.00	5288309	SW6010
2/26/2008	022608-B3-SW-09.50	5288306	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/26/2008	022608-B3-SW-09.50	5288307	SW6010
2/26/2008	022608-C1-SW-02.20	5288293	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/26/2008	022608-C1-SW-02.20	5288294	SW6010
2/26/2008	022608-C1-SW-02.20	5288295	SM20-2340-C
2/26/2008	022608-C2-SW-03.00	5288296	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/26/2008	022608-C2-SW-03.00	5288297	SW6010
2/26/2008	022608-C3-SW-02.00	5288300	SM20-5310-C, SW6010, SW7199
2/26/2008	022608-C3-SW-02.00	5288301	SW6010
2/26/2008	022608-C3-SW-08.50	5288298	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/26/2008	022608-C3-SW-08.50	5288299	SW6010
2/26/2008	022608-C4-SW-03.00	5288304	SM20-5310-C, SW6010, SW7199
2/26/2008	022608-C4-SW-03.00	5288305	SW6010
2/26/2008	022608-C4-SW-09.00	5288302	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/26/2008	022608-C4-SW-09.00	5288303	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 2.0 to 3.8 °C.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

All samples were qualified as L or UL and assigned footnote ICVSL to indicate the CRDL standard in the calibration recovered below limits. Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank sample were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 26, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU26 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/26/2008	022608-B1-SW-03.00	5288316	SM20-5310-C, SW6010, SW7199
2/26/2008	022608-B1-SW-03.00	5288317	SW6010
2/26/2008	022608-B1-SW-07.00	5288314	SM20-2340-C, SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/26/2008	022608-B1-SW-07.00	5288315	SW6010
2/26/2008	022608-B1-SW-03.00	5288316	SM20-5310-C, SW6010, SW7199
2/26/2008	022608-B1-SW-03.00	5288317	SW6010
2/26/2008	022608-B1-SW-07.00	5288314	SM20-2340-C, SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/26/2008	022608-B1-SW-07.00	5288315	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.

- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 2.0 to 3.8 °C.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Sample 022608-B1-SW-07.00 (grab and filtered) were qualified as estimated and assigned secondary qualifier TD to indicate the filtered concentration was greater than the total concentration. Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank sample were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 28, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU27 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/28/2008	022708-B1-PW-00.50	5289463	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/28/2008	022708-B1-PW-00.50	5289464	SW6010
2/28/2008	022708-B2-PW-00.50	5289461	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
2/28/2008	022708-B2-PW-00.50	5289462	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 1.1 to 4.7°C. No qualification was made for low cooler temperatures outside the recommended range of 4 ± 2°C.

The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sample partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

The LCS recovered above limits. No qualification of the data was made since the associated results were non-detected and the chromatograms show peak tailing. The laboratory was contacted regarding the elevated LCS recovery, a copy of the email is provided in the Communication section of this report.

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 28, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU28 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
3/1/2008	022908-37A-PW-00.50	5292056	SW6010
3/1/2008	022908-37A-PW-00.50	5292052	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
3/1/2008	022908-37B-PW-00.50	5292060	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
3/1/2008	022908-37B-PW-00.50	5292061	SW6010
3/1/2008	022908-F2-PW-00.50	5292064	ASTM D1498, SM20-2340-C, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
3/1/2008	022908-F2-PW-00.50	5292065	SW6010
3/1/2008	022908-F4-PW-00.50	5292062	ASTM D1498, SM20-3500-FeB, SM20-4500-HB, SM20-5310-C, SW6010, SW7199
3/1/2008	022908-F4-PW-00.50	5292063	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the porewater matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.

- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.7 to 1.5°C. No qualification was made for low cooler temperatures outside the recommended range of 4 ± 2°C.

The chain-of-custody documentation for this dataset consisted of the original sampling documentation and the documentation of the additional preparation of the sample partitioning for analysis of the porewater fraction. The porewater samples were reviewed against a holding time of 24 hours from the time of completion of the centrifugation to analysis for the hexavalent chromium, which was documented by the laboratory on the result form and reviewed during validation.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

The LCS recovered above limits. No qualification of the data was made since the associated results were non-detected and the chromatograms show peak tailing. The laboratory was contacted regarding the elevated LCS recovery, a copy of the email is provided in the Communication section of this report.

