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- Import of HazWasteOnline™ format .hwol files:
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- Guidelines for the creation of the HazWasteOnline™ .hwol laboratory analysis files
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- Version 1.4.3

- List of changes from previous version

20 th June 2017	- Requirement to order sys_sample_code in same order as the sample names presented on PDF laboratory reports
3 rd July 2017	- Analysis date and time combined into one field; - Clearer definition for sys_sample_code added;
12 July 2017	- Requirement for descriptive determinands for Sample Name, Depth, Date, Type removed - Example .hwo file improved to provide some better examples of the unique sys_sample_code
13 December 2017	- New report_type TOP_SOIL added to Appendix A - It is a requirement that labs inform us as to any other reports that they may include in a .hwo file (e.g. Topsoil) so that we can a) add them to the specification and b) understand how we might need to process the data (or not) for waste classification purposes. - New cas_rn SAMPLE_DEPTH – sample depth should be reported with cas_rn SAMPLE_DEPTH, depth in the result_comments column and units e.g. “m” in the result_unit column. Examples of entries in a .hwo are shown on page 12.
21 st October 2020	- Addition of extra column to define HWOL Acronyms. Section 1.2 detailing acronyms and examples - More detail for sys_sample_code - correction to AGS P-numbers for PCB and phenol - correct mailing address.
25 October 2020	- minor edit – CAS no. of chromium(III)
8 January 2021	- minor edits - Section 1.2 updated with table numbers; Table 1.2.1, #1, #2: word “extracted” changed to “mathematically subtracted” for greater clarity
15 November 2021	- correction of typo for numbering of columns 23 to 33

- Import of HazWasteOnline™ .hwol EDD files

1. Introduction & Background

HazWasteOnline™ uses Electronic Data Delivery (EDD) tools to automate the import of laboratory data into the database. Whilst laboratory data can be entered manually, the issues related to volume, time and accuracy/quality control are significant. This document defines the format of a HazWasteOnline™ .hwol EDD file required to deliver chemical analysis data from registered laboratories to HazWasteOnline™.

Only .hwol EDD files from laboratories that have been registered with One Touch Data can be accepted by HazWasteOnline™.

The list of registered laboratories is published on www.hazwasteonline.com.

The basic requirements for the HazWasteOnline™'s EDD file are outlined below:

- The file must be encoded using the CSV standard (Network Working Group, 2005); the fields must be tab or comma delimited
- The data model is based the US EPA standard for the submission of chemistry data to a database (EPA 2016a, b) with two enhancements:
 - An extra field to document the type of report (*report_type*)
 - An extra field to define the type of moisture correction (*MC_type*)
- The file extension must be .hwol
- the following character encodings are supported
 - ANSI (Windows-01252)

- Unicode UTF-8
 - AGS version 4 P-Numbers are used to define CAS # identifiers for some WAC determinands

A description of each of the fields is detailed below (spread over several pages) and is followed by an example of a .hwol file.

File naming convention

Each .hwol EDD file must have a unique name. Typically these file names will relate to the laboratory report identifier, for example:

17_1234_1.hwol to indicate year, report number and report version.

Order of samples in the .hwol data file

The first occurrence of each sys_sample_code in the .hwol data file should be presented in the same order as the sample names would be published in the laboratory's PDF report e.g. TP1, TP2, TP3

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Glossary

.hwol	HazWasteOnline™ laboratory analysis file (www.hazwasteonline.com)
AGS	Association of Geotechnical and Geoenvironmental Specialists (http://ags.org.uk)
CAS	Chemical Abstracts Service (www.cas.org)
CSV	Comma-Separated Values
EDD	Electronic Data Delivery
LIMS	Laboratory Information Management System
TIC	Tentatively Identified Compounds
WAC	Waste Acceptance Criteria

1. Description of the content of a HazWasteOnline™ .hwo EDD file.

The fields shown in red are required fields. Entries in the remaining fields are not required by HazWasteOnline but may be required by other data management systems. The placeholder “,” must be retained for all empty fields. An example of a .hwo file can be found on page in Appendix A. More information and valid values for certain fields such as *fraction*, *lab_matrix_code* etc. can be found in the tables in EPA 2016b.

