

**Sistema de dados ambientais: como uma iniciativa de compartilhamento de dados pode auxiliar no estudo do fator de atenuação de intrusão de vapores**

**Guilherme Panichi Amaro**  
**Atila Pessoa**  
**Calvin los**  
**Leandro Gomes de Freitas**  
**Humberto Hagio**  
**Adriel Simeão**  
**Danilo Saunite**

*Palestra ministrada na Conferência Internacional de Gerenciamento e Reabilitação de Áreas Contaminadas 2020+1, Lisboa, 2021. (on-line)*

A série “Comunicação Técnica” compreende trabalhos elaborados por técnicos do IPT, apresentados em eventos, publicados em revistas especializadas ou quando seu conteúdo apresentar relevância pública.

# Sistema de Dados Ambientais - Como uma iniciativa de compartilhamento de dados pode auxiliar no estudo do fator de atenuação de intrusão de vapores

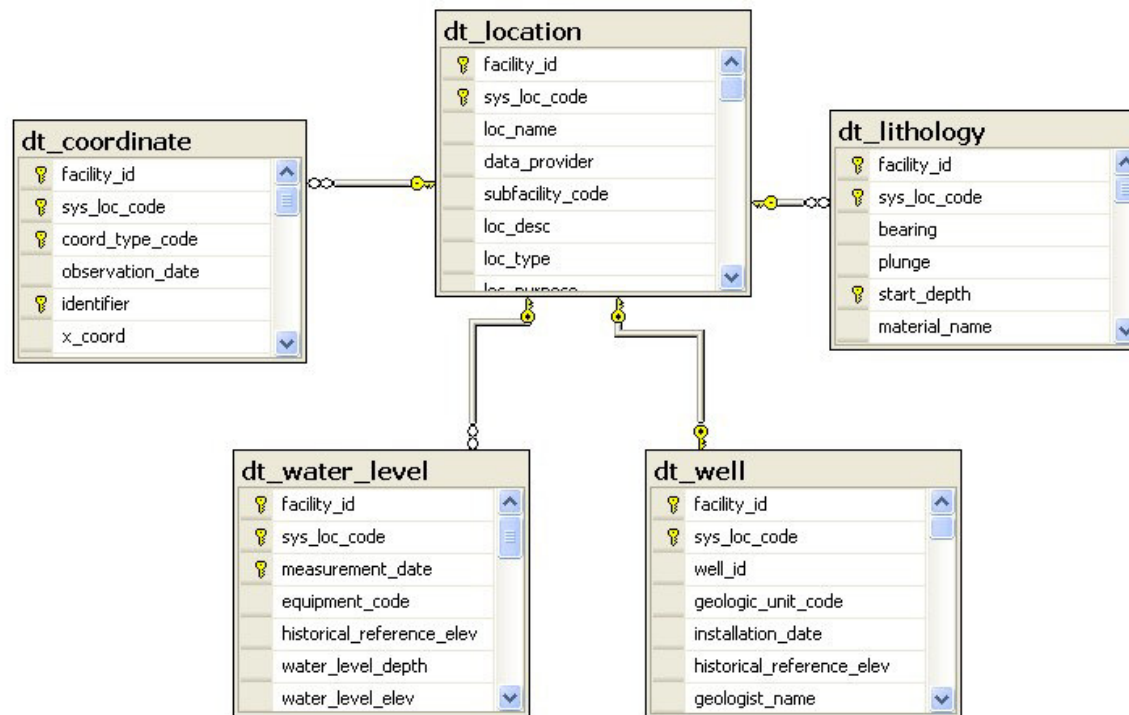
Guilherme Panichi Amaro  
Calvin Iost  
Atila Pessoa  
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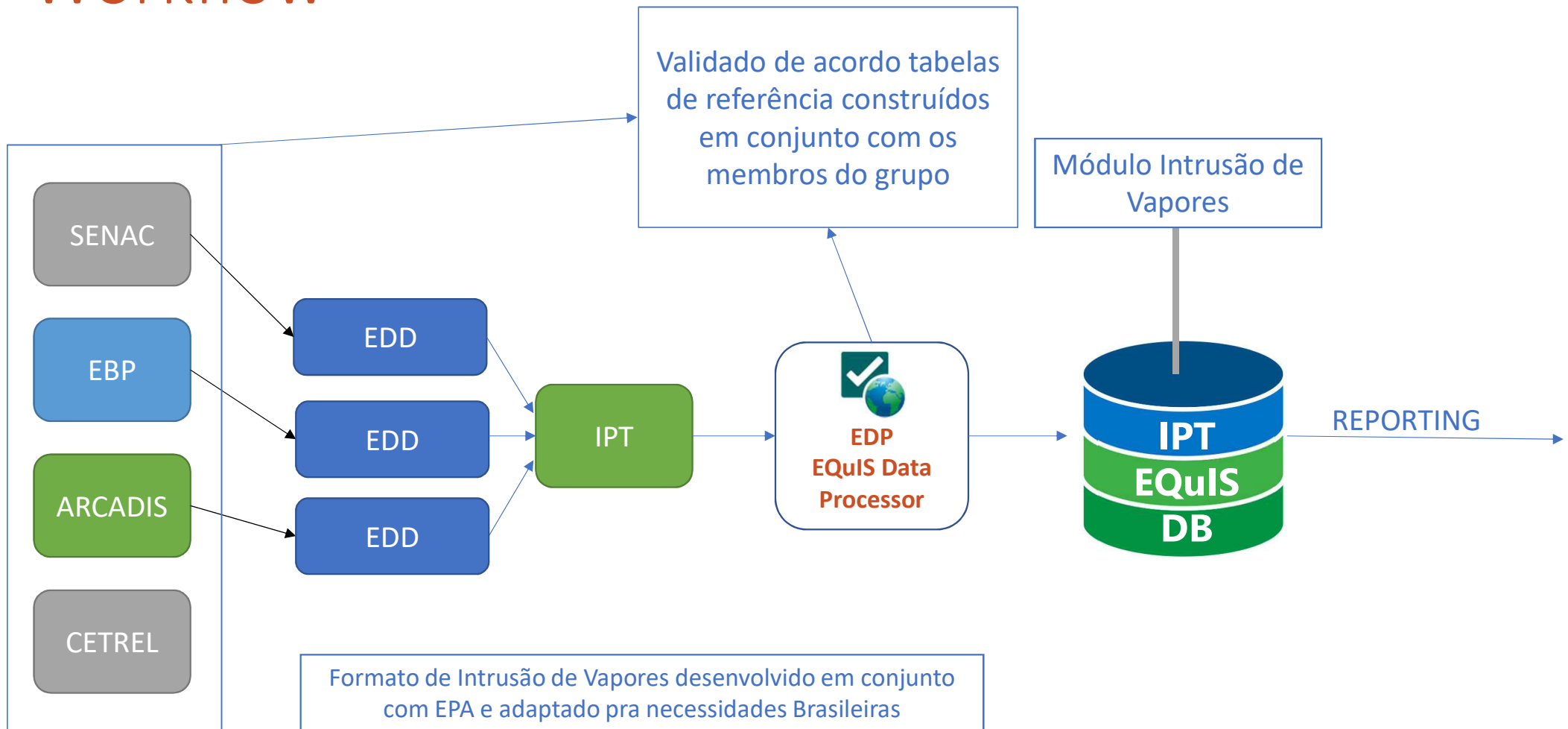
International Conference  
on Contaminated Land  
Management and  
Rehabilitation

