

Quick Start Guide – A Brief Tutorial for DRAS 4

Contents	
Quick Start Guide – A Brief Tutorial for DRAS 4	1
Task 1: Start DRAS 4	2
Step 1. Copy DRAS4_20200803.exe to a location on your hard drive	2
Step 2. Double-click the DRAS4_20200803.exe file	2
Step 3. Click "New" from Toolbar or select "File" > "New" from the drop-down menu	2
Task 2: Set up a new project:	3
Step 1: Set up WMU properties in the upper portion of the main window	3
Step 3: Set up Site COCs in the lower portion of the main window	4
Step 4. Click "Petitioner" tab to enter petitioner information.	6
Step 5. Click "Save as" to save the project database to a user specified location	7
Step 6. Click "Create input" to create input file "DRAS.IN" under the current directory	8
Step 7. Click "Run" to execute the computation engine.	8
Step 8. Click "Results" to import the results from "DRAS.OUT" under the working directory	9
Step 9. Click "Report" to print the results to .pdf and .html formats	1



Task 1: Start DRAS 4

Step 1. From the EPA Delisting website, copy DRAS4_20200803.exe to a location on your hard drive where you have read/write access.

Step 2. Double-click the DRAS4_20200803.exe file or execute it from the command line window. Wait until the main window pops up.

Step 3. Click "New" from Toolbar or select "File" > "New" from the drop-down menu.

🔳 DRAS 4.0							_		\times
File Edit Ru	n Help								
New Import	Save as	Export	Petitioner	Create input	Run	Results	Report	Manual	About
	Click "Ne "File" > "	w" or New"							



For more detail on DRAS 4 Toolbars and Drop-Down Menus, see Section 3.2 of the DRAS 4 User's Manual.



Task 2: Set up a new project:

Step 1: Set up Waste Management Unit (WMU) properties in the upper portion of the main window.

				Cubic Yards •	Hazard Quotie	ent 1.0 ~
nt Unit Active Lif	e ar Batch Active Year	rs 20			Run with I	Detection Lim
				Add Cus.	Add COCs	Remove Ro
TCLP Concentration (mg/L)	Is TCLP Conc. a Detection Limit (COC is ND)?	Total Concentration (mg/kg)	Is Total Conc. a Detection Limit (COC is ND)?		Property Details	
	TCLP Concentration (mg/L)	TCLP Concentration (mg/L) Is TCLP Conc. a Detection Limit (COC is ND)?	TCLP Is TCLP Conc. Total Concentration Is TCLP Conc. Total (mg/L) (COC is ND)? (mg/kg)	Int Unit Active Life Image: Multiple Year Batch Active Years Image: Multiple Year Batch Active Years Image: TCLP Is TCLP Conc. Concentration a Detection Limit (mg/L) Is TCLP Conc. Image: Concentration a Detection Limit (mg/L) (COC is ND)?	Multiple Year Batch Active Years 20 Add Cus. TCLP Concentration (mg/L) Is TCLP Conc. a Detection Limit (COC is ND)? Total Concentration (mg/kg) Is Total Conc. a Detection Limit (COC is ND)? (COC is ND)?	Int Unit Active Life Run with I Image: Multiple Year Batch Active Years 20 Image: Add Cus. Add Cus. Add CoCs Add Cus. Add CoCs Add CoCs Image: TCLP Conc. Concentration (mg/L) Is TCLP Conc. Concentration (mg/kg) Is Total Conc. a Detection Limit (COC is ND)? Property Details

Waste Management Unit Type: Choose Landfill or Surface Impoundment.

Waste Management Unit Active Life:

1 Year Batch is for one-time projects such as dig-and-haul remediation projects. *Multiple Year Batch* is for ongoing generated waste.

You must specify an assumed waste management unit *Active Life* for *Multiple Year Batch* projects. (EPA recommends 20 years for landfills and 50 years for surface impoundments.)

Waste Volume:1 Year Batch Projects, enter the total project waste volume.Multiple Year Batch Projects, enter annual waste volume.

Risk/HQ Values: Specify target cancer risk and hazard values the project.

Run with Detection Limits: Choose the fraction of the detection limit to be used in estimates of risk and hazard from waste constituents that were not detected at an identified detection limit.



For more detail on Waste Management Unit options, see Section 3.3.2.2 of the DRAS 4 User's Manual.



