Air Quality Monthly Report

December, 2023

Department of Environment
Ministry of Environment, Forest and Climate Change
Bangladesh

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Introduction:

Department of Environment (DoE), Bangladesh has established a countrywide air quality monitoring (AQM) network. The continuous monitoring of 6 (six) criteria pollutants ($PM_{2.5}$, PM_{10}, SO_2, CO, NOx and O_3) is being done by 31(thirty one) Continuous Air Monitoring Stations (CAMS) and Compact Continuous Air Monitoring Stations (C-CAMS) located in the divisional and industrial districts of the country; The network encompasses all the regions of the country - Dhaka, Narayanganj Gazipur, Savar, Mymensing, Narsindi in the center, Chittagong in the south-east. Khulna Cumilla and Barisal in the south, Rajshahi in the west, and Sylhet in the north-east regions, Rangpur in the north west of the country. And C-CAMS are located in Faridpur, Jashore, Satkhira, Bagerhat, Gopalganj, Tangail, Bogura, Tongi, BUET campus, Brahmanbaria, Feni, Noakhali, BSRM (Chattogram), Cox's-Bazar, Nagor Bhaban, Dhaka. The data and information generated from those stations are automatically collected in the central server and are disseminated through DoE website. Air Quality Index (AQI) for each city is calculated and published online daily for notifying the public about the status of air quality in their respective city.

Quality Assurance/Quality Control (QA/QC) methods and procedures are implemented with full documentation and are validated through an international certified calibration reference laboratory. Forms and log sheets document every activity in the air monitoring stations and document all maintenance, calibration, operation and other activities such as all visits to the stations. This monthly report provides an overview and analysis of air quality monitoring data in Bangladesh for the month wise monitoring results.

The report summarizes the data of different CAMS located in different cities of Bangladesh.

Standards of Ambient Air Quality

The Government of Bangladesh has enacted Air Pollution (Control) Rules – 2022 with ambient air quality standards. This report establishes the Air Quality Index (AQI) followed by USEPA guideline to evaluate air pollution.

