



L19a

EXECUTIVE CHAMBERS  
HONOLULU

November 9, 2007

LINDA LINGLE  
GOVERNOR

**CERTIFIED MAIL -  
RETURN RECEIPT REQUESTED**  
(#7004 1160 0005 6541 7414)

Mr. Wayne Natri  
Regional Administrator  
U.S. EPA, Region IX  
75 Hawthorne Street  
San Francisco, California 94105

Dear Mr. Natri:

**SUBJECT:** Recommended Designation for the Annual and Revised 24-Hour Federal Fine Particulate (PM<sub>2.5</sub>) National Ambient Air Quality Standards

Pursuant to Section 107(d) of the Clean Air Act, I am recommending that the State of Hawaii be designated in attainment of the annual and revised 24-hour PM<sub>2.5</sub> National Ambient Air Quality Standards (NAAQS). The Department of Health (DOH), which manages the ambient air monitoring network, has determined that the quality-assured PM<sub>2.5</sub> data for the calendar years 2004 through 2006 is in attainment with the federal fine particulate standards.

The state has five stations using Federal Reference Method samplers for the collection of PM<sub>2.5</sub> data. Attachment I contains data summaries from these stations for the 3-year annual and 24-hour standard design values. The Honolulu station was shut down from July 2005 to July 2006 due to building roof repairs and therefore has incomplete, partial design values. However, using the available data, the design values for this station were well below the annual and the revised 24-hour NAAQS. Also, due to various unexpected problems, each of the other PM<sub>2.5</sub> stations had at least one calendar quarter that did not meet the 75% data-capture requirement. These stations were in attainment of the annual and 24-hour standards when the 3-year design values were calculated using the data substitution method.

Attachment II is the "Documentation for Exceptional Events Excluded Data" report. Pursuant to 40 CFR 50.14, *Treatment of air quality monitoring data influenced by exceptional events*, the state is requesting EPA concurrence with the exclusion of six PM<sub>2.5</sub> exceedances due to the New Year's fireworks celebrations. The report was made available for public inspection and no comments were received.

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Based on continuous compliance with all criteria pollutant NAAQS and ongoing monitoring of air pollution sources, the state has determined that there are no anticipated changes or activities that would cause a significant variation from the currently measured PM<sub>2.5</sub> values. We therefore ask for EPA's consideration of our recommendation for attainment of the PM<sub>2.5</sub> standards.

We look forward to working with EPA Region IX on the final designation for this important public health and environmental issue. If you have any questions, please contact Mr. Wilfred Nagamine at the DOH Clean Air Branch, at (808) 586-4200.

Sincerely,



LINDA LINGLE

Enclosures

c: Deborah Jordan, Director (AIR-1), Air Division, U.S. Environmental Protection Agency, Region 9

<b><sup>1</sup>Kapolei Station ID 150030010. In compliance with the Annual PM<sub>2.5</sub> standard of 15 ug/m<sup>3</sup></b>												
	2004				2005				2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Creditable # of samples	22	26	26	25	25	28	27	28	26	30	29	31
Required # of samples	31	30	31	30	30	31	30	31	30	30	31	31
Data capture	71%	87%	84%	83%	83%	90%	90%	90%	87%	100%	94%	100%
Quarterly sums	91.1	94.0	63.2	76.6	94.8	95.6	89.0	120.9	98.6	114.5	77.3	147.4
Quarterly # of samples	22	26	26	25	25	28	27	28	26	30	29	31
Qtr. average (unrounded)	4.14091	3.61615	2.43077	3.06240	3.95000	3.41464	3.29481	4.31786	3.79231	3.81667	2.66552	4.75484
Annual Average (unrounded)	3.31256											
3-yr. ann. ave. (unrounded)	3.74433											
Annual DV (to nearest 0.1)	3.60474											
Validity of DV and Comparison to NAAQS	The "test" annual average for 2004 (3.83768) using the PM <sub>10</sub> collocation "under NAAQS" data substitution is still below the annual NAAQS level AND the "test" DV (3.9) is also below the NAAQS level, therefore, the original quarterly average (4.14091), the original annual average (3.31256), and the original DV (3.6) are considered valid and <b>this site meets the annual standard.</b>											
Data substitution "test" for compliance with the annual PM <sub>2.5</sub> standard using PM <sub>10</sub> co-located data ("Colo")	2004											
Qtr. Ave	6.24138											
#samples Required	29											
Data capture	31											
"Test" Annual Average	94%											
"Test" 3-Yr DV	3.83768											
	3.9											

<sup>1</sup> With EPA concurrence, exceedance of 55 ug/m<sup>3</sup> that occurred on 1/1/2005 has been excluded due to an exceptional event (fireworks)

<b>Honolulu Station ID 150031000. Incomplete 3-year design value, cannot be compared to the annual standard</b>												
	2004				2005				2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Creditable # of samples	86	91	86	89	89	85	5	0	0	0	21	31
Required # of samples	91	91	92	92	90	91	92	92	30	30	31	31
Data capture	95%	100%	93%	97%	99%	93%	5%	0%	0%	0%	68%	100%
Quarterly sums	380.7	348.3	227.9	333.3	427.4	327.2	10.9	0.0	0.0	0.0	65.5	117.3
Quarterly # of samples	87	91	86	89	89	85	5	4	0	0	21	31
Qtr. average (unrounded)	4.37586	3.82692	2.65000	3.74494	4.80169	3.84929	2.18000	0.00000	0.00000	0.00000	3.11905	3.78387
Annual Average (unrounded)	3.64943											
3-yr. ann. ave. (unrounded)	4.09487											
Annual DV (to nearest 0.1)	3.73616											
Validity of DV and Comparison to NAAQS	This site is considered incomplete and cannot be compared to the standard because there are 4 quarters with <50% data capture (station had to be shut-down due to roof repairs)											

