Appendix - Calculations

The following tables summarize corrosion, rainfall, atmospheric deposition, runoff, and BMP cost estimates that were made as part of this study.

Calculations in these appendices are presented to three or four decimal places in order to show the arithmetic involved, not to imply that the estimates have an accuracy to that many significant digits.

Dry Deposition Data For Exhibit 8

Dry Deposition	Sample 1 Concentration (ug/L) in 10 mls	ug/ Sample	SAMPLE 1 µg/M2/DAY	Sample 2 Concentration (ug/L) in 10 mls	ug/sample	SAMPLE 2 µg/M2/DAY	AVERAGE OF ALL VALUES µg/M2/DAY
8/31/99	10.9	0.109	2.2	9.5	0.095	1.9	2.0
9/14/99	7.4	0.074	1.5	8.6	0.086	1.7	1.6
9/28/99	22.3	0.223	4.5	17.7	0.177	3.5	4.0
10/13/99	7.3	0.073	1.5	7.4	0.074	1.5	1.5
10/26/99	1.8	0.018	0.4	2.4	0.024	0.5	0.4
11/9/99	11.3	0.113	2.3	9.0	0.090	1.8	2.0
11/23/99	9.4	0.094	1.9	11.0	0.110	2.2	2.0
12/7/99	8.1	0.081	1.6	16.1	0.161	3.2	2.4
12/21/99	11.0	0.110	2.2	10.4	0.104	2.1	2.1

Average Dry Deposition (µg/sqm/day):	2.0

Average Dry Deposition (µg/sqm/yr):	728

Source: Pam Tsai, SFEI, via e-mail 6/19/00 [16]

A photo of the SFEI dry deposition test stand is at <http://www.sfei.org/rmp/reports/air_dep/air_dep.html>.

Wet Deposition Data For Exhibit 8 and 12

Wet Deposition Data*	Gauge (inches)	(mm)	(ng/l)	(ng/sqm)
09/14/99-09/28/99	0.00		na	na
09/28/99-10/13/99	0.00		na	na
10/13/99-10/26/99	0.00		na	na
10/26/99-11/09/99	0.78	19.69	317	5,357
11/09/99-11/23/99	0.27	6.86	699	4,580
11/23/99-12/07/99	0.19	4.70	676	3,017

Extrapolation Of Copper Deposition Via Rainfall For Palo Alto Service Area ***

	µg/sqm/2wks	µg/sqm/rain hr**	µg/sqm/yr
10/26/99-11/09/99	5.4	0.16	163
11/09/99-11/23/99	4.6	0.14	138
11/23/99-12/07/99	3.0	0.09	90.4

Average Wet Deposition (µg/sqm/rain hour):	0.13

Average Wet Deposition (µg/sqm/yr):	130

* Source: Pam Tsai, SFEI, via e-mail 6/19/00 [16]

** Assumed that rain fell 10% of the time (1,012 hr/yr), as was observed at Station PAA from 1/6/00 - 6/6/00.

*** These data from late 1999 are extrapolated into 2000.

Copper Release From Unit Area Of Algae-Resistant Shingles

Results of tests at Palo Alto RWQCP - 2000.

Weather Station PAA Rainfall Data

Date	Time	∑ ∂t	Rainfall	Event			Accum		
	24hrt	hr	hr	in	m	liters[1]	in	m	liters [1]
3/23/00									
4/13/00	4:23	12.2	12.2	0.24	0.0061	6.95	0.24	0.0061	6.9
4/14/00	6:51	26.5	26.3	0.07	0.0018	2.03	0.31	0.0079	9.0
4/17/00	7:13	72.4	48.4	0.35	0.0089	10.13	0.66	0.0168	19.1
5/8/00	14:27	21.3	26.7	0.12	0.0030	3.47	0.78	0.0198	22.6
5/15/00	12:43	166.3	7.7	0.19	0.0048	5.50	0.97	0.0246	28.1
5/16/00	18:00	3.0	7.1	0.12	0.0030	3.47	1.09	0.0277	31.6
6/9/00	15:30	452.5	9.9	0.24	0.0061	6.95	1.33	0.0338	38.5