Table 1: National Ambient Air Quality Standards (NAAQS) for Bangladesh

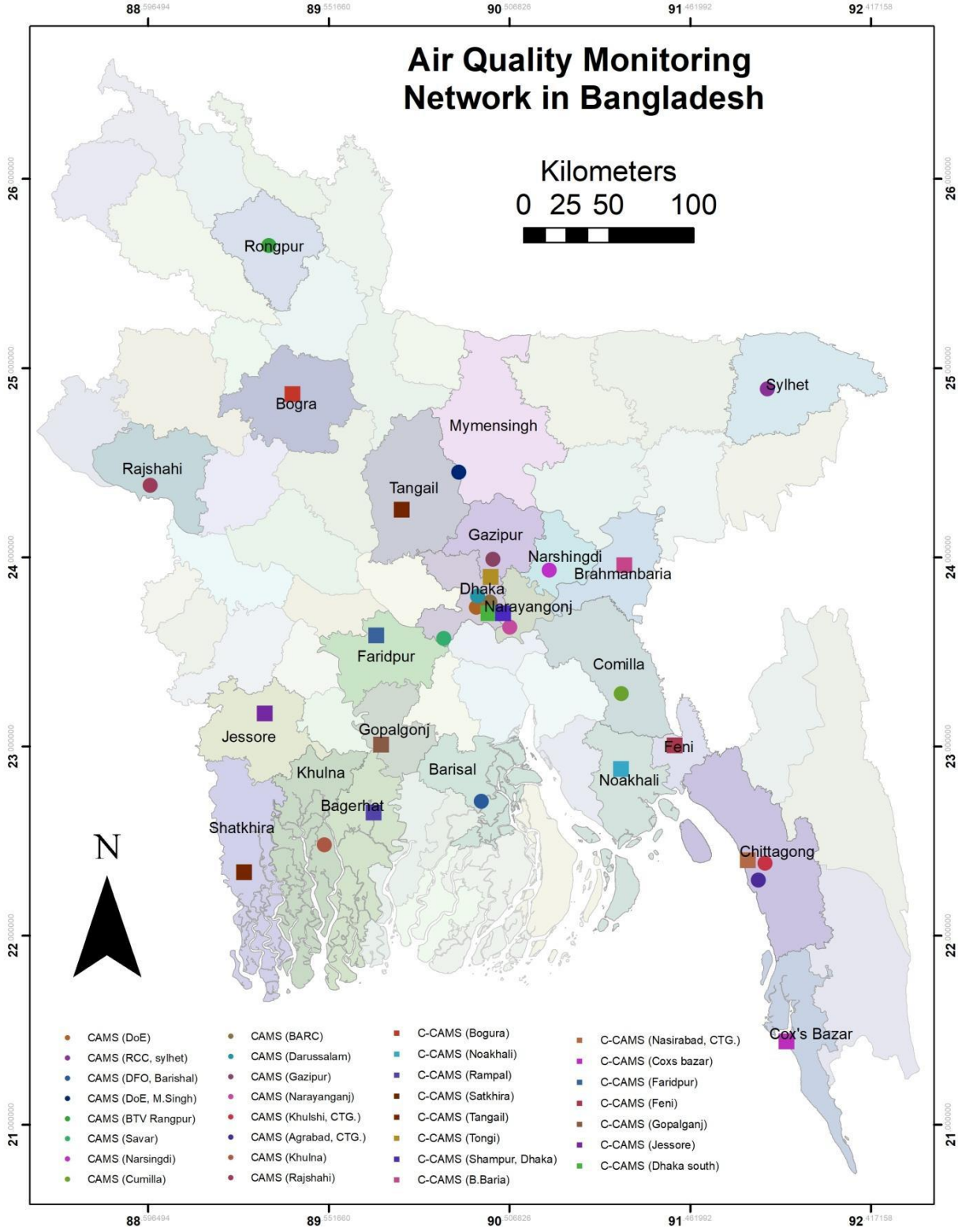
Pollutant	Limit Value	Averaging time
CO	5 mg/m^3	8 hours[a]
	20 mg/m^3	1 hour[a]
Pb	0.25 µg/m^3	Annual
	0.50 µg/m^3	24 hours
NO_x	40 µg/m^3	Annual
	80 µg/m^3	24 hours
PM_{10}	50 µg/m^3	Annual[b]
	150 µg/m^3	24 hours[c]
$PM_{2.5}$	35 µg/m^3	Annual
	65 µg/m^3	24 hours
O_3	180 µg/m^3	1 hour[d]
	100 µg/m^3	8 hours
SO_2		Annual
	80 µg/m^3	24 hours[a]

Table 2: Air quality index (AQI) in Bangladesh

Air quality index (AQI)	Category		Colour
	In English	In Bangla	
0-50	Good	ভাল	Green
51-100	Moderate	মধ্যম	Yellow Green
101-150	Caution	সাবধানতা/সতর্কীকরণ	Yellow
151-200	Unhealthy	অস্বাস্থ্যকর	Orange
201-300	Very Unhealthy	খুব অস্বাস্থ্যকর	Red
301-500	Extremely Unhealthy/Hazardous	অত্যন্ত অস্বাস্থ্যকর	Purple

Location Map of Air Monitoring Stations

Figure 1: Locations Map of Continuous Air Monitoring Stations (CAMS) under Department of Environment in Bangladesh.