	Sand Island Station ID 150031004. In compliance with the Annual PM <sub>2.5</sub> standard of 15 ug/m <sup>3</sup>											
	2004			2005			2006					
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Creditable # of samples	14	13	16	15	14	13	16	14	11	14	14	16
Required # of samples	15	15	16	15	15	15	16	16	15	15	15	16
Data capture	93%	87%	100%	100%	93%	87%	100%	100%	73%	93%	93%	100%
Quarterly sums	77.6	56.5	71.6	78.7	75.7	61.3	54.5	49.6	49.6	76.6	62.5	82.3
Quarterly # of samples	14	13	16	15	14	13	16	16	11	14	14	16
Qtr. average (unrounded)	5.54286	4.34923	4.47500	5.24667	5.40429	4.71538	4.19308	5.67500	4.50636	5.47143	4.46429	5.14375
Annual Average (unrounded)	4.90344											
3-yr. ann. ave. (unrounded)	4.93228											
Annual DV (to nearest 0.1)	4.9											
Validity of DV and Comparison to NAAQS	The "test" annual mean for 2006 (4.86470) using the maximum quarterly value "under NAAQS" data substitution is still below the annual NAAQS level AND the "test" DV (4.9) is also below the NAAQS level, therefore, the original quarterly mean (4.50636), the original annual mean (4.89646), and the original DV (4.9) are considered valid and this site meets the annual standard.											
Data substitution "test" for compliance with the annual PM <sub>2.5</sub> standard using maximum quarterly value ("Maxq")	2006 Q1 Maxq 4.37933 15 15 100% 4.86470 4.9											
Qtr. Ave #samples Required												
Data capture												
"Test" Annual Average												
"Test" 3-Yr DV												

	Pearl City Station ID 150032004. In compliance with the Annual PM <sub>2.5</sub> standard of 15 ug/m <sup>3</sup>											
	2004			2005			2006					
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Creditable # of samples	78	73	75	64	70	88	90	86	25	27	30	30
Required # of samples	91	91	92	70%	90	91	92	92	30	30	31	31
Data capture	86%	80%	82%	70%	78%	97%	98%	93%	83%	90%	97%	97%
Quarterly sums	288.1	283.5	209.2	239.2	274.8	343.9	290.6	370.2	92.8	95.9	85.2	117.2
Quarterly # of samples	78	73	75	64	70	88	90	86	25	27	30	30
Qtr. average (unrounded)	3.69359	3.88288	2.78933	3.73734	3.92500	3.90795	3.22833	4.30465	3.71200	3.55185	2.84000	3.90667
Annual Average (unrounded)	3.52579											
3-yr. ann. ave. (unrounded)	3.84148											
Annual DV (to nearest 0.1)	3.62330											
Validity of DV and Comparison to NAAQS	The "test" annual mean for 2004 (4.83019) using the PM <sub>10</sub> collocation "under NAAQS" data substitution is still below the annual NAAQS level AND the "test" DV (4.1) is also below the NAAQS level, therefore, the original quarterly mean (3.73734), the original annual mean (3.52579), and the original DV (3.6) are considered valid and this site meets the annual standard.											
Data substitution "test" for compliance with the annual PM <sub>2.5</sub> standard using PM <sub>10</sub> co-located data ("Colo")	2004 Q4 Colo 8.95494 89 92 97% 4.83019 4.1											
Qtr. Ave #samples Required												
Data capture												
"Test" Annual Average												
"Test" 3-Yr DV												

<sup>1</sup> With EPA concurrence, exceedances of 77, 103, 88, and 51 ug/m<sup>3</sup> that occurred on 1/1/04, 12/31/04, 12/31/05, and 12/31/06 respectively, have been excluded due to exceptional events (fireworks)

Kihel Station ID 150090006. In compliance with the Annual PM <sub>2.5</sub> standard of 15 ug/m <sup>3</sup>												
	2004				2005				2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Creditable # of samples	27	29	23	23	21	29	27	31	27	26	25	31
Required # of samples	31	30	31	30	30	31	30	31	30	30	31	31
Data capture	87%	97%	74%	77%	70%	94%	90%	100%	90%	87%	81%	100%
Quarterly sums	121.0	138.8	110.7	107.9	92.0	135.3	93.7	161.2	117.9	118.7	102.5	171.6
Quarterly # of samples	27	29	23	23	21	29	27	31	27	26	25	31
Qtr. average (unrounded)	4.48148	4.78448	4.81304	4.68913	4.37952	4.66448	3.47074	5.20000	4.36556	4.56538	4.10000	5.53548
Annual Average (unrounded)	4.69203											
3-yr. ann. ave. (unrounded)	4.58744											
Annual DV (to nearest 0.1)	4.6											
Validity of DV and Comparison to NAAQS	The "test" annual means for 2004 and 2005 (4.99442 and 4.87272) using the maximum quarterly value "under NAAQS" data substitution is still below the annual NAAQS level AND the "test" DV (4.8) is also below the NAAQS level, therefore, the original quarterly means (4.81304 and 4.37952), the original annual means (4.69203 and 4.42869), and the original DV (4.6) are considered valid and <b>this site meets the annual standard.</b>											
Data substitution "test" for compliance with the annual PM <sub>2.5</sub> standard using the maximum quarterly value ("Maxq")	2004				2005				2006			
Qtr. Ave												
#samples Required	6.02258				6.15567							
Data capture	31				30							
"Test" Annual Average	31				30							
"Test" 3-Yr DV	1				1							
	4.99442				4.87272							
	4.8				4.8							