Results of Composition Shingle Runoff Tests

		Measured Copper Concentrations					
		Open Container [5]		Plain Roof [5]		Algae-Resist	
Date	Time	Total	Dissolved	Total	Dissolved	Total	Dissolved
	24hrt	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
3/23/00	Pair of 1.14 sqm roof panels installed @ RWQCP.						
4/13/00	4:23	• • •	• • •	26	19	406	386
4/14/00	6:51	• • •	• • •	13	15	182	173
4/17/00	7:13	66	23	10	10	615	96
5/8/00	14:27	16	10	42	28	952	973
5/15/00	12:43	38	27	21	11	238	163
5/16/00	18:00	94	12	21	25	145	137
6/9/00	15:30	59	• • •	15	• • •	629	• • •

Estimate of Copper Releases - Based Upon Weather Station PAA Rainfall Data

Date	Plain Shingle Roof [5]				Algae-Resist Shingle Roof			
	[1]	[2]	[3]	[4]		[2]	[3]	[4]
	ml	µg	µg/sqm/d	g/sqm/yr	ml	µg	µg/sqm/d	g/sqm/yr
4/13/00	6,949	178	307	0.0129	6,949	2,821	4,869	0.2053
4/14/00	2,027	27	22	0.0009	2,027	369	295	0.0125
4/17/00	10,135	101	44	0.0019	10,135	6,233	2,713	0.1144
5/8/00	3,475	147	116	0.0049	3,475	3,308	2,608	0.1100
5/15/00	5,502	114	313	0.0132	5,502	1,309	3,580	0.1510
5/16/00	3,475	72	216	0.0091	3,475	504	1,505	0.0634
6/9/00	6,949	105	223	0.0094	6,949	4,368	9,288	0.3916
		Average:	170	0.0075		Average:	2,595	0.1497

Estimate of Copper Releases - Based Upon RWQCP Test Stand Rainfall Data

Date	Plain Shingle Roof [5]				Algae-Resist Shingle Roof			
	ml	µg	µg/sqm/d	g/sqm/yr	ml	µg	µg/sqm/d	g/sqm/yr
4/13/00	6,521	166.9	288	0.0121	5,434	2206	3,807	0.1605
4/14/00	1,813	24.1	19	0.0008	2,517	458	367	0.0155
4/17/00	9,438	94.4	41	0.0017	10,525	6473	2,817	0.1188
5/8/00	5,834	246.2	194	0.0082	5,834	5554	4,379	0.1847
5/15/00	7,608	158.2	433	0.0182	7,608	1811	4,951	0.2088
5/16/00	5,091	105.9	316	0.0133	5,091	738	2,204	0.0930
6/9/00	6,178	93.3	198	0.0084	9,038	5680	12,079	0.5094
		Average:	215	0.0090		Average:	3,088	0.1844
Used in Study:		**Average:**	**tbd**	**tbd**		**Average:**	**2,841**	**0.167**

[1] vol (liters) = rainfall (m) * 1.14 sqm * 1,000 (l / cubic m)