Description	1) Sample Reference Name	2) Labs analytical method	3) Lab analysis date	4) Total or Dissolved 1 character (T or D)	5)	6) Sample matrix
Max Field Size/Type	40 characters	35 characters	DD/MM/YYYY HH:MM:SS		10 characters	3 characters
Field Name in .hwo file	sys_sample_code	lab_anl_method_name	analysis_date	fraction	test_type	lab_matrix_code
Example 1	TP1-0.5-0.7m	PM4	03/02/2016 14:20:00	N	Initial	SOI
Example 2	TP1-0.5-0.7m	TM30	03/02/2016 14:20:00	N	Initial	SOI
Example 3	TP1-0.5-0.7m	TM38	03/02/2016 14:20:00	N	Initial	SOI
Example 4	TP1-0.5-0.7m	TM5	03/02/2016 14:20:00	N	Initial	SOI
Example 5	TP1-0.5-0.7m	TM5	03/02/2016 14:20:00	N	Initial	SOI
Example 6	TP1-0.5-0.7m	TM31	03/02/2016 14:20:00	N	Initial	SOI
Example 7	TP1-0.5-0.7m	TM16_TIC	03/02/2016 14:20:00	N	Initial	SOI
Example 8	TP1-0.5-0.7m	TM0	03/02/2016 14:20:00	N	Initial	SOI
Example 9	TP1-0.5-0.7m	TM38	03/02/2016 14:20:00	N	Initial	SOI
Example 10	TP1-0.5-0.7m	TM30	03/02/2016 14:20:00	N	Initial	SOI
Example 11	TP1-1.2-1.3m	TM73	03/02/2016 16:32:00	N	Initial	WL
Example 12	TP1-1.2-1.3m	TM30	03/02/2016 16:32:00	D	Initial	WL
Example 13	TP1-1.2-1.3m	TM30A10	03/02/2016 16:32:00	D	Initial	WL

Notes

- The field *sys_sample_code* refers to a **unique** Sample Reference Name. (including duplicates, replicates, blanks etc.). Examples above are for a soil and the code contain both sample site name and sample depth.
 - For soils, and with the goal of creating a **unique** value for identifying the samples, we recommend that the “*sys_sample_code*” value should be composed of at least three (3) fields, all data being supplied by the customer. These are: *customer_sample_name* / *sample_depth* / *sample_date*.
 - The separator can be a different character than “/” but it should be obvious it is a separator.
 - If “*sample_depth*” and/or “*sample_date*” were not supplied by the customer they can be omitted – as long as the *sys_sample_code* is unique.

- Some LIMS use more than one field to store the “customer_sample_name”. In this case all the relevant fields should be used to compose the “customer_sample_name”.
 - Laboratory assigned identifiers like the value stored in the “lab_sample_id” should not be used as they are not relevant to the customer.
 - For WAC, the eluates and the solids belonging to the same sample should use the same value in the “sys_sample_code” field.
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- The field *lab_anl_method_name* identifies the laboratory analytical method.
 - The date and time that the laboratory analysed the sample – date must be in format: dd/mm/yyyy or international ISO 8601 date format: yyyy-mm-dd.
 - The field *fraction* can contain “D” for dissolved or filtered (metal) concentration, “T” (Total) or “N” for not applicable. (EPA 2016b Table A-24)
 - *test_type* – Valid results include: Initial, Reanalysis, Reextract1, Dilution1, Dilution2 etc (EPA 2016b Table A-25)
 - *lab_matrix_code* identifies different types of matrix. Examples: SOI: soil analysed in the lab; SL: sludge, ST: solid waste (EPA 2016b Table A-1)