**ATTACHMENT I**

	Kapolei Station ID 150030010. In compliance with the 24-hour PM <sub>2.5</sub> standard of 35 ug/m <sup>3</sup>											
	2004				2005				2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Creditable # of samples	22	26	26	25	25	28	27	28	26	30	29	31
Required # of samples	31	30	31	30	30	31	30	31	30	30	31	31
Data capture	71%	87%	84%	83%	83%	90%	90%	90%	87%	100%	94%	100%
Total creditable samples	99				107				116			
Total Possible	122				122				122			
98th percentile value	7				9				7			
3-yr DV	8											
Honolulu Station ID 150031001. Incomplete, partial DV under the 24-hour PM <sub>2.5</sub> standard of 35 ug/m <sup>3</sup>												
	2004				2005				2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Creditable # of samples	86	91	86	89	89	85	5	0	0	0	21	31
Required # of samples	91	91	92	92	90	91	92	92	30	30	31	31
Data capture	95%	100%	93%	97%	99%	93%	5%	0%	0%	0%	68%	100%
Total creditable samples	352				178				52			
Total Possible	366				365				122			
98th percentile value	9				10				10			
3-yr DV	10											
Sand Island Station ID 150031004. In compliance with the 24-hour PM <sub>2.5</sub> standard of 35 ug/m <sup>3</sup>												
	2004				2005				2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Creditable # of samples	14	13	16	15	14	13	13	16	11	14	14	16
Required # of samples	15	15	16	15	15	15	15	16	15	15	15	16
Data capture	93%	87%	100%	100%	93%	87%	87%	100%	73%	93%	93%	100%
Total creditable samples	58				56				55			
Total Possible	61				61				61			
98th percentile value	8				10				10			
3-yr DV	9											
Pearl City Station ID 150032004. In compliance with the 24-hour PM <sub>2.5</sub> standard of 35 ug/m <sup>3</sup>												
	2004				2005				2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Creditable # of samples	78	73	75	64	70	88	90	86	25	27	30	30
Required # of samples	91	91	92	92	90	91	92	92	30	30	31	31
Data capture	86%	80%	82%	70%	78%	97%	98%	93%	83%	90%	97%	97%
Total creditable samples	290				334				112			
Total Possible	366				365				122			
98th percentile value	8				10				7			
3-yr DV	8											
Kihei Station ID 150090006. In compliance with the 24-hour PM <sub>2.5</sub> standard of 35 ug/m <sup>3</sup>												
	2004				2005				2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Creditable # of samples	27	29	23	23	21	29	27	31	27	26	25	31
Required # of samples	31	30	31	30	30	31	30	31	30	30	31	31
Data capture	87%	97%	74%	77%	70%	94%	90%	100%	90%	87%	81%	100%
Total creditable samples	102				108				109			
Total Possible	122				122				122			
98th percentile value	9				8				10			
3-yr DV	9											

## **Attachment II**

1. Public Notice Announcement
2. Documentation for Exceptional Events Excluded Data  
New Year's Fireworks Events 2004 to 2006  
24-Hour PM<sub>2.5</sub>

★  
**Public Notices**

★  
**Public Notices**

**PUBLIC NOTICE**

The Department of Health, State of Hawaii, is providing notice to all interested persons of the report, "Documentation for Exceptional Events Excluded Data." Pursuant to 40 CFR 50.14, this report describes the treatment of air quality monitoring data influenced by exceptional events.

The report is available for public review during regular office hours, Monday through Friday, 7:45 a.m. to 4:15 p.m., at the following location:

- Clean Air Branch, Department of Health  
919 Ala Moana Boulevard, Room 203,  
Honolulu, Hawaii 96814

The report is also available on the Clean Air Branch, Department of Health website at <http://www.hawaii.gov/health/environmental/air/cab/index.html>. Interested persons may submit written comments to the Department of Health at the above address and must be postmarked or received by November 2, 2007. For additional information, contact Ms. Lisa Young of the Clean Air Branch in Honolulu at (808) 586-4200.

(SB05532170 10/3/07)



## Documentation for Exceptional Events Excluded Data New Year's Fireworks Events 2004 to 2006 24-Hour PM<sub>2.5</sub>

### Summary

This document is submitted pursuant to 40 CFR 50.14, *Treatment of air quality monitoring data influenced by exceptional events*. Prior to submitting the state's attainment designation recommendation of the new PM<sub>2.5</sub> NAAQS, all PM<sub>2.5</sub> exceedances attributed to exceptional events must be documented and presented to EPA for data exclusion concurrence.

There were six exceedances of the new 24-hour PM<sub>2.5</sub> NAAQS recorded at three of the state's ambient air monitoring stations in data years 2004 to 2006 due to exceptional events. All exceedances were the result of the New Year's fireworks celebrations, a historical cultural practice in the state of Hawaii.

The two sections in this document will present:

- I. The causal relationship between each exceedance and the New Year's fireworks celebration; and,
- II. How the exceedances fit the "but for" test and how the measured concentrations are in excess of normal historical fluctuations.

### I. Causal Relationship between PM<sub>2.5</sub> Exceedances and New Year's Fireworks Events

Exceedances occurred at the following SLAMS stations as shown in Table 1:

- Kapolei (KA) AIRS ID 150030010  
 2052 Lauwiliwili Street  
 Kapolei, Oahu, HI
- Honolulu (DH) AIRS ID150031001  
 1250 Punchbowl Street  
 Honolulu, Oahu, HI
- Pearl City (PC) AIRS ID150032004  
 860 4<sup>th</sup> Street  
 Pearl City, Oahu, HI

**Table 1. Exceedances of the 35 µg/m<sup>3</sup> 24-Hour PM<sub>2.5</sub> NAAQS in 2004 to 2006**

	2004		2005		2006	
	1/1	12/31	1/1	12/31	1/1	12/31
KA 150030010			55 µg/m <sup>3</sup>			
DH 150031001			45 µg/m <sup>3</sup>			
PC 150032004	77 µg/m <sup>3</sup>	103 µg/m <sup>3</sup>		88 µg/m <sup>3</sup>		51 µg/m <sup>3</sup>

The State of Hawaii allows the private and public use of fireworks in celebrating the New Year from 9:00 p.m. on December 31 to 1:00 a.m. on January 1. This is a long standing cultural tradition that is embraced by Hawaii's population. Although there are some large organized public fireworks displays, it is the use of common fireworks by the residential community that cause most of the associated particle pollution. The resulting emissions from fireworks are also compounded by the seasonal increase in weather systems that typically produce light and variable winds.