[2] µgrams of copper = liters * µg/l

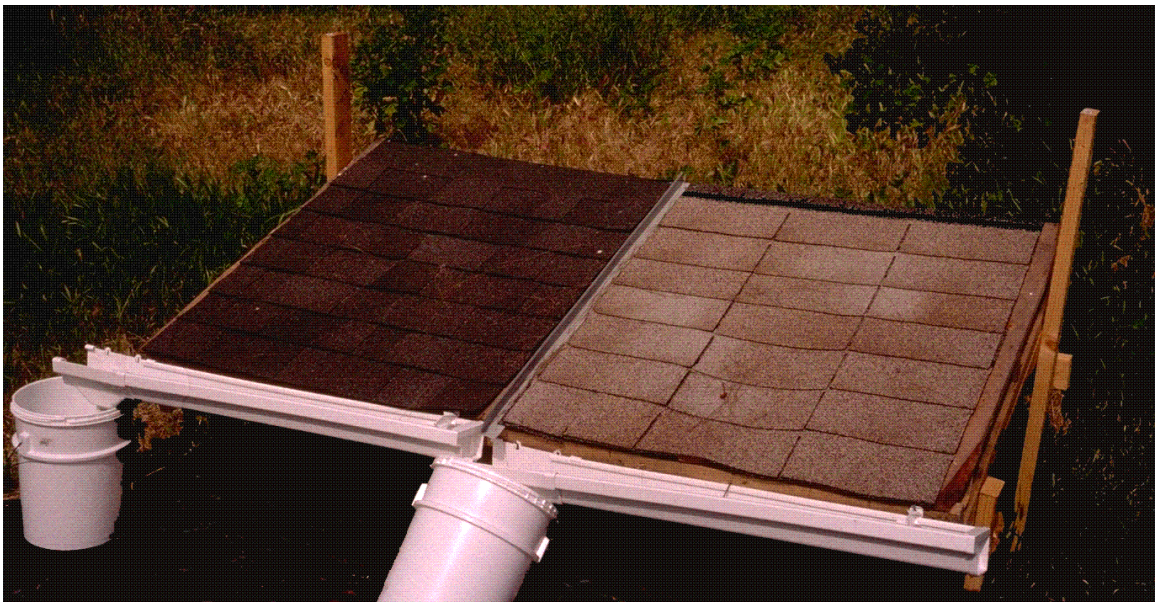
[3] µg/sqm/rain day = (µgrams / 1.14 sqm) / (24 hrs per day / hours of rainfall)

[4] g/sqm/yr = [(µg/sqm) • (1,012 total rainfall hours / hours of this rainfall)] / 1,000,000

[5] Open bucket and plain shingle roof may reflect influence of nearby sludge incinerator at the RWQCP.

Standard and Algae-Resistant Composition Shingles

This photo shows the test stand located at the Palo Alto RWQCP that was used to measure copper in rainfall runoff. Each side of the test stand measures about 1.1 sqm. The left half of the stand is covered with standard shingles, while the right half is covered with algae-resistant shingles.



Service Area Copper Release Used In Exhibit 14

	Residential	Industrial	Other	Open Land	Total
Roof Areas					
Roof area as % of land area	30%	50%	50%		
No. of Structures	138,516	536	612		
Area of All Roofs (sqm)	32,135,621	5,355,937	6,121,071		43,612,628
Copper Roofs					
% of All Roof Area	0.05%	0.30%	1.50%		
No. of Structures	69	17	9		
Roof sqm	16,068	16,068	91,816		123,952
Cu Release (g/sqm/yr)	1	1	1		
Cu Release (g/yr)	16,068	16,068	91,816		**123,952**
Cu Release (lbs/yr)	35	35	202		**273**
Algae-Resistant Composition Shingle Roofs					
% of All Roof Area	0.03%	0.00%	0.00%		
No. of Structures	42	0	0		
Roof sqm	9,641	0	0		9,641
Cu Release (g/sqm/yr)	0.17	0.17	0.17		
Cu Release (g/yr)	1,610	0	0		**1,610**
Cu Release (lbs/yr)	4	0	0		**4**
Regular Composition Shingle Roofs					
% of All Roof Area	60%	10%	0%		
No. of Structures	83,109	54	0		
Roof sqm	19,281,372	535,594	0		19,816,966
Cu Release (g/sqm/yr)	0.008	0.008	0.008		
Cu Release (g/yr)	***158,541***	***4,404***	0		**tbd**
Cu Release (lbs/yr)	***349***	***10***	0		**tbd**
Copper Gutters, Downspouts, Etc.					
% of All Roof Area	0.06%	0.30%	1.88%		
No. of Structures	83	69	495		
Roof sqm	19,281	16,068	114,770		150,119
Feature sqm	632	526	3,760		4,918
Cu Corrosion (g/sqm/yr)	2	2	2		
Cu Release (g/yr)	1,263	1,053	7,519		**9,835**
Cu Release (lbs/yr)	3	2	17		**22**

[1] Land covered by service area = 15,300 ha (37,800 acres) - 1999 Pretreatment Report [42]

[2] Land uses estimated from California Atlas. [29]

[3] Roof % of land areas per Woodward-Clyde [15].