Sheet cont'd

	7) 2 characters	8) Basis 3 characters	9) Dilution Factor Float (number)	10) Lab prep. method 35 characters	11) 15 characters	12) DD/MM/YYYY	13) HH:MM:SS	14) Lab Name 20 characters	15) Lab Sample ID 40 characters
	analysis_location	basis	dilution_factor	prep_method	leachate_method	leachate_date	leachate_time	lab_name_code	lab_sample_id
1	LB	NA	1	PM0				JEL	17-1234/1
2	LB	DRY	1	PM15				JEL	17_1234/1
3	LB	DRY	1	PM20				JEL	17_1234/1
4	LB	DRY	1	PM8				JEL	17_1234/1
5	LB	DRY	1	PM8				JEL	17_1234/1
6	LB	DRY	1	PM12				JEL	17_1234/1
7	LB	DRY	1	PM8				JEL	17_1234/1
8	LB	DRY	1	PM0				JEL	17_1234/1
9	LB	DRY	1	PM20				JEL	17_1234/1
10	LB	DRY	1	PM15				JEL	17_1234/1
11	LB	WET	1	PM11				JEL	17_1234/2
12	LB	DRY	5	PM17				JEL	17_1234/2
13	LB	DRY	5	PM17				JEL	17_1234/2

- *analysis_location* will be LB for results from a commercial laboratory
 - Must be either 'WET' for wet_weight basis **reporting**, 'DRY' for dry_weight basis **reporting**, or 'NA' for tests for which this distinction is not applicable.
 - The field *dilution_factor* should be supplied if the sample was diluted (default=1; no dilution).
 - The field *prep_method* should reference the labs technical documentation that describes their preparation method (Not EPA 2016b)
 - Laboratory leachate generation method name or description
 - Beginning date of leachate preparation. Date must be in date format: dd/mm/yyyy or international ISO 8601 date format: yyyy-mm-dd
 - Time of leachate preparation in time format HH:MM:SS
- 14) The field *lab_name_code* must contain the unique identifier of the testing laboratory as agreed with One Touch Data (Not EPA 2016b).
- 15) Laboratory LIMS sample identifier

Sheet cont'd

	16) CAS Number 15 characters cas_rn	17) Determinand 75 characters chemical_name ¹	18) Concentration Float (number) result_value	19) Units 12 characters result_unit	20) 10 characters result_type_code	21) 3 characters (Yes/No) reportable_result	22) Above LOD 1 character (Y/N) detect_flag
1	MOIST_CONT_DRY	moisture	10.2	percent	TRG	Yes	Y
2	7440-50-8	copper	12	mg/kg	TRG	Yes	Y
3	16887-00-6	chloride	1083	mg/kg	TRG	Yes	Y
4	EPHC08C40	EPH >C8-C40	5420	mg/kg	TRG	Yes	Y
5	INTERPRETATION	Interpretation		None	TRG	Yes	N
6	71-43-2	benzene		µg/kg	TRG	Yes	N
7	57-10-3	n-hexadecanoic acid	52234	µg/kg	TIC	Yes	Y
8	16065-83-1	chromium(III)	1078	mg/kg	TRG	Yes	Y
9	18540-29-9	hexavalent chromium	25.1	mg/kg	TRG	Yes	Y
10	7439-89-6	iron	8594	mg/kg	TRG	Yes	Y
11	P1334	pH	8.14	pH units	TRG	Yes	Y
12	7440-66-6	zinc	0.027	mg/l	TRG	Yes	Y
13	7440-66-6	zinc	0.27	mg/kg	TRG	Yes	Y

16) The field *cas_rn* must contain legitimate CAS Registry numbers for all substances. For other determinands, such as pH, C6-C10 etc. these will be agreed with each laboratory in turn. Please note that these codes have to be approved by One Touch Data before EDD files from a particular lab can be accepted.

Warning – if you save data from Excel in CSV format, some data may be altered by Excel. For example the CAS for potassium (7440-09-7) may be saved by Excel as the date 07/09/7440. This will flag as an error during import.

17) *chemical_name* is the name of the determinand

18) The field *result_value* must not contain any qualifiers such as <. If the result is less than the Limit of Detection then the *result_value* field should be empty and the lab qualifier should be set to < (See #25)

19) The field *result_unit* should contain SI units where applicable The “mu” character (eg in µS/cm) should be the micro sign and not the letter “u”

20) Must be either 'TRG' for a target or regular result, 'TIC' for a tentatively identified compound, 'SUR' for surrogates, 'IS' for internal standards, 'SC' for spiked compounds, 'CAL' for calculated. For SAMPLE_DEPTH, leave blank.

21) *reportable_result* must be either 'Y' (Yes) for results which are considered to be reportable, or 'N' (No) for other results.