May 11th to 14th, 2021  
Lisbon

# O que é um banco de dados



# Workflow



# Conceitos

EDD

Electronic Data Deliverable

#	#data_provider	sys_sample_code	sample_name	sample_matrix_code	sample_type_code	sample_source	parent_sample_code	sample_delivery_group	sample_start_date	sys_loc_code	chain_of_custody	sent_to_lab_date	sample_receipt_date	sampler	sampling_company_code	sampling_reason	sampling_method	task_code	sample_end_date	sample_duration	sample_duration_unit	fk
1	Text(20)	Text(40)	Text(50)	Text(4)	Text(20)	Text(10)	Text(40)	Text(20)	DateTime	Text(20)	Text(40)	DateTime	DateTime	Text(50)	Text(20)	Text(30)	Text(40)	Text(40)	DateTime	Text(20)	Text(15)	Text(15)
2	CONFIDENTIAL	001-AA-AA-160516	001-AA-AA-160516	AA	N	CAMPO			16/05/2016 18:27	AAI-002					CONFIDENTIAL		TO-15	T_2016		7,55	h	
3	CONFIDENTIAL	002-AA-AA-160516	002-AA-AA-160516	AA	N	CAMPO			16/05/2016 18:40	AAI-003					CONFIDENTIAL		TO-15	T_2016		8	h	
4	CONFIDENTIAL	003-AA-AA-160516	003-AA-AA-160516	AA	N	CAMPO			16/05/2016 19:07	AAI-004					CONFIDENTIAL		TO-15	T_2016		8	h	
5	CONFIDENTIAL	004-AA-AA-160516	004-AA-AA-160516	AA	N	CAMPO			16/05/2016 19:19	AAI-001					CONFIDENTIAL		TO-15	T_2016		8	h	
6	CONFIDENTIAL	005-AA-AA-160516	005-AA-AA-160516	AA	N	CAMPO			16/05/2016 19:27	AAE-005					CONFIDENTIAL		TO-15	T_2016		8	h	
7	CONFIDENTIAL	006-PCP-VAP-160516	006-PCP-VAP-160516	VAP	N	CAMPO			16/05/2016 15:49	PV-001					CONFIDENTIAL		TO-15	T_2016		0,15	h	
8	CONFIDENTIAL	007-PCP-VAP-160516	007-PCP-VAP-160516	VAP	N	CAMPO			16/05/2016 16:17	PV-002					CONFIDENTIAL		TO-15	T_2016		0,15	h	
9	CONFIDENTIAL	008-PCP-VAP-160516	008-PCP-VAP-160516	VAP	N	CAMPO			16/05/2016 16:36	PV-003					CONFIDENTIAL		TO-15	T_2016		0,12	h	
10	CONFIDENTIAL	009-PCP-VAP-160516	009-PCP-VAP-160516	VAP	N	CAMPO			16/05/2016 17:09	PV-004					CONFIDENTIAL		TO-15	T_2016		0,13	h	
11	CONFIDENTIAL	010-PCP-VAP-160516	010-PCP-VAP-160516	VAP	N	CAMPO			16/05/2016 17:50	PV-005					CONFIDENTIAL		TO-15	T_2016		0,13	h	
12	CONFIDENTIAL	001-PCP-001-VAP-161116	001-PCP-001-VAP-161116	VAP	N	CAMPO			16/11/2016 15:18	PV-001					CONFIDENTIAL		TO-15	T_2016		0,12	h	
13	CONFIDENTIAL	002-PCP-002-VAP-161116	002-PCP-002-VAP-161116	VAP	N	CAMPO			16/11/2016 15:39	PV-002					CONFIDENTIAL		TO-15	T_2016		0,12	h	
14	CONFIDENTIAL	003-PCP-003-VAP-161116	003-PCP-003-VAP-161116	VAP	N	CAMPO			16/11/2016 15:58	PV-003					CONFIDENTIAL		TO-15	T_2016		0,12	h	
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16	CONFIDENTIAL	005-PCP-005-VAP-161116	005-PCP-005-VAP-161116	VAP	N	CAMPO			16/11/2016 16:39	PV-005					CONFIDENTIAL		TO-15	T_2016		0,12	h	
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19	CONFIDENTIAL	003-PV-001-VAP-270117	003-PV-001-VAP-270117	VAP	N	CAMPO			27/01/2017 17:35	PV-001					CONFIDENTIAL		TO-15	T_2017		0,12	h	
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23	CONFIDENTIAL	004-AAI-003-AA-240118	004-AAI-003-AA-240118	AA	N	CAMPO			24/01/2018 17:49	AAI-003					CONFIDENTIAL		TO-15	T_2018		8	h	
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25	CONFIDENTIAL	019-PCP-011-VAP-290118	019-PCP-011-VAP-290118	VAP	N	CAMPO			29/01/2018 11:42	PV-011					CONFIDENTIAL		TO-15	T_2018		0,08	h	