Station Information

Table 3: Overview of the locations and capacity of the CAMS

City	ID	Location	Latitude/ Longitude	Monitoring Capacity	Year of Est.	Type	Inlet & Met tower Height(m)
Dhaka	CAMS-1	Dept of Environment	23°.77'73.94"N 90°.37'26.03"E	PM_{10}, $PM_{2.5}$, SO_2, CO, O_3 & NOx with Meteorological Parameters	2012	UB/Res	4.8 & 8
	CAMS-2	Farmgate	23°.75'94.10"N 90°.38'86.79"E		2008	Rd/Com	8.8 & 11
	CAMS-3	Darussalam	23°.78'07.75"N 90°.35'54.10"E		2012	UB/Com	8.8 & 11
Gazipur	CAMS-4	Gazipur	23°.99'41.28"N 90°.42'23.15"E		2012	SUB	8.8 & 11
Narayanganj	CAMS-5	Narayanganj	23°.62'60.79"N 90°.50'72.00"E		2012	UB industry	8.8 & 11
Chattogram	CAMS-6	TV Station, Khulshi	22°.36'04.87"N 91°.80'04.54"E		2006	UB1	4.8 & 7
	CAMS-7	Agrabad	22°.32'30.20"N 91°.80'23.36"E		2012	UB/Res	8.8 & 11
Khulna	CAMS-8	Boyra	22°.83'57.75"N 89°.52'90.56"E		2008	UB	6.8 & 10
Rajshahi	CAMS-9	Sapura	24°.38'33.20"N 88°.60'80.07"E		2008	Rd/Res	6.8 & 10
Sylhet	CAMS-10	Red Crecent Campus	24°.88'83.34"N 91°.86'73.47"E		2012	Rd/UB/Res	13.8 & 15
Barishal	CAMS-11	DFO Office Campus	22°.71'02.87"N 90°.36'25.98"E		2012	UB/Res	6.8 & 10
Mymensingh	CAMS-12	DoE Office, Divisional Headquarter	24°.76'24.58"N 90°.40'21.02"E		2019	UB	8.8 & 11
Rangpur	CAMS-13	BTV Rangpur Station	25°.74'73.71"N 89°.22'89.31"E		2019	UB	8.8 & 11
Savar	CAMS-14	Atomic Energy Research Institute	23°.95'37.04"N 90°.27'97.94"E		2019	SUB	10.8 & 14
Narsingdi	CAMS-15	Sadar Upazila Complex	23°.93'24.56"N 90°.71'65.98"E		2019	SUB	8.8 & 11
Cumilla	CAMS-16	Court Area	23°.47'29.88"N 91°.18'06.71"E		2019	UB	8.8 & 11

UB: Urban; Rd: Road; Res: residential; Com: Commercial; SUB: Suburban; Rural: Rural

Table 4: Overview of the locations and capacity of the C-CAMS

City	ID	Location	Lat/Lon	Year of Est.	Type	Monitoring Capacity	Inlet & Met tower Height(m)
Faridpur	C-CAMS-17	Sadar, Faridpur (Municipal Office)	23°.60'64.11"N 89°.83'88.19"E		SUB		9 & 11
Jashore	C-CAMS-18	Sadar, Jashore (circuit house)	23°.16'22.16"N 89°.20'63.70"E		SUB		12 & 14
Satkhira	C-CAMS-19	Shyamnagar, Satkhira	22°.31'59.96"N 89°.04'31.70"E		Rural		5.2 & 7.2
Bagerhat	C-CAMS-20	Rampal, Bagerhat (Maytree Super Thermal Power Project)	22°.59'60.86"N 89°.55'37.20"E		Rural/Industrial		5.7 & 7.7
Gopalganj	C-CAMS-21	Sadar, Gopalganj	23°.00'88.53"N 89°.82'91.60"E		SUB		22 & 24
Tangail	C-CAMS-22	Sadar, Tangail (DoE office)	24°.24'97.96"N 89°.92'93.57"E		SUB		15 & 17
Bogura	C-CAMS-23	Sadar, Bogura (DoE Office)	24°.86'17.79"N 89°.36'11.46"E		SUB		9 & 11
Tongi	C-CAMS-24	BSCIC, Tongi, Gazipur	23°.89'41.74"N 90°.41'12.10"E		Com/ Industrial	PM_{10}, $PM_{2.5}$, SO_2, CO, O_3& NOx with Meteorological Parameters	18 & 20
BUET	C-CAMS-25	Department of Chemical Engineering, BUET, Dhaka	23°.72'75.91"N 90°.39'27.97"E	2020	UB		10 & 12
Brahmanbaria	C-CAMS-26	Sadar, B.Baria (municipal Office)	23°.97'43.71"N 91°.10'97.69"E		SUB		18 & 20
Feni	C-CAMS-27	Sadar, Feni (DoE Office)	23°.00'62.97"N 91°.38'13.05"E		SUB		18 & 20
Noakhali	C-CAMS-28	Maijdi Bazar, Noakhali (DoE Office)	22°.88'11.48"N 91°.09'69.66"E		SUB		15 & 17
Chattogram BSRM	C-CAMS-29	BSRM, Nasirabad, Chattogram	22°.37'28.38"N 91°.81'80.54"E		UB/Industrial		12 & 14
Cox's-Bazar	C-CAMS-30	Saymon Road, Sadar, Cox's-Bazar (DoE Office)	21°.44'22.08"N 91°.97'10.83"E		SUB		9 & 11
Nagor Bhaban, Dhaka	C-CAMS-31	Nagar Bhaban, DSCC, Dhaka	23°.72'40.75"N 90°.40'91.42"E		UB/Com		13 & 15