22) *detect_flag* indicates whether the analyte was detected i.e. above or below the limit of detection (LOD) - Y = True, N = False.

¹ Unless the file is tab delimited, it is important to use quotes around all the variables in the .hwo file. This is because comments or organic compounds often contain commas and any importation could fail if supplied without quotes. Examples include: “Fred’s test” or “1,1,2-trichloroethene”

Sheet cont'd

23) Qualifier 2 characters	24) 3 characters ²	25) <i>LOD (Limit of detection)</i> Float (Number)	26) Float (Number)	27) Float (Number)	28) <i>LOD_UNITS</i> 10 characters	29) Float (Number)
interpreted_qualifiers	lab_qualifiers	reporting_detection_limit	method_detection_limit	quantitation_limit	detection_limit_unit	tic_retention_time
1	>	0.1	0.1		percent	
2	>	1	1		mg/kg	
3	>	2	2		mg/kg	
4	>	30	30		mg/kg	
5	>				None	
6	<	25	5		µg/kg	
7	>	100	100		µg/kg	666.84
8	>	0.5	0.5		mg/kg	
9	>	0.3	0.3		mg/kg	
10	>	20	20		mg/kg	
11	>	0.01	0.01		pH units	
12	>	0.015	0.003		mg/l	
13	>	0.15	0.03		mg/kg	

Notes

23) *interpreted_qualifiers* (see EPA 2016b Table A-10)

24) *lab_qualifier* should contain a qualifier if the result was less than or equal to the limit of detection (LOD) defined in the field *method_detection_limit*.
lab_qualifier can be: < <= = > >= NDP (No Detection Possible)

25) *reporting_detection_limit* is the minimum concentration of an analyte that can be measured and reported – which is equal to or greater than the *method_detection_limit* (The limit of detection or LOD)

26) *method_detection_limit* is the minimum concentration of an analyte that can be measured and reported

27) *quantification_limit* refers to the minimum concentration of an analyte that can be measured within specific limits of precision and accuracy

28) *detection_limit_unit* should contain SI units where applicable and match the units given in the *result_unit* field.

29) *tic_retention_time* required when *result_type_code* = TIC

Note - The “mu” character in units such as µS/cm should be the micro sign and not the letter “u”. See Appendix C for Unicode values.

² *lab_qualifiers* can be: < <= = > >= NDP

Sheet cont'd

	30) <i>Comments</i> 512 characters result_comment	31) 10 characters MC_type	32) 50 characters report_type	33) 30 characters hwol_acronym_system
1		DRY_WEIGHT	SOLID	
2			SOLID	
3			SOLID	
4			SOLID	EH_1D_Total
5	diesel and lubricating oil		SOLID	EH_1D_Total
6			SOLID	
7			SOLID	
8			SOLID	
9			SOLID	
10			SOLID	
11			WAC_CEN_10_1	
12			WAC_CEN_10_1_C10	
13			WAC_CEN_10_1_A10	

Notes

30) *result_comment* Result specific comments such as : Interpretation: "degraded diesel and lubricating oil"

31) *MC_type* variables are DRY_WEIGHT or WET_WEIGHT – entry used to define which moisture correction is needed to convert dry weight results back to their equivalent wet weight (As Received) results. Result is only placed on rows where a relevant moisture result is reported.

DRY_WEIGHT states that for the moisture content reported for this sample, a Dry Weight correction must be used to convert the dry weight results back to their As-Received equivalent (based on BS 1377 and ISO 11465). DRY_WEIGHT need only be present in the rows of the .hwol file where the moisture content is also reported.

WET_WEIGHT states that for the moisture content reported for this sample, a Wet Weight correction must be used to convert the dry weight results back to their As-Received equivalent (based on EN12880). WET_WEIGHT need only be present in the rows of the .hwol file where the moisture content is also reported.

32) *report_type* This column is used to identify different report types produced by the laboratories and matched to HazWasteOnline™. See Section 1.1

33) *hwol_acronym_system* This column is used to describe the steps in the analysis of hydrocarbons. See Section 1.2

1.1 Detail for column 33: report_type

Acceptable entries at the time of specification issue are shown below, along with a description. Further entries can be found in Appendix A.