Hawaii's weather is generally stable due to a nearly stationary Pacific High located to the northeast of the state<sup>1</sup>. This high pressure area moves the air in a northeasterly direction over the islands and helps to clear the air of pollutants. During the winter months (October to April), low pressure systems disrupt these northeasterly trade winds and the winds shift direction generally becoming southerly. This shift causes pollutants, for example those resulting from fireworks, to linger over land rather than be blown out to sea.

Attachment 1 contains the following documentation that links each PM<sub>2.5</sub> exceedance to the New Year's fireworks celebration and winter weather conditions.

1. Table 1: 24-Hour PM<sub>2.5</sub> Data: New Year's Fireworks Celebrations 2004 - 2006
  - This table shows each exceedance as well as the three valid PM<sub>2.5</sub> sample data collected before and after the event
  - The data clearly shows the specific association of the PM<sub>2.5</sub> exceedance with the New Year's fireworks celebration
2. National Weather Service: *Climate of Hawaii*
  - This summary was printed from the National Weather Service website: [www.prh.noaa.gov/hnl/pages/climate\\_summary.php](http://www.prh.noaa.gov/hnl/pages/climate_summary.php)
  - It provides a brief description of Hawaii's climate, in particular, how winter fronts disrupt the normal trade wind flow around the island.
3. Figure 1: Station Locations and Impact of Various Wind Directions
  - This map illustrates how the direction of the prevailing northeasterly and southerly or variable wind conditions can affect pollutant transport.
4. Historical Meteorological Information for New Years 2004 to 2007
  - The historical meteorological information was obtained from the weather site [www.wunderground.com](http://www.wunderground.com)
  - Since peak fireworks use occurs just prior to midnight of the New Year (i.e. on New Year's eve), weather summaries for December 31 of 2003, 2004, 2005 and 2006 are presented. These represent each PM<sub>2.5</sub> exceedance period.
  - The summaries illustrate to some degree the relationship of calm, variable winds with the highest PM<sub>2.5</sub> values, which occurred on December 31, 2004 and December 31, 2005.

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<sup>1</sup> Description is from the National Weather Service Pacific Region's *Climate of Hawaii*, provided in Attachment I of this document.

5. Local Honolulu Newspaper Articles Documenting Each New Year Fireworks Event

- The following newspaper articles provide testimony to the traditional New Year's fireworks celebration. Additionally, there is commentary in each article about the weather conditions as it is integral in clearing smoke and pollutants resulting from the use of fireworks.
  - a. For the 2004 New Year:  
Honolulu Star-Bulletin, January 7, 2004: *Rain served as New Year's air filter*
  - b. For the 2005 New Year:  
Honolulu Star-Bulletin, January 7, 2005: *Pearl City rang in smokiest New Year*; and,  
Honolulu Advertiser, January 7, 2005: *Fireworks smoke worse than 2000*
  - c. For the 2006 New Year:  
Honolulu Advertiser, January 5, 2006: *New Year's a bit clearer*
  - d. For the 2007 New Year:  
Honolulu Star-Bulletin, January 4, 2007: *New Year's smoke yields to wind*

II. Exceedances and Normal PM<sub>2.5</sub> Fluctuations

- Since PM<sub>2.5</sub> monitoring began in 1999, the state has never exceeded any of the PM<sub>2.5</sub> NAAQS except for those that occurred during the New Year's fireworks celebrations.
- Attachment 2 contains graphs of historical PM<sub>2.5</sub> data at the Kapolei, Honolulu and Pearl City stations. The graphs clearly show that each 24-hour exceedance was directly attributed to the respective New Year's fireworks event and that normal PM<sub>2.5</sub> fluctuations are way below the standard.

Attachment 2 contains the following graphs:

1. Figure 1. Kapolei (50030010) 2005 New Year's Event. Normal PM<sub>2.5</sub> Fluctuations: October 2004 to March 2005 (1 in 3 days sampling)
2. Figure 2. Honolulu (150031001) 2005 New Year's Event. Normal PM<sub>2.5</sub> Fluctuations: October 2004 to March 2005 (Daily sampling)
3. Figure 3. Pearl City (150032004) 2004 New Year's Event. Normal PM<sub>2.5</sub> Fluctuations: October 2003 to February 2004 (Daily sampling)
4. Figure 4. Pearl City (150032004) 2005 New Year's Event. Normal PM<sub>2.5</sub> Fluctuations: October 2004 to February 2005 (Daily sampling)
5. Figure 5. Pearl City (150032004) 2006 New Year's Event. Normal PM<sub>2.5</sub> Fluctuations: October 2005 to March 2006 (Daily sampling reduced to 1 in 3 days in 2006)
6. Figure 6. Pearl City (150032004) 2007 New Year's Event. Normal PM<sub>2.5</sub> Fluctuations: October 2006 to March 2007 (1 in 3 days sampling)

State of Hawaii  
Department of Health  
Clean Air Branch

Documentation for Exceptional Events Excluded Data  
New Year's Fireworks Events 2004 to 2006  
24-Hour PM<sub>2.5</sub>

## Attachment 1

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**24-Hour PM<sub>2.5</sub> Data  
New Year's Fireworks Celebrations 2004 - 2006**

The following table shows each exceedance of the PM<sub>2.5</sub> 24-hour standard by station and by year. Included in each table are the three valid sample data collected immediately before and after the exceedance.