26	CONFIDENTIAL	020-PV-004-VAP-290118	020-PV-004-VAP-290118	VAP	N	CAMPO			29/01/2018 13:14	PV-004					CONFIDENTIAL		TO-15	T_2018		0,08	h	
27	CONFIDENTIAL	021-PCP-010-VAP-300118	021-PCP-010-VAP-300118	VAP	N	CAMPO			30/01/2018 09:06	PV-010					CONFIDENTIAL		TO-15	T_2018		0,12	h	
28	CONFIDENTIAL	014-PV-006-VAP-260118	014-PV-006-VAP-260118	VAP	N	CAMPO			26/01/2018 13:58	PV-006					CONFIDENTIAL		TO-15	T_2018		0,13	h	
29	CONFIDENTIAL	015-PV-005-VAP-260118	015-PV-005-VAP-260118	VAP	N	CAMPO			26/01/2018 14:51	PV-005					CONFIDENTIAL		TO-15	T_2018		0,1	h	
30	CONFIDENTIAL	017-PCP-001-VAP-310118	017-PCP-001-VAP-310118	VAP	N	CAMPO			31/01/2018 17:43	PV-001					CONFIDENTIAL		TO-15	T_2018		0,18	h	
31	CONFIDENTIAL	018-PV-003-VAP-310118	018-PV-003-VAP-310118	VAP	N	CAMPO			31/01/2018 17:03	PV-003					CONFIDENTIAL		TO-15	T_2018		0,1	h	
32	CONFIDENTIAL	023-PCP-006-VAP-310118	023-PCP-006-VAP-310118	VAP	N	CAMPO			31/01/2018 15:46	PV-006					CONFIDENTIAL		TO-15	T_2018		0,08	h	
33	CONFIDENTIAL	001-AAI-001-AA-240818	001-AAI-001-AA-240818	AA	N	CAMPO			24/08/2018 17:32	AAI-001					CONFIDENTIAL		TO-15	T_2018		8	h	
34	CONFIDENTIAL	002-AAI-009-AA-240818	002-AAI-009-AA-240818	AA	N	CAMPO			24/08/2018 17:59	AAI-009					CONFIDENTIAL		TO-15	T_2018		8	h	
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37	CONFIDENTIAL	005-AAI-008-AA-240818	005-AAI-008-AA-240818	AA	N	CAMPO			24/08/2018 18:32	AAI-008					CONFIDENTIAL		TO-15	T_2018		8	h	
38	CONFIDENTIAL	006-AAI-004-AA-240818	006-AAI-004-AA-240818	AA	N	CAMPO			24/08/2018 18:44	AAI-004					CONFIDENTIAL		TO-15	T_2018		8	h	
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41	CONFIDENTIAL	001-AAI-001-AA-310818	001-AAI-001-AA-310818	AA	N	CAMPO			31/08/2018 17:30	AAI-001					CONFIDENTIAL		TO-15	T_2018		8	h	
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43	CONFIDENTIAL	003-AAI-003-AA-310818	003-AAI-003-AA-310818	AA	N	CAMPO			31/08/2018 18:05	AAI-003					CONFIDENTIAL		TO-15	T_2018		8	h	
44	CONFIDENTIAL	004-AAI-008-AA-310818	004-AAI-008-AA-310818	AA	N	CAMPO			31/08/2018 18:20	AAI-008					CONFIDENTIAL		TO-15	T_2018		8	h	
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46	CONFIDENTIAL	006-AAI-010-AA-310818	006-AAI-010-AA-310818	AA	N	CAMPO			31/08/2018 18:59	AAI-010					CONFIDENTIAL		TO-15	T_2018		8	h	
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48	CONFIDENTIAL	008-AAE-012-AA-310818	008-AAE-012-AA-310818	AA	N	CAMPO			31/08/2018 19:29	AAE-012					CONFIDENTIAL		TO-15	T_2018		8	h	
49	CONFIDENTIAL	001-AAI-001-AA-060918	001-AAI-001-AA-060918	AA	N	CAMPO			06/09/2018 16:25	AAI-001					CONFIDENTIAL		TO-15	T_2018		8	h	
50	CONFIDENTIAL	002-AAI-009-AA-060918	002-AAI-009-AA-060918	AA	N	CAMPO			06/09/2018 16:46	AAI-009					CONFIDENTIAL		TO-15	T_2018		8	h	
51	CONFIDENTIAL	003-AAI-003-AA-060918	003-AAI-003-AA-060918	AA	N	CAMPO			06/09/2018 17:03	AAI-003					CONFIDENTIAL		TO-15	T_2018		8	h	
52	CONFIDENTIAL	005-AAI-004-AA-060918	005-AAI-004-AA-060918	AA	N	CAMPO			06/09/2018 17:40	AAI-004					CONFIDENTIAL		TO-15	T_2018		8	h	
53	CONFIDENTIAL	006-AAI-011-AA-060918	006-AAI-011-AA-060918	AA	N	CAMPO			06/09/2018 18:03	AAI-011					CONFIDENTIAL		TO-15	T_2018		8	h	
54	CONFIDENTIAL	007-AAI-010-AA-060918	007-AAI-010-AA-060918	AA	N	CAMPO			06/09/2018 18:14	AAI-010					CONFIDENTIAL		TO-15	T_2018		8	h	