[4] Number of structures: 232 sqm/avg. home & 965 sqm/ avg. other bldg.

[5] "Other" includes large campuses such as Stanford University.

Costs Of BMPs For 10,000 Sqft Office

Capital Cost Estimate - Retrofit Metals Removal System

Technology: Combined Metallic Exchange & Ion Exchange

	Units	Qty	Unit $	Cost
Excavation/Disposal	cy	12	$35.00	$420
Concrete	cy	4	$400.00	$1,600
Paving	sq yd	5	$500.00	$2,500
Piping (0.75- & 3-in. plastic)	ft	250	$1.25	$313
Fittings	lot	1	$50.00	$50
Cistern (55 gal/plastic)	ea	4	$125.00	$500
Pump (1.0 gpm; 110V)	ea	4	$75.00	$300
Conduit	lot	4	$25.00	$100
Wiring	lot	4	$50.00	$200
Cabinet	lot	4	$150.00	$600
Metal Exch. Unit (10 liter/min)	ea	4	$100.00	$400
IX Resin	lot	4	$75.00	$300
			Materials:	$6,983
Laborer	hr	144	$10.00	$1,440
Craftsman	hr	24	$25.00	$600
			Labor:	$2,040
			Permit Fee & Misc.:	$1,350
			Total:	$10,373

Annual Costs (10,000 sqft office building)

	Units	Qty	Unit $	Annual Cost
5-Year Amortization	lot	0.20	$10,373	$2,075
Electricity (350 hrs/yr)	kWhr	524	$0.15	$79
Maintenance	hr	12	$10.00	$120
ME & IX Ctgs (4-yr life)	lot	1	$100.00	$100
				$2,373
		lbs of Copper removed per year		1.6
			Cost per lb	$1,521

Performance Of Alternative BMPs (Exhibits 16 & 17)

Metallic Exchange / Ion Exchange System - 10,000 sqft Office Building

Rainstorm No. 1 (11 hours on 1/16/00)

Time	Start Vol.	Rain In	Pump Out	O'flow	End Vol.	Cu In	Cu Fixed	Cu Out
hr	<-------- liters -------->					<-------- mg -------->		
0	0	600	600	0	0	1,714	1,234	480
1	0	600	600	0	0	1,714	1,234	480
2	0	600	600	0	0	1,714	1,234	480
3	0	600	600	0	0	1,714	1,234	480
4	0	600	600	0	0	1,714	1,234	480
5	0	600	600	0	0	1,714	1,234	480
6	0	600	600	0	0	1,714	1,234	480
7	0	600	600	0	0	1,714	1,234	480
8	0	600	600	0	0	1,714	1,234	480
9	0	600	600	0	0	1,714	1,234	480
10	0	600	600	0	0	1,714	1,234	480
	Totals:	6,600				18,856	13,576	5,280

Removal Efficiency: 72%

Discharge copper concentration (mg/l): 1.0

Costs Of BMPs For 2,500 Sqft House

Capital Cost Estimate - Retrofit Metals Removal System

Technology: Combined Metallic Exchange & Ion Exchange

	Units	Qty	Unit $	Cost
Excavation/Disposal	cy	2	$35.00	$70
Concrete	cy	0	$400.00	$0
Paving	sq yd	0	$500.00	$0
Piping (0.75- & 3-in. plastic)	ft	10	$1.25	$13
Fittings	lot	1	$25.00	$25
Cistern (55 gal/plastic)	ea	0	$125.00	$0
Pump (1.0 gpm; 110V)	ea	0	$75.00	$0
Conduit	lot	0	$25.00	$0
Wiring	lot	0	$50.00	$0
Cabinet	lot	0	$150.00	$0
Metal Exch. Unit (1 liter/min)	ea	4	$100.00	$400
IX Resin	lot	0	$75.00	$0
			Materials:	$508
Laborer	hr	8	$10.00	$80
Craftsman	hr	4	$25.00	$100
			Labor:	$180
			Permit Fee & Misc.:	$500
			Total:	$1,188