**Table 1: PM<sub>2.5</sub> Data**

<b>KA (150030010)</b> Sampling Schedule: 1 in 3 days Exceedance: 1/1/2005		<b>DH (150031001)</b> Sampling Schedule: Daily Exceedance: 1/1/2005		<b>PC (150032004)</b> Sampling Schedule: Daily Exceedance: 1/1/2004	
Date	PM <sub>2.5</sub> µg/m <sup>3</sup>	Date	PM <sub>2.5</sub> µg/m <sup>3</sup>	Date	PM <sub>2.5</sub> µg/m <sup>3</sup>
12/20/04	5	12/28/04	3	12/23/03	4
12/26/04	3	12/29/04	3	12/26/03	4
12/29/04	3	12/30/04	5	12/29/03	25
1/1/05	55	12/31/04	20	1/1/04	77
1/13/05	5	1/1/05	45	1/2/04	4
1/16/05	5	1/2/05	4	1/3/04	3
1/19/05	2	1/3/05	5	1/5/04	5
<b>PC (150032004)</b> Sampling Schedule: Daily Exceedance: 12/31/2004		<b>PC (150032004)</b> Sampling Schedule: Daily Exceedance 12/31/2005		<b>PC (150032004)</b> Sampling Schedule: 1 in 3 days Exceedance 12/31/2006	
12/28/04	3	12/28/05	8	12/22/06	2
12/29/04	3	12/29/05	10	12/25/06	2
12/30/04	6	12/30/05	10	12/28/06	3
12/31/04	103	12/31/05	88	12/31/06	51
1/2/05	3	1/2/06	2	1/3/07	5
1/3/05	2	1/5/06	3	1/6/07	4
1/4/05	3	1/8/06	4	1/9/07	6



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## Climate of Hawai'i

The climate of an area is a composite or frequency distribution of various kinds of weather. The outstanding features of Hawaii's climate include mild temperatures throughout the year, moderate humidity, persistence of northeasterly trade winds, significant differences in rainfall within short distances, and infrequent severe storms.

For most of Hawaii, there are only two seasons: "summer," between May and October, and "winter," between October and April.

### Latitude

Hawaii is in the tropics, where the length of day and temperature are relatively uniform throughout the year.

Hawaii's longest and shortest days are about 13 1/2 hours and 11 hours, respectively, compared with 14 1/2 and 10 hours for Southern California and 15 1/2 hours and 8 1/2 hours for Maine.

Uniform day lengths result in small seasonal variations in incoming solar radiation and, therefore, temperature. On a clear winter day, level ground in Hawaii receives at least 67 percent as much solar energy between sunrise and sunset as it does on a clear summer day. By comparison the percentages are only 33 and 20 at latitudes 40 and 50 degrees respectively.

### The Surrounding Ocean.

The ocean supplies moisture to the air and acts as a giant thermostat, since its own temperature varies little compared with that of large land masses. The seasonal range of sea surface temperatures near Hawaii is only about 6 degrees, from a low of 73 or 74 degrees between late February and March to a high near 80 degrees in late September or early October. The variation from night to day is one or two degrees.

Hawaii is more than 2,000 miles from the nearest continental land mass. Therefore, air that reaches it, regardless of source, spends enough time over the ocean to moderate its initial harsher properties. Arctic air that reaches Hawaii, during the winter, may have a temperature increase by as much as 100 degrees during its passage over the waters of the North Pacific. Hawaii's warmest months are not June and July, but August and September. Its coolest months, are not December and January, but February and March, reflecting the seasonal lag in the oceans's temperature.

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## Storm Tracks and the Pacific Anticyclone.

These tracks, the paths taken by eastward migrating high and low pressure areas, generally are between 35 degrees north and 65 degrees north, the latitudes of changeable weather. To the south, and particularly over the subtropical oceans, we often find an atmospheric eddy, that rarely changes its position. Sometimes it is called "nearly stationary" and lasts long enough to be called "semipermanent."

These eddies include the large subtropical high pressure systems or anticyclones. Weather in their vicinity is usually stable. One of these, the Pacific High or anticyclone, is usually northeast of Hawaii. The air from it moves past the islands as northeasterly trade winds. Its persistence directly reflects that of the Pacific High from which it comes.

The storm tracks and the Pacific High follow the seasonal shift of the sun, moving north in summer and south in winter. The high tends to be stronger and more persistent in summer than in winter. Therefore, in winter, the trade winds may be interrupted for days or weeks by the invasion of the fronts or migratory cyclones from the northern latitudes and by Kona storms forming near the islands. Therefore, winter in Hawaii is the season of more frequent clouds and rainstorms, as well as southerly and westerly winds.

## Terrain

Hawaii's mountains significantly influence every aspect of its weather and climate. The endless variety of peaks, valleys, ridges, and broad slopes, gives Hawaii a climate that is different from the surrounding ocean, as well as a climatic variety within the islands. These climatic differences would not exist if the islands were flat and the same size.

The mountains obstruct, deflect, and accelerate the flow of air. When warm, moist air rises over windward coasts and slopes, clouds and rainfall are much greater than over the open sea. Leeward areas, where the air descends, tend to be sunny and dry. In places sheltered by terrain, local air movements are significantly different from winds in exposed localities. Since temperature decreases with elevation by about 3 degrees per thousand feet, Hawaii's mountains, which extend from sea level to nearly 14,000 feet, contain a climatic range from the tropic to the sub-Arctic.

The climate of Hawaii can be defined by what it has and by what it does not have. It does not have the extremes of cold winters and summer heat waves and it usually does not have hurricanes and hailstorms. However, Hawaii's tallest peaks do get their share of winter blizzards, ice, and snow. Highest temperatures may reach into the 90s. Thunderstorms, lightning, hail, floods, hurricanes, tornadoes, and droughts are not unknown. However, these phenomena are usually less frequent and less severe than their counterparts in continental regions.

The highest temperature ever recorded in Hawaii was 100 at Pahala (elevation 870 feet) on the Big Island of Hawaii on April 27, 1931. The lowest ever recorded was 12 on Mauna Kea (elevation 13,770 feet), also on the Big Island, on May 17, 1979.