If a laboratory has other report types other than those listed below or in Appendix B (e.g. Topsoil); these will need to be added to this specification so that we can understand how to process the extra data (or not) during importation.

Test type	report_type	Explanation
Analysis of whole waste		
	SOLID	means that the results are for solid waste analysis: units mg/kg or similar plus non solid units such as pH (pH units) and moisture content (%).
	LIQUID	means that the results are for liquid waste analysis: units mg/l or similar plus non liquid units such as pH (pH units) and conductivity (mS/m)
	PRODUCT	means that the results are for the analysis of products
	GAS	means that the results are for the analysis of gases
Single stage WAC results		
	WAC_CEN_10_1	Solid and Leachate Prep Analyses (WAC) - indicates that the results are for the analysis of the solid waste (and any other WAC parameters not described below such as Loss on Ignition (%))
	WAC_CEN_10_1_C10	indicates the results are for the 10:1 leached C10 column (mg/l)
	WAC_CEN_10_1_A10	indicates the results are for the 10:1 leached A10 column (mg/kg) [This column is the one compared to the WAC limits]
Two Stage WAC results		
	WAC_CEN_10_1	Solid and Leachate Prep Analyses (WAC) - indicates that the results are for the solid waste analysis (and any other WAC parameters not described below such as Loss on Ignition (%))
	WAC_CEN_10_1_C2	indicates the results are for the 2:1 eluate C2 column (mg/l result) (1 st Step)
	WAC_CEN_10_1_C8	indicates the results are for the 8:1 eluate C8 column (mg/l result) (2 nd step)
	WAC_CEN_10_1_A2	indicates the results are for the 2:1 leached A2 column (mg/kg) (1 st step)
	WAC_CEN_10_1_A2-10	indicates the results are for the cumulative 10:1 leached A2-10 column (mg/kg) (2 nd step) [This column is the one compared to the WAC limits]

WAC Determinands

In HazWasteOnline™, WAC data are managed using a simpler process than that employed to process the data for waste classification (i.e. to determine whether the waste is hazardous or non-hazardous).

WAC data are imported directly into a standard WAC report format for presentation purposes. To make sure the WAC determinands are identified correctly, the following CAS/ID numbers should be used in the *cas_mn* field

<i>cas_mn</i>	<i>chemical_name</i>
P1340	Total Organic Carbon
P1226	Loss on Ignition
P1330	Sum of BTEX
P1434	Sum of PCB (actually PCB EC7 congeners)
P1406	Mineral Oil >C10-40
P1858	PAH Total 17
P1334	pH
P1114	ANC at pH 4
P1115	ANC at pH 7
16984-48-8	Fluoride
16887-00-6	Chloride
14808-79-8	Sulphate as SO ₄
P1132	Total Dissolved Solids
P1839	Dissolved Organic Carbon
P1187	Phenol (index)
P1840	Conductivity (μS/cm)
P1325	Temperature (°C)
P1870	Leachant Volume / Volume of Eluate (litres)
P1869	Mass of raw test portion / Mass of sample taken kg
P1871	Mass of Dry Sample
P1942	Moisture Content Ratio (%) / Natural Moisture Content 105C
P1831	Dry Matter Content (%)

[The P-numbers are taken from AGS-4 maintained by the AGS]

1.2 Detail for column 34 hwo_acronym_system and determinands in PDF reports

Table 1.2.1 List of acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
2D	GC-GC - Double coil gas chromatography
#1	e.g. EH_2D_Total_#1 means humics mathematically subtracted
#2	e.g. EH_2D_Total_#2 means fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry

Table 1.2.2 Examples of their use in the hwo file and PDF report

#	Terms used in a lab's PDF Report	Acronyms – PDF Report & .hwo
1	GRO >C5-C10	HS_1D_Total
2	EPH Range >C10-C40	EH_1D_Total
3	TPH1 (C10-C40)	EH_1D_Total
4	TPH (C10-C40)	EH_CU_1D_Total
5	EPH(C5-C40)	EH_CU+HS_1D_Total
6	Total Aliphatics >C10-C44	EH_CU_1D_AL
7	Total Aromatics >C10-C44	EH_CU_1D_AR
8	Total Aliphatics & Aromatics >C10-C44	EH_CU_1D_Total
9	Total Petroleum Hydrocarbons	EH_2D_Total
10	Total Aliphatics & Aromatics >C10-C44	EH_2D_Total_#1_#2
11	Mineral Oil (mg/kg)	EH_1D_Total
12	Mineral Oil >C10-C40	EH_CU_1D_AL

Appendix A Example of the HazWasteOnline™ format HWOL file.