# Conceitos

EDP

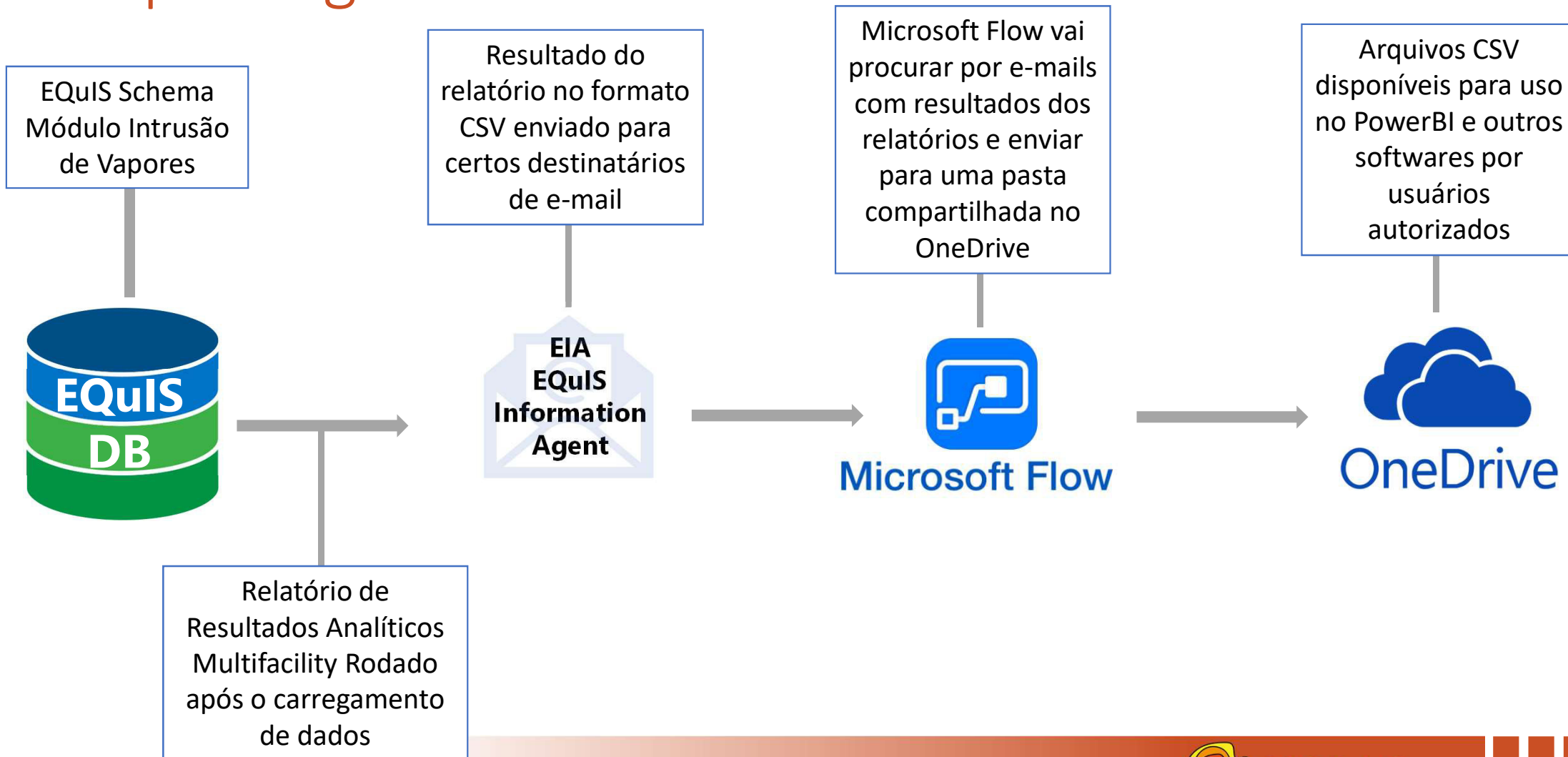
EqUIS Data Processor

The screenshot displays the EqUIS Data Processor software interface. The main window shows a data table with 21 rows and 7 columns. The columns are: Line, sys\_sample\_code, sample\_name, sample\_matrix\_code, sample\_type\_code, sample\_source, and parent\_sample\_code. The data is organized into a tree view on the left, with categories like Field, Lab, and Files. The table shows various sample records, including those from San Juan R at Me and San Juan River at. The interface includes a ribbon with tabs for File, Home, Professional, and Link, and various toolbars for formatting, filtering, and data manipulation.