UB: Urban; Rd: Road; Res: residential; Com: Commercial; SUB: Suburban; Rural: Rural

Summary of Components
Month of December, 2023

Table 5: Summary of components_ Month of December, 2023

Parameter	Summary	DoE	BARC	Darus-salam, Dhaka	Gazipur	Narayanganj	TV-Station, Chattagram	Agrabad, Chattagram	Sylhet	Khulna	Rajshahi	Barisal	Savar	Mymensingh	Rangpur	Cumilla	Narshingdi
SO_2 -24 hr (ppb)	Average	15.9	3.3	16.8	10.3	DNA	3.9	7.3	7.0	6.0	5.6	11.3	5.7	DNA	3.0	6.9	2.4
	Max	32.4	4.7	19.4	10.5	DNA	7.5	8.4	7.4	16.6	13.9	14.5	17.7	DNA	5.3	22.4	3.3
	Min	4.2	1.9	14.3	10.0	DNA	2.3	4.7	6.3	0.1	0.6	10.6	0.7	DNA	1.1	0.7	1.7
	Excedance(Days)	2.0	0.0	0.0	0.0	DNA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	DNA	0.0	0.0	0.0
	Data capture(%)	90.3	41.9	6.5	87.1	DNA	71.0	100.0	100.0	96.8	100.0	90.3	100.0	DNA	77.4	100.0	100.0
NO2 -24 hr (ppb)	Average	3.5	93.3	8.0	0.2	DNA	4.4	7.3	DNA	3.7	2.8	4.1	4.0	1.5	DNA	5.4	6.8
	Max	40.4	116.0	13.8	0.2	DNA	6.6	17.0	DNA	4.0	4.8	10.5	4.1	4.0	DNA	5.5	7.7
	Min	0.2	58.0	1.7	0.2	DNA	3.9	1.9	DNA	3.6	1.7	0.4	3.9	0.2	DNA	5.4	4.1
	Excedance(Days)	0.0	31.0	0.0	0.0	DNA	0.0	0.0	DNA	0.0	0.0	0.0	0.0	0.0	DNA	0.0	0.0
	Data capture(%)	87.1	100.0	100.0	100.0	DNA	61.3	100.0	DNA	100.0	100.0	100.0	83.9	12.9	DNA	12.9	100.0
CO-8hr (ppm)	Average	2.5	1.7	13.2	6.5	0.9	DNA	3.9	7.9	1.0	3.9	DNA	1.0	1.4	1.3	DNA	0.8
	Max	4.1	4.3	20.0	8.5	1.3	DNA	5.1	18.7	2.0	10.7	DNA	2.0	5.1	3.8	DNA	1.9
	Min	1.0	0.0	7.6	1.4	0.7	DNA	3.2	1.3	0.2	0.1	DNA	0.3	0.0	0.5	DNA	0.3
	Excedance(Hour)	11.0	4.0	737.0	63.0	0.0	DNA	240.0	624.0	0.0	319.0	DNA	0.0	6.0	0.0	DNA	0.0
	Data capture(%)	78.6	98.0	99.1	9.5	98.8	DNA	84.3	98.8	98.8	98.5	DNA	99.1	97.2	99.1	DNA	99.1
O_3-8hr (ppb)	Average	DNA	5.1	4.4	5.6	5.6	13.1	2.5	3.0	8.0	9.8	112.5	13.1	7.1	37.5	8.4	5.0
	Max	DNA	12.9	4.6	7.6	12.0	45.6	2.6	4.3	24.4	24.7	119.6	36.8	25.5	108.5	31.8	15.8
	Min	DNA	0.8	4.3	5.0	2.8	2.1	2.4	0.2	3.2	0.2	25.8	4.9	0.4	1.5	0.5	0.1
	Excedance(Hour)	DNA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.0	0.0	0.0	131.0	0.0	0.0
	Data capture(%)	DNA	98.1	98.9	98.9	40.6	99.1	95.7	52.0	98.8	99.1	7.8	99.1	99.1	79.2	99.1	99.1
$PM_{2.5}$ -24hr (ug/m3)	Average	123.3	94.9	163.3	160.2	227.3	93.0	106.6	20.0	115.1	122.7	104.2	167.9	143.4	177.1	76.1	151.9
	Max	190.2	172.4	250.7	243.0	347.5	172.5	237.0	35.5	184.7	238.3	148.4	243.1	260.7	280.6	219.1	227.5