Below is a partial example of a HazWasteOnline™ format .hwol file for a suite of tests carried out on two samples (2 different depths) from trial pit TP1.

```
"sys_sample_code","lab_anl_method_name","analysis_date","fraction","test_type","lab_matrix_code","analysis_location","basis","dilution_factor","prep_method","leachate_method","leachate_date","leachate_time","lab_name_code","lab_sample_id","cas_rn","chemical_name","result_value","result_unit","result_type_code","reportable_result","detect_flag","interpreted_qualifiers","lab_qualifiers","reporting_detection_limit","method_detection_limit","quantitation_limit","detection_limit_unit","tic_retention_time","result_comment","MC_type","report_type","hwol_acronym_system"

"TP1-0.5-0.7m","PM4","03/02/2016","N","Initial","SO","LB","NA","1","PM0",,,,,"JEL","17-1234/1","MOIST_CONT_DRY","moisture","10.2","percent","TRG","Yes","Y",,">","0.1","0.1",,"percent",,,,,"DRY_WEIGHT","SOLID",

"TP1-0.5-0.7m","TM30","03/02/2016","N","Initial","SO","LB","DRY","1","PM15",,,,,"JEL","17-1234/1","7440-50-8","COPPER","12","mg/kg","TRG","Yes","Y",,">","1","1",,"mg/kg",,,,,"SOLID",

"TP1-0.5-0.7m","TM38","03/02/2016","N","Initial","SO","LB","DRY","1","PM20",,,,,"JEL","17-1234/1","16887-00-6","chloride","1083","mg/kg","TRG","Yes","Y",,">","2","2",,"mg/kg",,,,,"SOLID",

"TP1-0.5-0.7m","TM5","03/02/2016","N","Initial","SO","LB","DRY","1","PM8",,,,,"JEL","17-1234/1","EPHC08C40","EPH >C8-C40","5420","mg/kg","TRG","Yes","Y",,">","30","30",,"mg/kg",,,,,"SOLID","EH_1D_Total"

"TP1-0.5-0.7m","TM5","03/02/2016","N","Initial","SO","LB","DRY","1","PM8",,,,,"JEL","17-1234/1","INTERPRETATION","Interpretation",,"None","TRG","Yes","Y",,">","None",,"diesel and lubricating oil",,"SOLID",,"EH_1D_Total"

"TP1-0.5-0.7m","TM31","03/02/2016","N","Initial","SO","LB","DRY","1","PM12",,,,,"JEL","17-1234/1","71-43-2","benzene",,"µg/kg","TRG","Yes","Y",,"<","25","5",,"µg/kg",,,,,"SOLID",

"TP1-0.5-0.7m","TM16_TIC","03/02/2016","N","Initial","SO","LB","DRY","1","PM8",,,,,"JEL","17-1234/1","57-10-3","n-hexadecanoic acid","52234","µg/kg","TIC","Yes","Y",,">","100","100",,"µg/kg",,,,,"SOLID",

"TP1-0.5-0.7m","TM0","03/02/2016","N","Initial","SO","LB","DRY","1","PM0",,,,,"JEL","17-1234/1","16065-83-1","chromium(III)","1078","mg/kg","TRG","Yes","Y",,">","0.5","0.5",,"mg/kg",,,,,"SOLID",

"TP1-0.5-0.7m","TM38","03/02/2016","N","Initial","SO","LB","DRY","1","PM20",,,,,"JEL","17-1234/1","18540-29-9","hexavalent chromium","25.1","mg/kg","TRG","Yes","Y",,">","0.3","0.3",,"mg/kg",,,,,"SOLID",

"TP1-0.5-0.7m","TM30","03/02/2016","N","Initial","SO","LB","DRY","1","PM15",,,,,"JEL","17-1234/1","7439-89-6","iron","8594","mg/kg","TRG","Yes","Y",,">","20","20",,"mg/kg",,,,,"SOLID",

"TP1-1.2-1.3m","TM73","03/02/2016","N","Initial","WL","LB","WET","1","PM11",,,,,"JEL","17-1234/2","P1334","pH","8.14","pH units","TRG","Yes","Y",,">","0.01","0.01",,"pH units",,,,,"WAC_CEN_10_1",

"TP1-1.2-1.3m","TM30","03/02/2016","D","Initial","WL","LB","DRY","5","PM17",,,,,"JEL","17-1234/2","7440-66-6","zinc","0.027","mg/l","TRG","Yes","Y",,">","0.015","0.003",,"mg/l",,,,,"WAC_CEN_10_1_C10",

"TP1-1.2-1.3m","TM30A10","03/02/2016","D","Initial","WL","LB","DRY","5","PM17",,,,,"JEL","17-1234/2","7440-66-6","zinc","0.27","mg/kg","TRG","Yes","Y",,">","0.15","0.03",,"mg/kg",,,,,"WAC_CEN_10_1_A10",
```