Line	sys_sample_code	sample_name	sample_matrix_code	sample_type_code	sample_source	parent_sample_code
1	#sys_sample_code	sample_name	sample_matrix_code	sample_type_code	sample_source	parent_sample_code
2	1508188-001A	San Juan R at Me	WS		FIELD	
3	1508188-001ADUP		WQ	DUP	LAB	1508188-001A
4	1508188-001AMS		WQ	MS	LAB	1508188-001A
5	1508188-001AMS N		WQ	MS	LAB	1508188-001A
6	1508188-001AMSD		WQ	MSD	LAB	1508188-001AMS
7	1508188-001AMSD		WQ	MSD	LAB	1508188-001AMS NO3
8	1508188-001B	San Juan R at Me	WS	N	FIELD	
9	1508188-001C	San Juan R at Me	WS	N	FIELD	
10	1508188-001CMS		WQ	MS	LAB	1508188-001C
11	1508188-001CMSD		WQ	MSD	LAB	1508188-001CMS
12	1508188-002A	San Juan R at Sa	WS	N	FIELD	
13	1508188-002B	San Juan R at Sa	WS	N	F	
14	1508188-002BMS		WQ	MS	LAB	1508188-002B
15	1508188-002BMSD		WQ	MSD	LAB	1508188-002BMS
16	1508188-002C	San Juan R at Sa	WS	N	FIELD	
17	1508188-002CMS		WQ	MS	LAB	1508188-002C
18	1508188-002CMSD		WQ	MSD	LAB	1508188-002CMSS
19	1508188-003A	San Juan River at	WS	N	FIELD	
20	1508188-003B	San Juan River at	WS	N	FIELD	
21	1508188-003C	San Juan River at	WS	N	FIFI D	

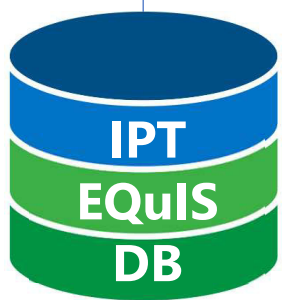
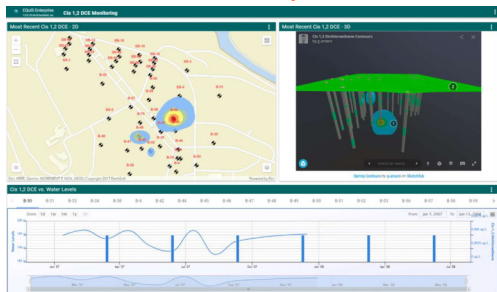


# Reporting Workflow



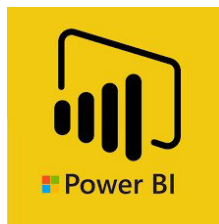
# Análise

EQiS Enterprise



Analyte	LTDW Levels	STDW Levels	4952942 13 Aug 2015	4952942 15 Aug 2015	4952942 16 Aug 2015	4952942 17 Aug 2015
Aluminum	5000	20000	42900	154000	91000	26200
Arsenic	100	2000	18.4	36.6	22	9.76
Cadmium	10	50	1.47	2.88	1.52	0.737
Chromium	1000	1000	15.6	15.3	40.5	11.3
Cobalt	50	5000	32.3	63.1	45.4	16.2
Copper	200	5000	68.8	19.2	104	39.4
Iron	5000	20000	23000	54000	64500	18300
Lead	5000	10000	83.4	175	105	43.8
Manganese	200	10000	2960	5740	2850	1240
Mercury			0.185	0.33	0.228	0.0983
Molybdenum	10	50	0.56	0.734	0.623	1.04
Nickel	200	2000	35.7	110	65.8	20.8
Selenium	20	20	1.39	1.38	1.88	1.11
Vanadium	100	1000	64.3	116	89.8	40.2
Zinc	2000	10000	182	294	477	105