	Min	15.7	16.3	47.8	31.7	55.0	17.6	39.1	13.2	25.6	45.5	32.5	33.5	24.5	89.9	26.2	31.8
	Excedance(Days)	27.0	22.0	29.0	20.0	30.0	22.0	22.0	0.0	27.0	29.0	29.0	30.0	30.0	31.0	16.0	30.0
	Data capture(%)	93.5	100.0	100.0	71.0	100.0	100.0	100.0	67.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PM_{10} -24hr (ug/m3)	Average	199.4	183.7	237.1	257.5	347.9	174.8	166.6	134.7	145.7	229.7	192.2	223.8	295.3	247.7	160.9	195.6
	Max	292.2	299.3	408.0	368.7	570.5	312.1	303.6	205.5	212.8	423.0	460.5	334.0	455.1	357.1	176.1	260.6
	Min	22.1	120.4	58.1	50.9	71.4	44.6	68.3	45.7	29.1	11.8	45.3	46.6	44.5	144.9	138.3	139.6
	Excedance(Days)	24.0	1.0	26.0	29.0	29.0	18.0	17.0	9.0	16.0	27.0	19.0	28.0	29.0	30.0	3.0	16.0
	Data capture(%)	93.5	9.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	77.4	100.0	100.0	100.0	12.9	54.8
Solar rad. 1hr (W/m2)	Average	83.12	145.24	51.4	13.4	DNA	440.0	127.1	DNA	348.6	795.1	64.3	189.8	167.6	270.3	181.8	233.6
	Max	456.47	483.8	1020.0	30.7	DNA	543.8	619.1	DNA	984.2	1084.1	364.6	620.1	576.2	756.5	548.7	705.3
	Min	19.84	0.1	1008.7	11.1	DNA	21.9	9.0	DNA	0.1	759.1	8.3	0.0	0.0	0.1	0.0	0.0
	Data capture(%)	68.68	45	52	97	DNA	99	95	DNA	76	96	99	57.9	51.6	50.4	55.4	52.8
Relative Humidity 1hr (%)	Average	60.89	76.7	74.3	DNA	DNA	57.9	72.8	DNA	75.1	90.1	62.9	60.3	90.8	83.1	92.0	44.9
	Max	89.08	100.0	96.6	DNA	DNA	79.4	98.5	DNA	94.5	92.3	68.3	100.0	99.4	99.7	100.0	84.1
	Min	38.52	43.9	37.2	DNA	DNA	57.1	33.8	DNA	59.6	89.8	55.0	15.1	45.2	37.9	19.4	17.0
	Data capture(%)	68.55	52.2	98.8	DNA	DNA	100	95	DNA	100	96	99	72.6	99.7	100.0	91.8	99.3
Ambient Temp. 1hr (degreeC)	Average	31.37	18.1	22.9	DNA	DNA	22.6	27.3	DNA	21.7	22.2	19.9	20.1	19.8	19.3	20.5	20.3
	Max	42.90	26.3	29.3	DNA	DNA	35.1	43.0	DNA	30.7	31.7	32.9	29.6	28.1	28.6	30.3	29.6
	Min	8.75	11.2	18.2	DNA	DNA	14.9	7.1	DNA	15.2	15.5	10.4	15.4	12.2	12.2	13.3	13.5
	Data capture(%)	30.91	73.8	97	DNA	DNA	100	62	DNA	100	96	99	18.1	98.4	99.9	98.1	99.6
Rainfall 1hr (mm)	Average	DNA	DNA	0.80	0.26	DNA	DNA	DNA	DNA	DNA	DNA	0.33	0.04	1.24	0.01	DNA	0.04
	Max	DNA	DNA	0.80	0.68	DNA	DNA	DNA	DNA	DNA	DNA	0.94	0.14	18.72	0.02	DNA	0.16
	Min	DNA	DNA	0.60	0.01	DNA	DNA	DNA	DNA	DNA	DNA	0.01	0.01	0.01	0.01	DNA	0.01
	Data capture(%)	DNA	DNA	28.76	41.53	DNA	DNA	DNA	DNA	DNA	DNA	90.99	3.09	54.97	1.21	DNA	2.82