## Rainfall

Over the ocean near Hawaii, rainfall averages between 25 and 30 inches a year. The islands receive as much as 15 times that amount in some places and less than one third of it in others. This is caused mainly by orographic or mountain rains, which form within the moist trade wind air as it moves from the sea over the steep and high terrain of the islands. Over the lower islands, the

average rainfall distribution resembles closely the topographic contours. Amounts are greatest over upper slopes and crests and least in the leeward lowlands. On the higher mountains, the belt of maximum rainfall lies between 2,000 to 3,000 feet and amounts decrease rapidly with further elevation. As a result, the highest slopes are relatively dry.

Another source of rainfall is the towering cumulus clouds that build up over the mountains and interiors on sunny calm afternoons. Although such convective showers may be intense, they are usually brief and localized.

Hawaii's heaviest rains are come from winter storms between October and April. While the effects of terrain on storm rainfall are not as great as on trade wind showers, large differences over small distances do occur, because of topography and location of the rain clouds. Differences vary with each storm.

Frequently, the heaviest storm rains do not occur in areas with the greatest average rainfall. Relatively dry areas may receive, within a day or a few hours, totals exceeding half of their average annual rainfall.

The leeward and other dry areas obtain their rainfall mainly from a few winter storms. Therefore, their rainfall is usually seasonal and, their summers are dry. In the wetter regions, where rainfall comes from both winter storms and trade wind showers, seasonal differences are much smaller.

At the opposite extreme, drought is not unknown in Hawaii, although it rarely affects an entire island at one time. Drought may occur when there are either no winter storms or no trade winds. If there are no winter storms, the normally dry leeward areas are hardest hit. A dry winter, followed by a normally dry summer and another dry winter, can have serious effects. The absence of trade winds affects mostly the windward and upland regions, which receive a smaller proportion of their rain from winter storms.

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The above product is a condensed chapter on Hawaii's climate from the Second Edition (University of Hawaii Press, 1983) of the "Atlas of Hawaii." The author is the late Saul Price, former Hawaii State Climatologist and Staff Meteorologist for the National Weather Service Pacific Region.

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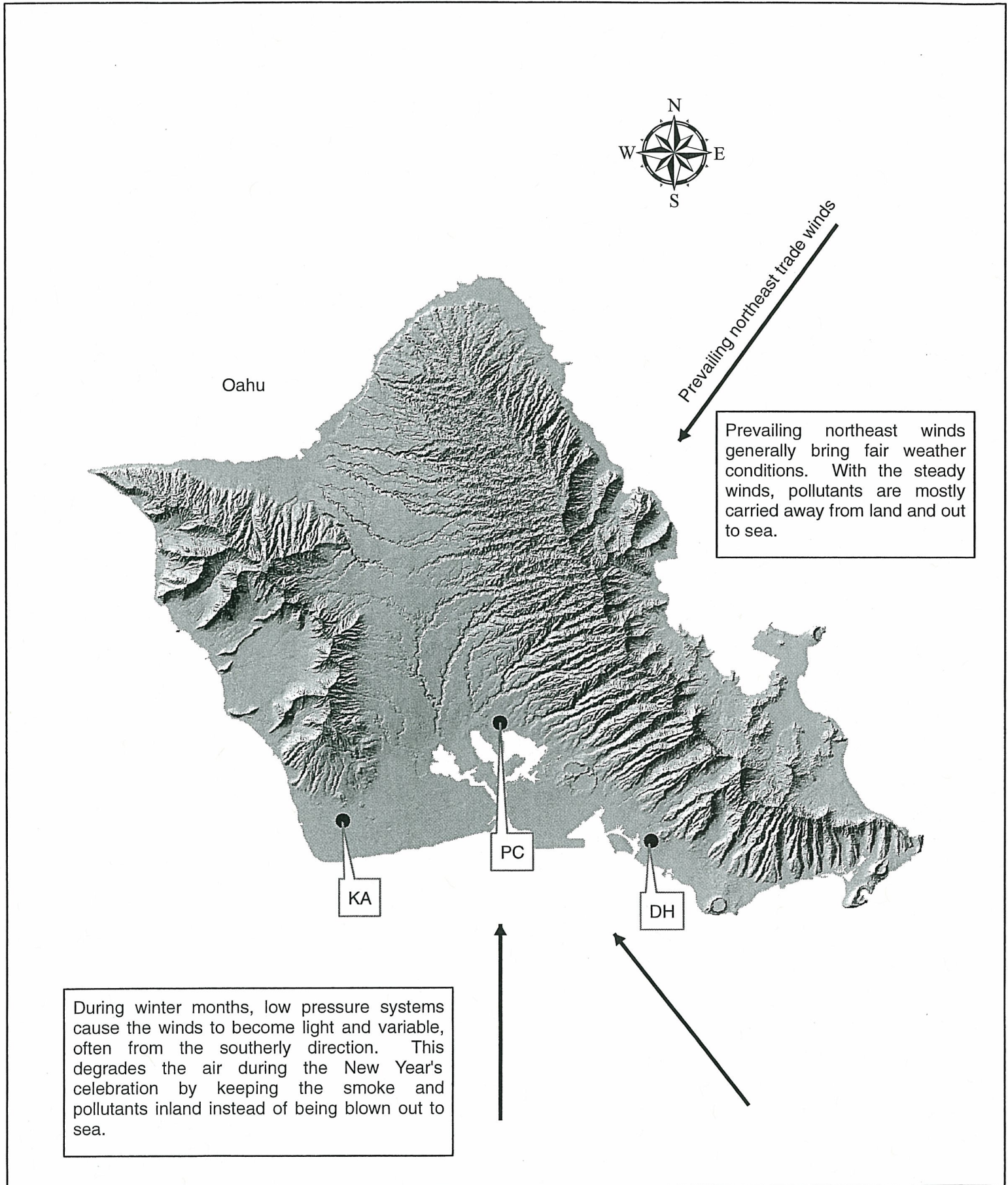
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**Figure 1. Station Locations and Impact of Various Wind Directions**