Rainfall Data Used In Exhibits 4 & 12

Date	Time	∑ Rainfall	Rainfall		∂t	Intensity	
		(in)	(In)	(mm)	(hours)	(in/hr)	(mm/hr)
Storm 1							
01/15/2000	17:08	10.90	0.00	0.00	12.2	0.00	0.00
01/16/2000	1:09	10.98	0.08	2.03	8.0	0.01	0.25
01/16/2000	1:39	11.02	0.04	1.02	0.5	0.08	2.03
01/16/2000	1:52	11.10	0.08	2.03	0.2	0.37	9.38
01/16/2000	2:20	11.14	0.04	1.02	0.5	0.09	2.18
01/16/2000	3:50	11.18	0.04	1.02	1.5	0.03	0.68
Storm 2							
01/22/2000	20:13	11.89	0.04	1.02	0.3	0.13	3.21
01/22/2000	20:45	11.93	0.04	1.02	0.5	0.07	1.90
01/22/2000	23:23	11.97	0.04	1.02	2.6	0.02	0.39
01/22/2000	23:55	12.01	0.04	1.02	0.5	0.07	1.90
01/23/2000	6:21	12.05	0.04	1.02	6.4	0.01	0.16
01/23/2000	6:50	12.09	0.04	1.02	0.5	0.08	2.10
01/23/2000	7:51	12.16	0.07	1.78	1.0	0.07	1.75
01/23/2000	8:06	12.16	0.00	0.00	0.3	0.00	0.00
01/23/2000	8:27	12.20	0.04	1.02	0.3	0.11	2.90
01/23/2000	8:47	12.24	0.04	1.02	0.3	0.12	3.05
01/23/2000	9:09	12.28	0.04	1.02	0.4	0.11	2.77
01/23/2000	9:17	12.32	0.04	1.02	0.1	0.30	7.62
01/23/2000	9:57	12.36	0.04	1.02	0.7	0.06	1.52
01/23/2000	12:34	12.40	0.04	1.02	2.6	0.02	0.39
01/23/2000	14:41	12.44	0.04	1.02	2.1	0.02	0.48
01/23/2000	15:19	12.48	0.04	1.02	0.6	0.06	1.60
01/23/2000	16:05	12.52	0.04	1.02	0.8	0.05	1.33
01/23/2000	16:30	12.56	0.04	1.02	0.4	0.10	2.44
01/23/2000	17:39	12.64	0.08	2.03	1.2	0.07	1.77
01/23/2000	18:48	12.68	0.04	1.02	1.2	0.03	0.88
01/23/2000	19:04	12.72	0.04	1.02	0.3	0.15	3.81
01/23/2000	20:18	12.76	0.04	1.02	1.2	0.03	0.82
01/23/2000	20:29	12.80	0.04	1.02	0.2	0.22	5.54
01/23/2000	21:58	12.84	0.04	1.02	1.5	0.03	0.68
01/23/2000	23:42	12.87	0.03	0.76	1.7	0.02	0.44
01/24/2000	8:29	12.95	0.08	2.03	8.8	0.01	0.23
01/24/2000	16:19	12.99	0.04	1.02	7.8	0.01	0.13
01/24/2000	21:32	13.03	0.04	1.02	5.2	0.01	0.19
01/25/2000	4:30	13.07	0.04	1.02	7.0	0.01	0.15
01/25/2000	8:53	13.07	0.00	0.00	4.4	0.00	0.00
01/25/2000	12:58	13.11	0.04	1.02	4.1	0.01	0.25
01/26/2000	9:17	13.11	0.00	0.00	20.3	0.00	0.00