Step 3: Set up Site COCs in the lower portion of the main window

1. Add COCs from default database:

Click button "Add COCs", a new dialog containing all default COCs will pop-up. Check the boxes in Column 2 – "Chemical Name" to select COCs for this project. The Default COCs Table can be sorted by any column and there are also drop-down menus allowing you to select COCs by chemical class.

The default database that opens in the dialog box below is the most recent version despite carrying a 2009 date at the top. This default database is identical to the July 2020 version noted in the "Switch Database" menu.

- Default COCs Table ? × in: All COCs Select All Clear All Switch Database 1/1/2009 Save Cancel Maximum Oral Contaminant Chemical Default COC Chemical cancer s CAS Level Version ID name facto number (MCL) 1/(mg/kg (mg/L) Acenaphthene 0 1 0 83-32-9 0 208-96-8 0 Acenapthylene 0 2 0 3 0 Acetaldehyde [Ethanal] 75-07-0 0 0 4 Acetone (2-propanone) 0 0 67-64-1 0 5 0 Acetonitrile (methyl cyanide) 75-05-8 0 0 6 0 Acetophenone 98-86-2 0 0 7 Acrolein 0 0 107-02-8 0 Acrylamide 0.5 8 0 79-06-1 1 9 0 Acrylonitrile 107-13-1 0 0.54 10 Aldrin 309-00-2 0 0 17 11 Aniline (benzeneamine) 0.0057 0 62-53-3 0 12 Anthracene 0 0 120-12-7 0 Antimony 13 0 7440-36-0 0.006 0 Aramite 14 0 140-57-8 0 0.025 15 0 Arsenic 7440-38-2 0.01 1.5 < >
- 2. Click button "Save" to add the selected COCs to the main window.



For more details on setting up COCs including using older databases stored in DRAS 4, entering concentrations, and modifying individual chemical properties, see Section 3.3.2.3 of the DRAS 4 User's Manual.



For more details on creating or importing customized COCs (COCs not available in the default DRAS 4 database), see Section 3.3.4 of the DRAS 4 User's Manual.



Back in the main project window, click each empty table cell to input waste specific COC concentrations. If the COC was not detected and you wish to evaluate the risk and hazard based on the detection limit, enter the detection limit (typically the reporting limit) and check the box in the detection limit column.

Fi	le Edit Run Heln					- 6
lev	v Import Save as Export Pe	titioner Create in	put Run Results	Report Manual	About	
W	Landfill Surface Impoundment Unit Active Life	Iste Volume		Cubic Yards •	Risk/HQ Values Cancer Risk Le Hazard Quotie Run with D	evel 1e-6 ~ nt 1.0 ~
C) 1 Year Batch () Multiple Year	Batch Active Years	20		• 0.5	0 1.0
				Add Cus.	Add COCs	Remove Row
	Chemical Name	TCLP Concentration (mg/L)	Is TCLP Conc. a Detection Limit (COC is ND)?	Total Concentration (mg/kg)	Is Total Conc. a Detection Limit (COC is ND)?	Property Details
1	Acetone (2-propanone)	1		10		
2	Cadmium	0.5	✓ Yes	4		
3	Chromium (III) (Chromic Ion)	0.5		250		
	Chromium (VI) (+6)	0.1	✓ Yes	1	✓ Yes	
4				3		
4 5	Pentachlorophenol	0.05				



Step 4. (Optional) Click "Petitioner" tab to enter petitioner information.

Although optional, the Petitioner tab is very useful in preparing documentation of the DRAS 4 run for the rulemaking docket. The information entered in this tab will be reproduced on output tables, serving to clearly identify the petitioned waste, the facility, date, and identify of the person performing the analysis.

Click "Ok" to save the information to database.

Delisting Petitioner Information	?	×
EPA Region: 5 • EPA Delisting Petition Number: DL-		
Petitioner's Name: XYZ Plating		
Petitioner's Address: 123 Main Street		
(Address Line 2)		
City/State/Zip Code: Zinc City IL • 90210)	
Waste Description: Wastewater filter cake from electropla	iting	
Waste Code(s): F006		
Analysis Performed by: D. Lister		
Date Created: 7/31/2020 Date Submitted to EPA:	5/1/2020	\$
User Comments:		
ОК	Canc	el