CAMS= Continuous Air Monitoring Station, NAAQS=National Ambient Air Quality Standard, a=Refurbisment CAMS, PM= Particulate Matter

DNA= Data Not Available

Table 6: Air Quality Index (AQI), Month of December, 2023

Date	Dhaka	Chittagong	Gazipur	Narayangonj	Sylhet	Khulna	Rajshahi	Barisal	Savar	Mymensingh	Rangpur	Cumilla	Narsingdi
01-12-23	163	154	122	284	81	152	166	173	188	165	208	129	148
02-12-23	146	160	118	217	85	163	288	158	181	167	214	150	193
03-12-23	162	107	112	220	91	184	239	157	168	159	230	138	102
04-12-23	174	131	127	231	78	156	198	174	187	195	249	135	198
05-12-23	172	116	138	235	73	108	175	153	208	188	239	157	200
06-12-23	159	107	209	220	82	151	148	163	197	176	250	133	185
07-12-23	129	90	171	170	68	81	116	128	161	160	213	82	163
08-12-23	66	53	79	114	82	160	94	94	86	74	178	75	88
09-12-23	200	113	174	202	107	155	190	148	187	155	210	107	177
10-12-23	205	168	213	343	60	166	190	176	198	196	226	161	205
11-12-23	236	175	223	344	DNA	188	194	191	263	187	185	148	232
12-12-23	195	178	200	296	DNA	194	234	173	203	184	231	149	186
13-12-23	227	135	282	289	DNA	164	222	178	278	237	251	163	233
14-12-23	228	180	288	367	295	195	233	181	291	274	286	161	277
15-12-23	170	199	254	345	120	194	196	203	258	237	297	170	256
16-12-23	188	206	218	330	112	166	199	197	282	194	297	157	226
17-12-23	195	182	241	316	103	207	205	195	236	229	285	152	232
18-12-23	194	144	262	338	83	187	200	193	235	256	252	135	221
19-12-23	210	147	234	289	81	185	188	185	237	185	272	125	219
20-12-23	206	154	209	326	81	166	157	200	221	191	250	137	219
21-12-23	202	188	210	321	101	191	183	169	234	181	206	146	195
22-12-23	211	208	214	236	92	195	175	165	229	198	170	133	236
23-12-23	220	193	245	193	84	194	179	179	257	178	168	127	200
24-12-23	218	169	214	231	84	209	196	178	227	207	171	119	200
25-12-23	203	196	226	290	101	234	190	197	252	267	224	162	229
26-12-23	225	227	295	298	123	210	201	227	311	260	260	157	253
27-12-23	229	216	269	288	113	218	164	204	287	263	250	170	229
28-12-23	192	250	189	273	71	201	164	186	224	212	242	267	189
29-12-23	178	183	187	293	61	165	167	169	237	215	212	195	185
30-12-23	188	150	169	264	67	DNA	149	159	233	192	206	176	183
31-12-23	202	173	DNA	306	65	181	136	186	221	213	179	206	200

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