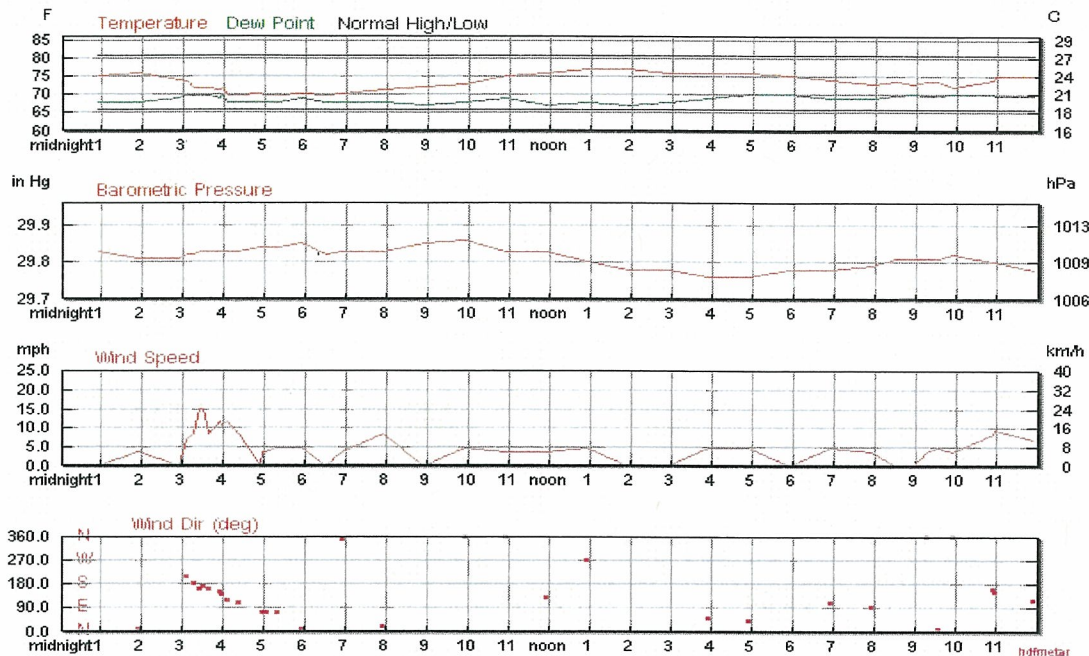
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## History for Honolulu, HI on Wednesday, December 31, 2003

December 31, 2003

## Daily Summary

	Actual	Average	Record
<b>Temperature</b>			
Mean Temperature	-	74 °F / 23 °C	
Max Temperature	77 °F / 25 °C	81 °F / 27 °C	85 °F / 29 °C (1986)
Min Temperature	70 °F / 21 °C	66 °F / 18 °C	56 °F / 13 °C (1958)
<b>Degree Days</b>			
Heating Degree Days	0	0	
Month to date heating degree days	0	0	
Since 1 July heating degree days	0	0	
Cooling Degree Days	9	9	
Month to date cooling degree days	336	303	
Year to date cooling degree days	4997	4561	
Growing Degree Days	23 (Base - )		
<b>Moisture</b>			
Dew Point	68 °F / 20 °C		
Average Humidity	85		
Maximum Humidity	100		
Minimum Humidity	69		
<b>Precipitation</b>			
Precipitation	1.41 in / 3.58 cm	0.09 in / 0.23 cm	2.50 in / 6.35 cm (1951)
Month to date precipitation	4.81	2.85	
Year to date precipitation	12.70	18.29	
<b>Snow</b>			
Snow	0.00 in / 0.00 cm	-	- ( )
Month to date snowfall	0.0		
Since 1 July snowfall	0.0		
Snow Depth	0.00 in / 0.00 cm		
<b>Wind</b>			
Wind Speed	4 mph / 6 km/h ( )		
Max Wind Speed	16 mph / 26 km/h		
Max Gust Speed	18 mph / 29 km/h		
<b>Visibility</b>	6 miles / 9 kilometers		
<b>Events</b>	Rain , Thunderstorm		
<b>Key:</b> T is trace of precipitation, MM is missing value			
<b>Source:</b> NWS Daily Summary			



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Time (HST)	Temperature	Dew Point	Humidity	Pressure	Visibility	Wind Direction	Wind Speed	Gust Speed	Precipitation	Events	Conditions
12:53 AM	75.0 °F / 23.9 °C	68.0 °F / 20.0 °C	79%	29.83 in / 1010.0 hPa	10.0 miles / 16.1 kilometers	Calm	Calm	-	N/A		Overcast
1:53 AM	75.9 °F / 24.4 °C	68.0 °F / 20.0 °C	76%	29.81 in / 1009.5 hPa	10.0 miles / 16.1 kilometers	North	3.5 mph / 5.6 km/h	-	0.00 in / 0.0 cm	Rain	Light Rain
2:53 AM	73.9 °F / 23.3 °C	69.1 °F / 20.6 °C	85%	29.81 in / 1009.2 hPa	4.0 miles / 6.4 kilometers	Calm	Calm	-	0.05 in / 0.1 cm	Rain	Heavy Rain
3:04 AM	73.4 °F / 23.0 °C	69.8 °F / 21.0 °C	88%	29.82 in / 1009.7 hPa	3.0 miles / 4.8 kilometers	SSW	6.9 mph / 11.1 km/h	-	0.06 in / 0.2 cm	Rain , Thunderstorm	Heavy Thunderstorms and Rain
3:14 AM	71.6 °F / 22.0 °C	69.8 °F / 21.0 °C	94%	29.82 in / 1009.7 hPa	1.0 miles / 1.6 kilometers	South	8.1 mph / 13.0 km/h	-	0.30 in / 0.8 cm	Rain , Thunderstorm	Heavy Thunderstorms and Rain
3:24 AM	71.6 °F / 22.0 °C	69.8 °F / 21.0 °C	94%	29.83 in / 1010.0 hPa	1.6 kilometers	SSE	15.0 mph / 24.1 km/h	-	0.50 in / 1.3 cm	Rain	Heavy Rain
3:28 AM	71.6 °F / 22.0 °C	69.8 °F / 21.0 °C	94%	29.83 in / 1010.0 hPa	2.0 miles / 3.2 kilometers	South	15.0 mph / 24.1 km/h	-	0.62 in / 1.6 cm	Rain	Rain
3:37 AM	71.6 °F / 22.0 °C	69.8 °F / 21.0 °C	94%	29.83 in / 1010.0 hPa	2.0 miles / 3.2 kilometers	SSE	8.1 mph / 13.0 km/h	-	0.76 in / 1.9 cm	Rain	Rain
3:53 AM	71.1 °F / 21.7 °C	69.1 °F / 20.6 °C	93%	29.83 in / 1010.0 hPa	2.0 miles / 3.2 kilometers	SSE	11.5 mph / 18.5 km/h	-	0.93 in / 2.4 cm	Rain	Rain