« DE-LIST » XYZ Plating	v ₽	Search XYZ Plating		,
v folder			•	•
XYZ Plating Run 1.sqlite				
DRAS sqlite (*.sqlite)		Specify Project and File Name	t Folder	
	 « DE-LIST » XYZ Plating v folder XYZ Plating Run 1.sqlite DRAS sqlite (*.sqlite) 	 Market DE-LIST > XYZ Plating V folder XYZ Plating Run 1.sqlite DRAS sqlite (*.sqlite) 	 * DE-LIST > XYZ Plating V folder XYZ Plating Run 1.sqlite DRAS sqlite (*.sqlite) Specify Project and File Name 	* DE-LIST > XYZ Plating folder XYZ Plating Run 1.sqlite DRAS sqlite (*.sqlite) Specify Project Folder and File Name

Step 5. Click "Save as" to save the project database to a user specified location.

If "Save as" not used, the project database will be saved under a default Windows temporary file location. It is recommended to use "Save as" so that the project can be revisited later. Navigate to a specific location, enter a project database name, and click "OK".

A confirmation message will appear. Click "OK."



Now that you've entered your waste information and saved the project, you are ready to run DRAS 4 and get results. At this point, the modular nature of DRAS 4's program elements requires that you proceed stepwise through a few similar and repetitive steps (Steps 6-8) necessary to set all of the needed input files, run the model, and view results. Every time you wish to rerun the model, these steps will need to be repeated. The steps are summarized as follows:



Each of these steps opens a similar dialog box for filefolders. A unique project folder (ideally the folder in which you saved the project database) should be selected. The *Create Input* and *Run* steps produce a confirmation message that you'll need to click "OK" to move on. The *Results* step asks you to select the output file before opening the Results for viewing.

X



Step 6. Click "Create input" to create input "DRAS.IN" u the current directory.

create input to	← → ∽ ↑ 🖡 « DE-LIST > XYZ Plating	 V Search XYZ Plating 	Q
"DRAS.IN" under	Organize • New folder	Ē	· 0
the current	A Name	Status	Date mor
directory.	Desktop *	No iten Select Project Folder]
If the project has	🖻 Documents 🖈 🗸 <		>
been saved to a user specified	Folder: XYZ Plating		
directory in the		Select Folder	Cancel
"Save as"		4	444 444

been saved to user specified directory in t "Save as"

procedure, the current directory will be the user specified directory, otherwise, it is the temporary directory subject to change by user. Click "Select Folder" to save the file "DRAS.IN"

Select Directory



Step 7. Click "Run" to execute the computation engine.

The default working directory is where the "DRAS.IN" was saved in the previous procedure. A user may also navigate to any



folder that contains "DRAS.IN" and execute the computation in that directory.





Step 8. Click "Results" to import the results from "DRAS.OUT" under the working directory. Tables 1-10 will be displayed in a pop-up dialog.

		Caral VVZ Distan	0
C -> V T > CE-LIST > XYZ Plating	v 0	Search XYZ Plating	2
Organize • New folder		NEE .	• 🔳 🕜
A Name	^	Status	Date mod
Desktop		C	9/11/202
↓ Downloads ★	Select	DRAS.OUT file	
Documents * <			>
File name: DRAS.OUT	~	dras.out (*.out)	~
		Open	Cancel

ble	1 Surface Pathway Risk					
1	Chemical Name Acetone (2-propanone)	Waste Stream Total Conc. (mg/kg) 10	Cancer Risk Surface Water Ingestion Pathway	Cancer Risk Air Particulate Inhalation Pathway	Cancer Risk Fish Ingestion Pathway	Ca Soil F
2	Cadmium	4		4.67e-11		
3	Chromium (III) (Chromic Ion)	250	5200 S			
4	Chromium (VI) (+6)	0.5	7.31e-13	2.65e-10	1.11e-11	6.73e-13
5	Pentachlorophenol	3	3.51e-12		1.12e-09	3.23e-12 🗸
<						>

Table 3.1 from the DRAS 4 User's Manual summarizes the contents of each output table and is included below for reference.