01/26/2000	21:29	13.11	0.00	0.00	12.2	0.00	0.00
01/27/2000	1:47	13.15	0.04	1.02	4.3	0.01	0.24
Storm 3							
04/12/2000	16:21	13.82	0.00	0.00	12.2	0.00	0.00
04/12/2000	22:09	13.86	0.04	1.02	5.8	0.01	0.18
04/12/2000	22:10	13.90	0.04	1.02	0.0	2.40	60.96
04/12/2000	22:14	13.94	0.04	1.02	0.1	0.60	15.24
04/12/2000	22:56	13.98	0.04	1.02	0.7	0.06	1.45
04/12/2000	23:18	14.02	0.04	1.02	0.4	0.11	2.77
04/13/2000	0:23	14.06	0.04	1.02	1.1	0.04	0.94
04/13/2000	4:33	14.06	0.00	0.00	4.2	0.00	0.00
04/13/2000	16:45	14.06	0.00	0.00	12.2	0.00	0.00
04/14/2000	4:57	14.06	0.00	0.00	12.2	0.00	0.00
04/14/2000	6:35	14.09	0.03	0.76	1.6	0.02	0.47
04/14/2000	6:51	14.13	0.04	1.02	0.3	0.15	3.81
04/14/2000	17:09	14.13	0.00	0.00	10.3	0.00	0.00
04/15/2000	5:21	14.13	0.00	0.00	12.2	0.00	0.00
04/15/2000	17:32	14.13	0.00	0.00	12.2	0.00	0.00
04/16/2000	17:56	14.13	0.00	0.00	0.4	0.00	0.00
04/16/2000	21:57	14.21	0.08	2.03	4.0	0.02	0.51
04/16/2000	23:10	14.25	0.04	1.02	1.2	0.03	0.84
04/16/2000	23:38	14.29	0.04	1.02	0.5	0.09	2.18

These rainfall data are for Weather Station PAA [32].

Cumulative Copper Release in Runoff - Exhibit 12

∑ Time	Deposition		Corrosion		Release		Runoff	
		∑		∑		∑		∑
hrs	µg/sqm	µg/sqm	µg/sqm	µg/sqm	µg/sqm	µg/sqm	l/sqm	l/sqm
13.6	1	1			0	0	0	0
14.0	0	1			0	0	0	0
26.2	1	2			0	0	0	0
38.4	1	3			0	0	0	0
50.6	1	4			0	0	0	0
62.8	1	5			0	0	0	0
75.0	1	6			0	0	0	0
75.4	0	6	0	0	0	0	0	0
86.7	1	7	6,487	7	2,903	2,903	1	1
87.6	0	7	496	503	0	2,903	0	1
88.5	0	7	553	1,057	2,177	5,080	1	2
100	1	8	6,429	7,486	0	5,080	0	2
112	1	9	6,973	14,459	0	5,080	0	2
124	1	10	6,983	21,442	0	5,080	0	2
136	1	11	6,983	28,424	0	5,080	0	2
149	1	12	6,983	35,407	0	5,080	0	2
161	1	13	6,983	42,389	0	5,080	0	2
173	1	14	6,983	49,372	0	5,080	0	2
185	1	15	6,983	56,355	0	5,080	0	2
193	1	16	4,588	60,943	5,806	10,886	2	4
194	0	16	286	61,229	2,903	13,789	1	5
194	0	16	124	61,353	5,806	19,594	2	7
194	0	16	267	61,620	2,903	22,497	1	8
196	0	16	859	62,479	2,903	25,400	1	9
197	0	16	859	63,337	0	25,400	0	9
198	0	16	219	63,557	0	25,400	0	9
208	1	17	5,743	69,299	2,903	28,303	1	10
210	0	18	1,240	70,539	0	28,303	0	10
214	0	18	2,080	72,619	2,903	31,206	1	11
215	0	18	582	73,201	2,903	34,109	1	12
216	0	18	887	74,088	5,806	39,914	2	14
217	0	18	763	74,851	2,903	42,817	1	15
218	0	18	401	75,251	2,903	45,720	1	16
220	0	18	1,288	76,539	5,080	50,800	2	18
221	0	18	353	76,892	5,806	56,606	2	20
221	0	18	219	77,112	2,903	59,509	1	21
222	0	18	105	77,216	2,903	62,411	1	22
222	0	19	143	77,360	2,903	65,314	1	23
222	0	19	124	77,484	2,903	68,217	1	24
222	0	19	38	77,522	0	68,217	0	24
223	0	19	439	77,961	2,903	71,120	1	25
228	0	19	3,100	81,061	2,903	74,023	1	26
234	1	20	3,444	84,504	0	74,023	0	26