No qualification of the data was made. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Results reported as J by the laboratory were assigned secondary qualifier IB to indicate the results were below the reporting limit. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipment blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 30, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU29 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/29/2008	022908-37A-SW-02.50	5292149	SM20-5310-C, SW6010, SW7199
2/29/2008	022908-37A-SW-02.50	5292153	SW6010
2/29/2008	022908-37A-SW-18.00	5292147	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/29/2008	022908-37A-SW-18.00	5292148	SW6010
2/29/2008	022908-37A-SW-36.00	5292145	SM20-5310-C, SW6010, SW7199
2/29/2008	022908-37A-SW-36.00	5292146	SW6010
2/29/2008	022908-37B-SW-02.50	5292161	SM20-5310-C, SW6010, SW7199
2/29/2008	022908-37B-SW-02.50	5292162	SW6010
2/29/2008	022908-37B-SW-02.50-D	5292163	SM20-5310-C, SW6010, SW7199
2/29/2008	022908-37B-SW-02.50-D	5292164	SW6010
2/29/2008	022908-37B-SW-19.00	5292159	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/29/2008	022908-37B-SW-19.00	5292160	SW6010
2/29/2008	022908-37B-SW-37.00	5292157	SM20-5310-C, SW6010, SW7199
2/29/2008	022908-37B-SW-37.00	5292158	SW6010
2/29/2008	022908-F4-SW-02.50	5292169	SM20-5310-C, SW6010, SW7199
2/29/2008	022908-F4-SW-02.50	5292170	SW6010
2/29/2008	022908-F4-SW-15.00	5292167	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/29/2008	022908-F4-SW-15.00	5292168	SW6010
2/29/2008	022908-F4-SW-26.00	5292165	SM20-5310-C, SW6010, SW7199
2/29/2008	022908-F4-SW-26.00	5292166	SW6010
2/29/2008	DMT-EB-022908-01	5292143	SM20-5310-C, SW6010, SW7199
2/29/2008	DMT-EB-022908-01	5292144	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.7 to 1.5 °C. No qualification was made for low cooler temperatures below the recommended range of 4± 2°C.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

The LCS recovered above limits. No qualification of the data was made since the associated results were non-detected and the chromatograms show peak tailing. The laboratory was contacted regarding the elevated LCS recovery, a copy of the email is provided in the Communication section of this report.

All samples were qualified as estimated and assigned footnote MSDP to indicate the matrix spike/matrix spike duplicate precision criteria was exceeded. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

A revised result form was sent to CH2M Hill and forwarded to the validator for sample DMT-EB-022908-01, and is provided in the Form 1 section of this report. A copy of the email communication is provided in the Communication section of this report.

Sample DMT-EB-022908-01 was qualified as K and assigned secondary qualifier ICVSH for chromium to indicate the CRDL standard recovery was above limits.

Samples DMT-EB-022908-01, 022908-37A-SW-36.00 and 022908-37A-SW-18.00 were reported on the instrument readout as 50 milliliters, whereas the Form 13 preparation log reported 25 milliliters. The

laboratory was contacted and revised the preparation log for these three samples, which reflects the correct amount used in the sample preparation step. A copy of the revised results are provided in the Communication section of this report.

Sample 022908-37B-SW-02.50-D (grab and filtered) were qualified as estimated and assigned secondary qualifier TD to indicate the filtered concentration was greater than the total concentration. Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate pair 022908-37B-SW-02.50/022908-37B-SW-02.50-D (total and filtered) were collected and met the duplicate criteria. The field duplicate criteria of ±20 % for values >5x reporting limit or ±1x the reporting limit for values <5x reporting limit for waters [35% for values >5x the RL (or ±2x the RL) for solids] was met.

Field blanks

Equipment blank sample DMT-EB-022908-01 was collected for this dataset. The hexavalent chromium and chromium were non-detected for this sample.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Data Validation
Date: March 30, 2008

This memorandum discusses the results of the data validation of analytical data in Sample Delivery Group (SDG) DMU30 provided by Lancaster Laboratories, Inc. - located in Lancaster, Pennsylvania, for samples collected as part of the Dundalk Marine Terminal Project. No data were rejected as a result of the data validation process, as summarized below. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklists, and Appendix C contains the qualified result forms.