Table Name	Description
Table 1 - Surface	Forward-calculation of cancer risks due to releases from the surface of the waste
Pathway Risk	management unit. Displays risk by individual pathway (fish ingestion, volatile
	inhalation, etc.) as well as an aggregate risk by chemical and overall. Risk estimated
	from concentrations in petitioned waste.
Table 2 - Groundwater	Forward-calculation of cancer risks due to a release to groundwater from the waste
Pathway Risk	management unit. Displays hazard by individual pathway (groundwater ingestion,
	groundwater inhalation, etc.) as well as an aggregate risk by chemical and overall.
	Risk estimated from concentrations in petitioned waste.
Table 3 - Surface	Forward-calculation of noncancer health effects (hazard) due to releases from the
Pathway Hazard Quotient	surface of the waste management unit. Displays hazard by individual pathway (fish
	ingestion, volatile inhalation, etc.) as well as an aggregate risk by chemical and
Table 4 Cassar denotes	E-mund entry of neuronean backle effects (heread) due to a million to
Pathway Hazard Quatiant	<i>Forward-calculation</i> of noncancer health effects (hazard) due to a release to
Pathway Hazard Quotient	groundwater from the waste management unit. Displays fisk by individual pathway
	(groundwater ingestion, groundwater initiation, etc.) as well as an aggregate risk by
Table 5 - Maximum	<i>Back calculation</i> of maximum allowable concentrations due to releases from the
Allowable Concentrations	surface of the waste management unit. Displays hazard by individual pathway (fish
for Surface Pathways	ingestion volatile inhalation etc.) Maximum allowable concentrations estimated
for Surface Fathways	based on target risk and bazard criterion set by the regulatory authority Entered
	waste concentrations are not used in these calculations. Concentrations will be
	mg/kg total for landfills and mg/L leachate for surface impoundments.
Table 6 - Maximum	<i>Back-calculation</i> of maximum allowable leachate concentrations, in mg/L, from
Allowable TCLP	releases to groundwater from the waste management unit. Displays hazard by
Concentration	individual pathway (groundwater ingestion, groundwater inhalation, etc.).
Groundwater Pathways	Maximum allowable concentrations estimated based on target risk and hazard
	criterion set by the regulatory authority. Entered waste concentrations are not used
	in these calculations.
Table 7 - Aggregate Risk	Forward-calculation of aggregate cancer risk and hazard summed across all
and Hazard Quotient	pathways and all chemicals. Includes one sum of risk and hazards limited to COCs
Results	that were detected and another sum of risk and hazard that includes estimates based
	on the detection limits for COCs that were not detected. This table summarizes the
	overall potential risk from the petitioned waste from COC concentrations in the
Table 9 Limiting	waste.
Pathways	<i>Back-calculation</i> of the mining maximum anowable concentrations based on target risk and bazerd oriterion set by the regulatory authority. The individual limiting
ratilways	nsk and nazard criterion set by the regulatory authority. The individual infitting
	This table is the most concise summary of maximum allowable concentrations
	Note that for surface impoundments, there will be a maximum allowable leachate
	concentration in mg/L for both surface and groundwater pathways.
Table 9 - Pathways	This table is a combination of <i>forward</i> - and <i>back-calculations</i> from DRAS.
Exceeding the Delisting	Although all COCs are included in the table, COCs with waste concentrations that
Limits	exceed limiting values are identified when the table also includes the limiting
	maximum concentration and pathway.
Table 10 - Toxicity	This table presents comparisons to alternative criteria. The leachate concentration of
Characteristic Soil	the petitioned waste is compared to the Toxicity Characteristic Leachate Procedure
Saturation and Ecological	concentrations from 40 CFR Part 261.24. TCLP leachate concentrations that exceed
Values	the regulatory values would remain hazardous regardless of the results of the DRAS
	model. Total concentrations in the waste that exceed an estimated soil-saturation
	concentration indicate that some of the assumptions used in this assessment may not
	apply and the user may need to make additional evaluations of the waste. Predicted
	surface water concentrations based on a release from the surface of the waste
	management unit are compared to ambient water quality criteria for protection of
	aquatic inte.



Step 9. Click "Report" to print the results to .pdf and .html formats.

The default report directory is the user specified project directory. The user may also choose to navigate to another folder.

← → × ↑ 🖡 « DE-LIST » XYZ Plating	v ت	Search XYZ Plating	Q
Organize • New folder			· 7
A Name	^	Status	Date mod
Desktop	No items	elect Project Folder	
			_
🕹 Downloads 🚿			
 ➡ Downloads * ☑ Documents * < 			>
 Downloads Documents Folder: XYZ Plating 			>

A pop-up window as below will appear when the report is ready.

DRAS	X
Report created in PDF and H	TML formats.
	OK