EQiS Professional



SDA

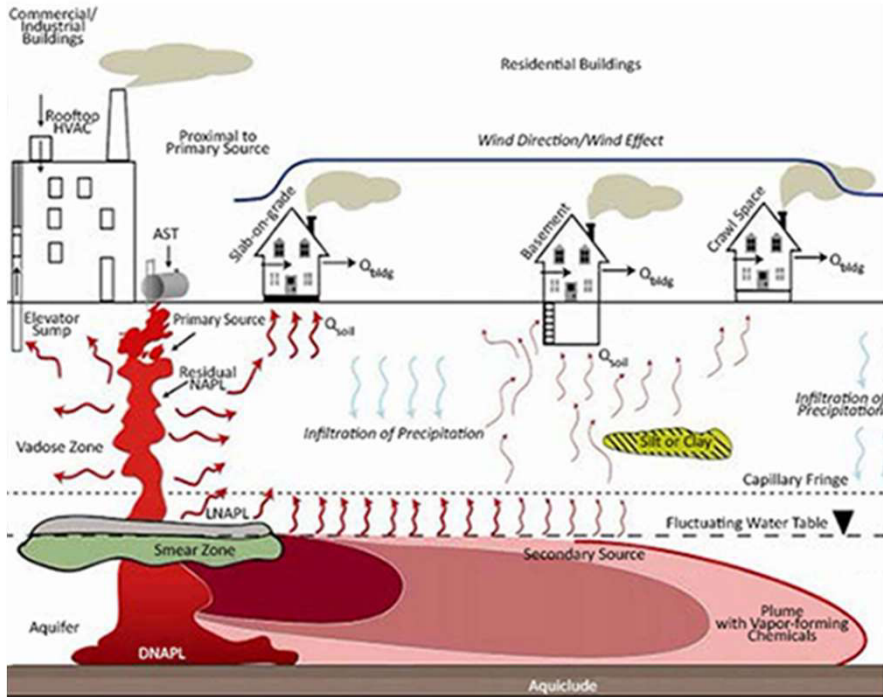


OneDrive

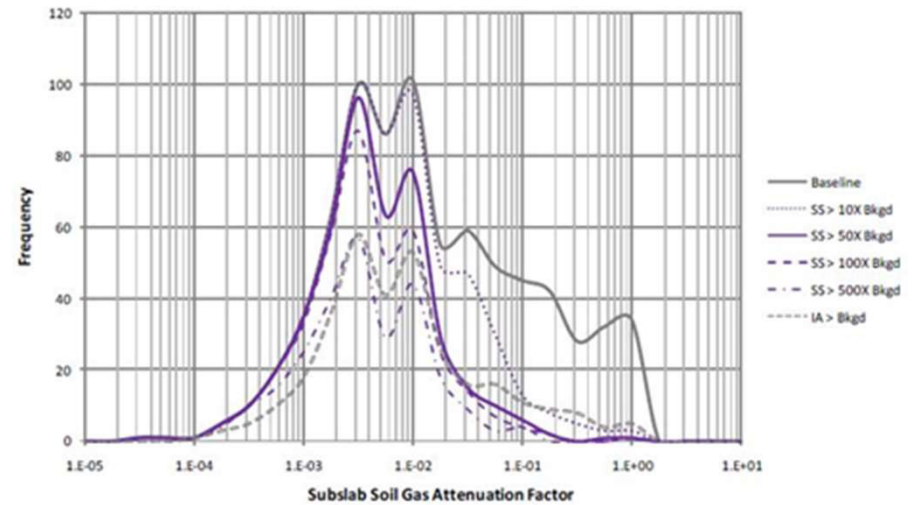
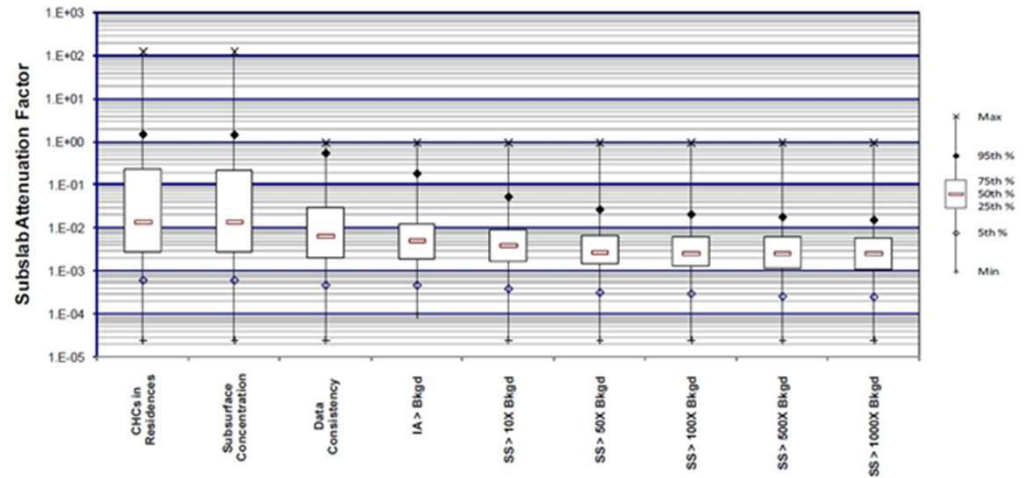




# Estudo de Caso



$$AF_{VI} = \frac{C_{IA-VI}}{C_{SV}}$$



# Estudo de Caso

	FACILITY_ID	FACILITY_CODE	SYS_LOC_CODE	LOC_NAME	SAMPLE_ID	SYS_SAMPLE_CODE	SAMPLE_NAME	SAMPLE_DATE	SAMPLEDATE
0	347	ZB	PMG-25A	NaN	1795	SB1906172.007	2019_09_23_PMG-25A_N_SS	2019-09-23 12:00:00	2019-09-23
1	347	ZB	PMG-25A	NaN	1795	SB1906172.007	2019_09_23_PMG-25A_N_SS	2019-09-23 12:00:00	2019-09-23
2	347	ZB	PMG-25A	NaN	1795	SB1906172.007	2019_09_23_PMG-25A_N_SS	2019-09-23 12:00:00	2019-09-23
3	347	ZB	PMG-25A	NaN	1795	SB1906172.007	2019_09_23_PMG-25A_N_SS	2019-09-23 12:00:00	2019-09-23
4	347	ZB	PMG-25A	NaN	1795	SB1906172.007	2019_09_23_PMG-25A_N_SS	2019-09-23 12:00:00	2019-09-23
...	...	...	...	...	...	...	...	...	...
66796	11326	FACILITY-6	PCP-64_43803	PCP-64	11562	64_43803_4380905760BIOAN	PCP-064	2019-12-10 13:49:00	2019-12-10
66797	11326	FACILITY-6	PCP-64_43803	PCP-64	11562	64_43803_4380905760BIOAN	PCP-064	2019-12-10 13:49:00	2019-12-10
66798	11326	FACILITY-6	PCP-64_43803	PCP-64	11562	64_43803_4380905760BIOAN	PCP-064	2019-12-10 13:49:00	2019-12-10
66799	11326	FACILITY-6	PCP-64_43803	PCP-64	11562	64_43803_4380905760BIOAN	PCP-064	2019-12-10 13:49:00	2019-12-10
66800	11326	FACILITY-6	PCP-64_43803	PCP-64	11562	64_43803_4380905760BIOAN	PCP-064	2019-12-10 13:49:00	2019-12-10