The validation for samples in the SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in the SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Sample Analyses
2/29/2008	022908-F2-SW-02.50	5292183	SM20-5310-C, SW6010, SW7199
2/29/2008	022908-F2-SW-02.50	5292184	SW6010
2/29/2008	022908-F2-SW-22.00	5292181	SM20-3500-FeB, SM20-5310-C, SW6010, SW7199
2/29/2008	022908-F2-SW-22.00	5292182	SW6010
2/29/2008	022908-F2-SW-43.00	5292179	SM20-2340-C, SM20-5310-C, SW6010, SW7199
2/29/2008	022908-F2-SW-43.00	5292180	SW6010

Validation Level

The level of validation for this SDG is level IV for chromium and hexavalent chromium, the remaining analyses were not validated per the project team and scope of the validation frequency requirements for the surface water matrix.

References

The samples collected for the project were analyzed in accordance with the following methods:

- USEPA 1986. *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, USEPA, Washington, D.C.
- American Water Works Association (AWWA), American Public Health Association (APHA) and Water Environment Federation (WEF). 1992. *Standard Methods for the Examination of Water and Wastewater*, 18th Edition, Washington, D.C.

The data validation procedures were consistent with those specified in published validation guidelines listed below as applicable:

- U.S. Environmental Protection Agency (USEPA). 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, April, 1993, Washington, D.C.
- Region III 1995. *Innovative Approaches to Data Validation*, June 1995, Washington, D.C.
- U.S. Environmental Protection Agency (USEPA). 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. October 2004, Washington, D.C.

Chain-of-Custody Documentation

The chain-of-custody (COC) documentation was complete. The cooler temperature ranged from 0.7 to 1.5 °C. No qualification was made for low cooler temperatures below the recommended range of 4± 2°C.

Major Deficiencies

No major deficiencies were noted during validation.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by SW7199

The LCS recovered above limits. No qualification of the data was made since the associated results were non-detected and the chromatograms show peak tailing. The laboratory was contacted regarding the elevated LCS recovery, a copy of the email is provided in the Communication section of this report.

All samples were qualified as estimated and assigned footnote MSDP to indicate the matrix spike/matrix spike duplicate precision criteria was exceeded. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Chromium by SW6010

Results reported as J by the laboratory to indicate the value is below the reporting limit were assigned secondary qualifier IB. Data usability is the number of usable (non-rejected) sample results divided by the total number of sample results for each type of analysis times 100. Data usability has been determined to be 100%.

Field Duplicates

Field duplicate samples were not collected for this dataset.

Field blanks

Equipement blank samples were not collected for this dataset.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the methods.

Data Usability

Based on the validation of data, it has been determined that 100% of the data are usable as qualified or reported. The usable analytical data are of sufficient quality to be used for qualitative and quantitative purposes.

To: Mark Stinnett/Brian Carling, CH2M Hill
From: Christina Jensen, Validata, LLC
Re: Dundalk Marine Terminal Air Data Validation
Date: January 31, 2008

This memorandum discusses the results of the data validation of air data in Sample Delivery Group (SDG) 2008010107 provided by St. Paul Travelers Laboratory, Windsor, Connecticut, for samples collected as part of the Dundalk Marine Terminal Project. No samples were rejected as a result of the data validation process. Appendix A contains a list of the qualifiers used for the data validation, Appendix B contains the completed data validation checklist and field forms, and Appendix C contains the qualified result forms.

The validation for samples in this SDG was performed by Christina Jensen, as subcontracted to CH2M Hill. The following table lists the samples that were included in this SDG.

Samples

Table 1-1. *Sample cross-reference list*

Sampling Date	Field Sample ID	Lab Sample ID	Method
1/3/2008	010308-FBT	2008010107-12	OSHA 215
1/3/2008	010308-TBT	2008010107-11	OSHA 215
1/3/2008	Air1-010308T	2008010107-6	OSHA 215
1/3/2008	Air2-010308T	2008010107-5	OSHA 215
1/3/2008	Air3-010308T	2008010107-3	OSHA 215
1/3/2008	Air4-010308T	2008010107-2	OSHA 215
1/3/2008	Air5-010308T	2008010107-1	OSHA 215
1/3/2008	Air6-010308T	2008010107-9	OSHA 215
1/3/2008	Air7-010308T	2008010107-10	OSHA 215
1/3/2008	Air8-010308T	2008010107-8	OSHA 215
1/3/2008	Air9-010308T	2008010107-7	OSHA 215
1/3/2008	AirC-010308T	2008010107-4	OSHA 215

Validation

The validation of this data is conducted following guidance specified in USEPA Functional Guidelines for Inorganic Review, USEPA Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses and USEPA Region III Innovative Approaches to Data Validation since specific validation criteria for OSHA 215 methodology is not available.