Below is an example of a HazWasteOnline™ format .hwol file containing sample depth information

```
"sys_sample_code","lab_anl_method_name","analysis_date","fraction","test_type","lab_matrix_code","analysis_location","basis","dilution_factor","prep_method","leachate_method","leachate_date","leachate_time","lab_name_code","lab_sample_id","cas_rn","chemical_name","result_value","result_unit","result_type_code","reportable_result","detect_flag","interpreted_qualifiers","lab_qualifiers","reporting_detection_limit","method_detection_limit","quantitation_limit","detection_limit_unit","tic_retention_time","result_comment","MC_type","report_type","hwol_acronym_system"

"TP1-1.2-1.3m",,,,,,,,,,"NA",,,,,,,,,,"JEL","17-1234/2","SAMPLE_DEPTH","sample depth",,"m",,"No","N",,,,,,,,,,"m",,"1.2-1.3m",,"SOLID",

"TP1-1.5m",,,,,,,,,,"NA",,,,,,,,,,"JEL","17-1234/2","SAMPLE_DEPTH","sample depth",,"m",,"No","N",,,,,,,,,,"m",,"1.5m",,"SOLID",
```

Appendix B

Test Types	report_type	Explanation
Other known report types		
	LEACH_NRA	National Rivers Authority leachate (NRA 1994)
	LEACH_CEN_10_1	CEN 10:1 (1 Batch) Leachate (NON-WAC)
	LEACH_CEN_2_1	CEN 2:1 Leachate
	LEACH_TCLP	Toxicity Characteristic Leaching Procedure Leachate (US EPA)
	LEACH_SPLP	Synthetic Precipitation Leaching Procedure Leachate (US EPA)
	LEACH_AUS_RW	Australian (Reagent Water) Leachate
	LEACH_AUS_PH5	Australian (Acetate pH 5.0) Leachate
	LEACH_AUS_PH5_2.9	Australian (Acetate pH 5.0/2.9) Leachate
	LEACH_AUS_PH9.2	Australian (Tetraborate pH 9.2) Leachate
	TOP_SOIL	Topsoil report based on BS3882:2015

Appendix C - Unicode character encoding

Micro μ : U+00B5 (181)

Degree $^\circ$: U+00B0 (176)

References

AGS – Association of Geotechnical & Geoenvironmental Specialists
<http://ags.org.uk/>

Network Working Group, 2005. Common Format and MIME Type for Comma-Separated Values (CSV) Files:
<https://tools.ietf.org/html/rfc4180>

EPA 2016a: Electronic data Deliverable (EDD): Comprehensive Specification Manual R2 4.0 Mar 2016, United States Environmental Protection Agency:
www.epa.gov/sites/production/files/2016-01/documents/r2comprehensivemanual_sept2015.pdf

EPA 2016b: ELECTRONIC DATA DELIVERABLE, VALID VALUES, REFERENCE MANUAL, Region 2; Appendix to EPA Electronic Data Deliverable (EDD) Comprehensive Specification Manual September 2016 Environment Protection Agency:
www.epa.gov/sites/production/files/2016-09/documents/r2validvaluesreferencemanual_region2_sept2016_0.pdf