➤ 66801 Linhas de Resultados Analíticos

➤ 1500 Amostras

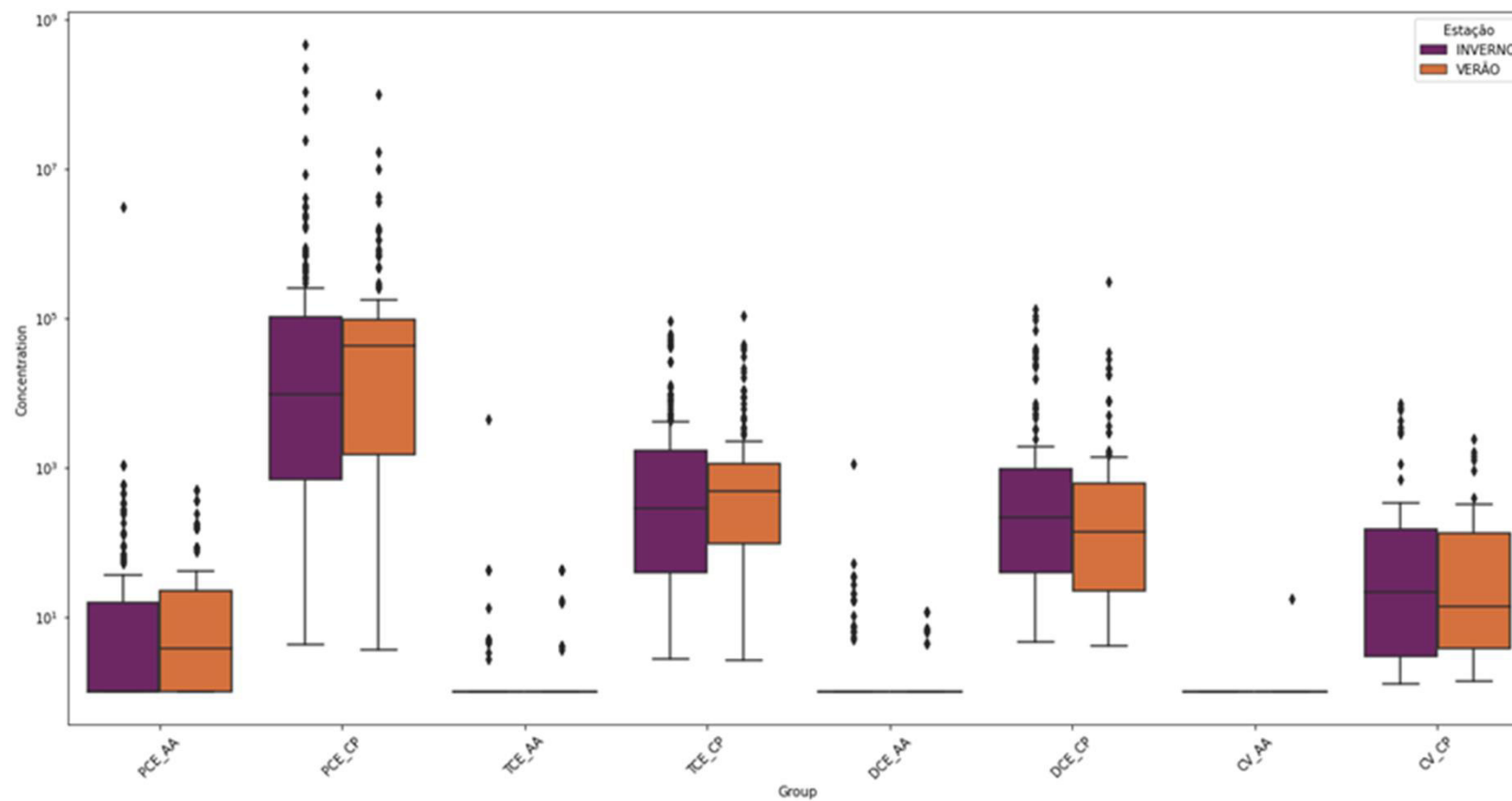
➤ 8 Facilities

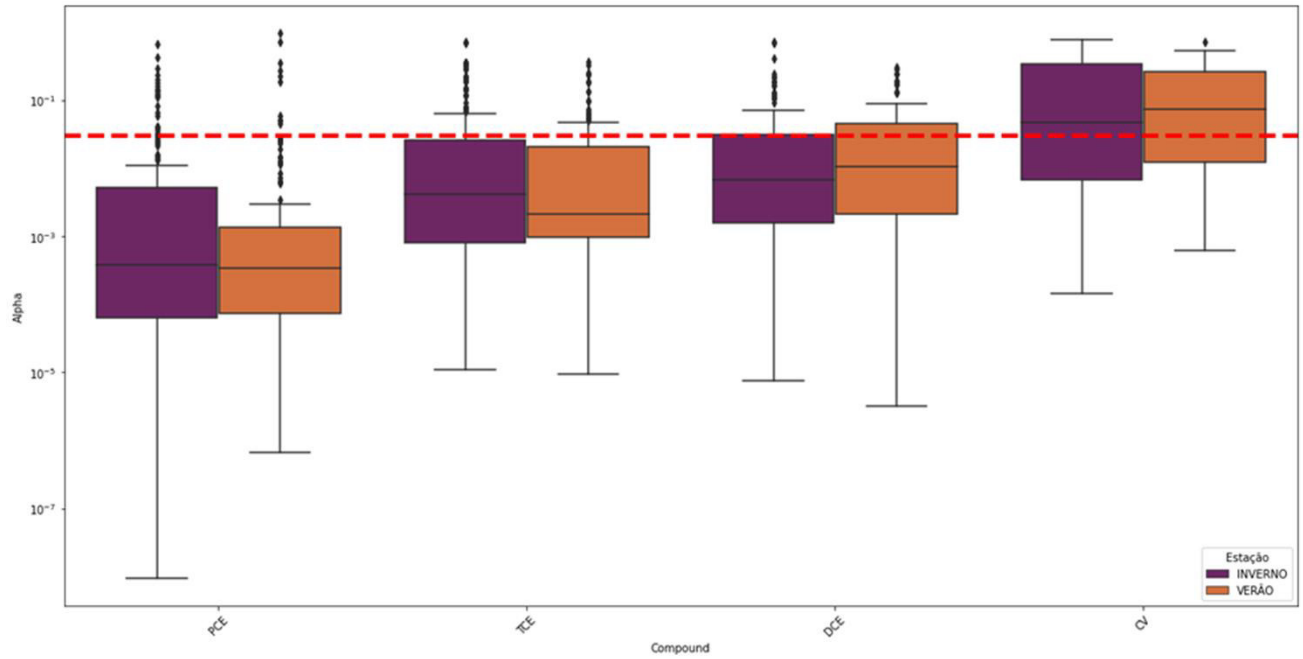
➤ 426 Pares Agrupados

➤ PCE, TCE, DCE e CV

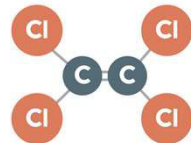
66801 rows × 68 columns

# Estudo de Caso

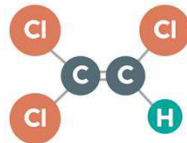