Analytical data in this report were reviewed to determine the usability of results and compared to OSHA 215 methodology and the Travelers Laboratory SOP for the modified method. The level of validation is 100%, which includes a review of all sampling field forms, custody documentation and associated laboratory QC including instrument calibration, check standards, linearity check standard, PVC filter spikes, PVC filter blanks, blank subtraction. Additionally, volumes, times and reported results and associated QC and field collection data have been verified and provided with this validation report to ensure the results reported by the laboratory agree with the raw data. The end-user is urged to review the Major and Minor Deficiency sections and associated data qualifications presented in this report. The OSHA 215 method recommends an 8 hour sampling time using a flow rate of 2 liters per minute. Per EA Engineering's Air Monitoring Plan (EA, 2007), a sampling time of 24 hours using a flow rate of 10 liters per minute was used. Further information regarding the deviation from the recommended method sampling time and flow rate, and further discussion of the rationale used for sample collection can be found in EA Engineering's Work Plan.

The laboratory indicates it is currently using the September 1998 OSHA 215 methodology while there is a more recent published version of OSHA 215(version 2, April 2006). The EA Engineering Air Monitoring Plan in Section 9 cites the newer version as the method reference. One difference between the September

1998 and the April 2006 methodologies is that the newer version requires wiping of interior walls of sampling cassettes.

References

The samples collected for the project were analyzed in accordance with the following methods:

- OSHA 1998. OSHA Method ID-215 *Hexavalent Chromium in Workplace Atmospheres*, Branch of Inorganic Methods Development, OSHA Salt Lake City, Utah. September 1998.
- OSHA 2006. OSHA Method ID-215 *Hexavalent Chromium in Workplace Atmospheres* Revision 2, Branch of Inorganic Methods Development, OSHA Salt Lake City, Utah. April 2006.
- EPA 2002. USEPA Contract Laboratory Program, *National Functional Guidelines for Inorganic Data Review*, EPA-540-R-02-003. August 2002.
- St. Paul Travelers Laboratory 2006. St. Paul Travelers Industrial Hygiene Laboratory, *Hexavalent Chromium IC-VIS or IC-ICPMS Analysis,* TIC-IC-07. March 2006.
- U.S. Environmental Protection Agency (USEPA) 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, Washington, D.C. April, 1993.
- U.S. Environmental Protection Agency (USEPA) Region III 1995. *Innovative Approaches to Data Validation*, Washington, D.C. June 1995.
- U.S. Environmental Protection Agency (USEPA) 2004. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. EPA 540-R-04-004. , Washington, D.C. October 2004.
- EA Engineering, Science and Technology. 2007. *Revised Dundalk Marine Terminal Hexavalent Chromium Air Monitoring Plan*, Sparks Maryland. August 2007.

Chain-of-Custody Documentation

The inlet button was off of samples Air3-010308T, AirC-010308T, Air1-010308T and Air9-010308T as noted on the laboratory login sheet. Therefore, these samples were qualified as estimated and assigned footnote IN for hexavalent chromium to indicate the possibility of contamination due to exposure of the sample. The particulate data were not validated per the project requirements.

Missing Information

Nothing noted.

Major Deficiencies

There were no major deficiencies identified with the data.

Minor Deficiencies and Completeness

Minor deficiencies identified during validation are summarized per analytical method as follows:

Hexavalent Chromium by OSHA ID-215

The field blank was used for subtraction of the raw data for the associated field samples.

Co-located samples Air2-010308T/AirC-010308T (location #2) were collected. The results met the comparison criteria of ±1x the reporting limit for values <5x reporting limit for air, as summarized below:

Analyte	Sample: Air4-12190T	Co-location: AirC-12190T	%RPD	Compare
Hexavalent Chromium	0.014 ug	0.011 ug	within ±1xRL	yes

Field Blanks

Trip blank 010308-TBT and field blank 010308-FBT were collected. As indicated above, the field blank contained hexavalent chromium below the reporting limit, which was used for correction of the field sample results on the raw instrument reading prior to calculation and confirmation of reported results.

Data Assessment Summary

Overall, the laboratory performed the analyses in accordance with the requirements set forth in the laboratory SOP and OSHA ID-215 methodology with exceptions noted.