247	1	21	6,983	91,487	0	74,023	0	26
259	1	22	6,983	98,470	0	74,023	0	26
271	1	23	6,983	105,452	0	74,023	0	26
283	1	24	6,973	112,425	0	74,023	0	26
295	1	25	6,983	119,408	0	74,023	0	26
308	1	26	6,983	126,390	0	74,023	0	26
320	1	27	6,983	133,373	0	74,023	0	26
332	1	28	6,983	140,356	0	74,023	0	26
332	0	28	181	140,537	2,903	76,926	1	27
333	0	28	305	140,842	2,903	79,829	1	28
335	0	28	1,507	142,349	2,903	82,731	1	29
336	0	28	305	142,655	2,903	85,634	1	30
342	1	29	3,682	146,337	2,903	88,537	1	31
343	0	29	277	146,613	2,903	91,440	1	32
344	0	29	582	147,195	5,080	96,520	2	34
344	0	29	143	147,338	0	96,520	0	34
344	0	29	200	147,539	2,903	99,423	1	35
345	0	29	191	147,729	2,903	102,326	1	36
345	0	29	210	147,939	2,903	105,229	1	37
345	0	29	76	148,015	2,903	108,131	1	38
346	0	29	382	148,397	2,903	111,034	1	39
349	0	29	1,498	149,895	2,903	113,937	1	40
351	0	29	1,211	151,106	2,903	116,840	1	41
351	0	29	362	151,469	2,903	119,743	1	42
352	0	29	439	151,907	2,903	122,646	1	43
353	0	29	238	152,146	2,903	125,549	1	44
354	0	30	658	152,804	5,806	131,354	2	46
355	0	30	658	153,462	2,903	134,257	1	47
355	0	30	153	153,615	2,903	137,160	1	48
356	0	30	706	154,321	2,903	140,063	1	49
356	0	30	105	154,426	2,903	142,966	1	50
358	0	30	849	155,275	2,903	145,869	1	51
360	0	30	992	156,267	2,177	148,046	1	52
368	1	31	5,027	161,294	5,806	153,851	2	54
376	1	31	4,483	165,777	2,903	156,754	1	55
382	0	32	2,986	168,763	2,903	159,657	1	56
389	1	32	3,987	172,750	2,903	162,560	1	57
393	0	33	2,509	175,259	0	162,560	0	57
397	0	33	2,337	177,596	2,903	165,463	1	58
417	2	35	11,628	189,224	0	165,463	0	58
429	1	36	6,983	196,207	0	165,463	0	58
434	0	36	2,461	198,668	2,903	168,366	1	59
442	1	37	4,522	203,189	0	168,366	0	59
454	1	38	6,983	210,172	0	168,366	0	59
466	1	39	6,973	217,145	0	168,366	0	59
489	2	41	13,049	230,195	2,903	171,269	1	60
490	0	41	916	231,110	0	171,269	0	60
503	1	42	6,983	238,093	0	171,269	0	60
515	1	43	6,983	245,076	0	171,269	0	60
527	1	44	6,983	252,058	0	171,269	0	60
539	1	45	6,983	259,041	0	171,269	0	60
551	1	46	6,983	266,023	0	171,269	0	60

564	1	47	6,973	272,996	0	171,269	0	60
576	1	48	6,983	279,979	0	171,269	0	60
588	1	49	6,983	286,962	0	171,269	0	60
600	1	50	6,983	293,944	0	171,269	0	60