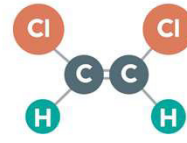
**PCE**  
Tetrachloroethene  
 $C_2Cl_4$



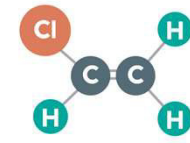
**TCE**  
Trichloroethene  
 $C_2HCl_3$



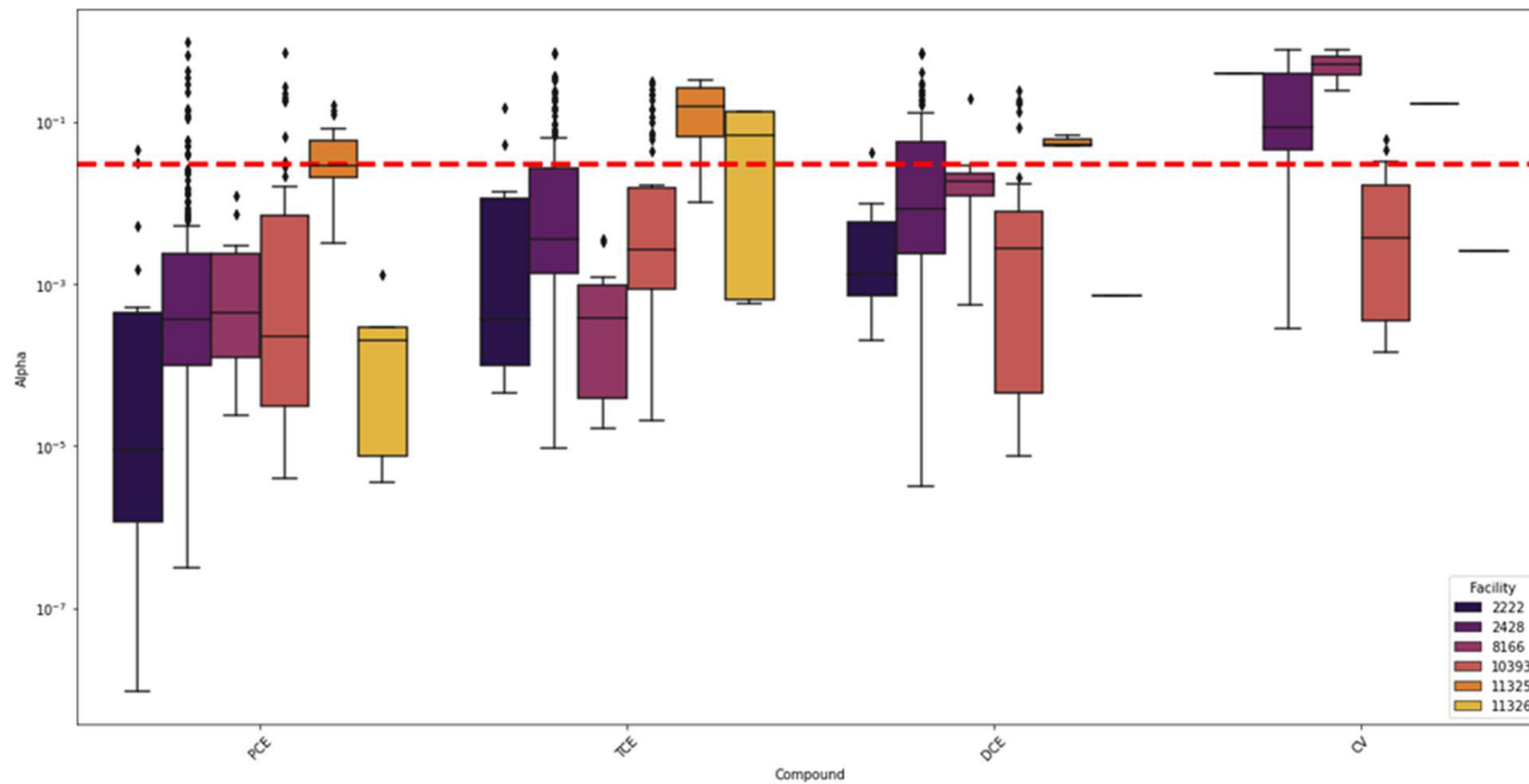
**cis-DCE**  
Dichloroethene  
 $C_2H_2Cl_2$



**VC**  
Vinyl Chloride  
 $C_2H_3Cl$



# Estudo de Caso



# Estudo de Caso