<b>12:53 PM</b>	77.0 °F / 25.0 °C	68.0 ° F / 20.0 ° C	74%	29.80 in / 1009.0 hPa	10.0 miles / 16.1 kilometers	West	4.6 mph / 7.4 km/h	-	0.00 in / 0.0 cm		<b>Mostly Cloudy</b>
<b>1:53 PM</b>	77.0 °F / 25.0 °C	66.9 ° F / 19.4 ° C	71%	29.78 in / 1008.2 hPa	10.0 miles / 16.1 kilometers	Calm	Calm	-	0.00 in / 0.0 cm	Rain	<b>Light Rain</b>
<b>2:53 PM</b>	75.9 °F / 24.4 °C	68.0 ° F / 20.0 ° C	76%	29.78 in / 1008.4 hPa	10.0 miles / 16.1 kilometers	Calm	Calm	-	0.00 in / 0.0 cm	Rain	<b>Light Rain</b>
<b>3:53 PM</b>	75.9 °F / 24.4 °C	69.1 ° F / 20.6 ° C	79%	29.76 in / 1007.8 hPa	10.0 miles / 16.1 kilometers	NE	4.6 mph / 7.4 km/h	-	0.01 in / 0.0 cm	Rain	<b>Light Rain</b>
<b>4:53 PM</b>	75.9 °F / 24.4 °C	70.0 ° F / 21.1 ° C	82%	29.76 in / 1007.8 hPa	10.0 miles / 16.1 kilometers	NE	4.6 mph / 7.4 km/h	-	0.00 in / 0.0 cm	Rain	<b>Light Rain</b>
<b>5:53 PM</b>	75.0 °F / 23.9 °C	70.0 ° F / 21.1 ° C	84%	29.78 in / 1008.3 hPa	9.0 miles / 14.5 kilometers	Calm	Calm	-	0.00 in / 0.0 cm		<b>Mostly Cloudy</b>
<b>6:53 PM</b>	73.9 °F / 23.3 °C	69.1 ° F / 20.6 ° C	85%	29.78 in / 1008.5 hPa	9.0 miles / 14.5 kilometers	ESE	4.6 mph / 7.4 km/h	-	0.01 in / 0.0 cm	Rain	<b>Light Rain</b>
<b>7:53 PM</b>	73.0 °F / 22.8 °C	69.1 ° F / 20.6 ° C	87%	29.79 in / 1008.7 hPa	10.0 miles / 16.1 kilometers	East	3.5 mph / 5.6 km/h	-	0.02 in / 0.1 cm	Rain	<b>Light Rain</b>
<b>8:29 PM</b>	73.4 °F / 23.0 °C	69.8 ° F / 21.0 ° C	88%	29.81 in / 1009.4 hPa	4.0 miles / 6.4 kilometers	Calm	Calm	-	0.00 in / 0.0 cm		<b>Mostly Cloudy</b>
<b>8:53 PM</b>	73.0 °F / 22.8 °C	70.0 ° F / 21.1 ° C	90%	29.81 in / 1009.2 hPa	3.0 miles / 4.8 kilometers	Calm	Calm	-	0.00 in / 0.0 cm		<b>Smoke</b>
<b>9:14 PM</b>	73.4 °F / 23.0 °C	69.8 ° F / 21.0 ° C	88%	29.81 in / 1009.4 hPa	2.0 miles / 3.2 kilometers	North	3.5 mph / 5.6 km/h	-	N/A		<b>Smoke</b>
<b>9:32 PM</b>	73.4 °F / 23.0 °C	69.8 ° F / 21.0 ° C	88%	29.81 in / 1009.4 hPa	1.8 miles / 2.8 kilometers	North	4.6 mph / 7.4 km/h	-	N/A		<b>Smoke</b>
<b>9:53 PM</b>	72.0 °F / 22.2 °C	70.0 ° F / 21.1 ° C	93%	29.82 in / 1009.6 hPa	1.8 miles / 2.8 kilometers	North	3.5 mph / 5.6 km/h	-	N/A		<b>Smoke</b>
<b>10:53 PM</b>	73.9 °F / 23.3 °C	70.0 ° F / 21.1 ° C	87%	29.80 in / 1008.9 hPa	2.0 miles / 3.2 kilometers	SSE	8.1 mph / 13.0 km/h	-	N/A		<b>Smoke</b>
<b>10:55 PM</b>	75.2 °F / 24.0 °C	69.8 ° F / 21.0 ° C	83%	29.80 in / 1009.0 hPa	3.0 miles / 4.8 kilometers	SSE	9.2 mph / 14.8 km/h	-	N/A		<b>Smoke</b>

<b>11:53 PM</b>	<b>75.2 °F / 24.0 °C</b>	<b>69.8 °F / 21.0 °C</b>	<b>83%</b>	<b>29.78 in / 1008.2 hPa</b>	<b>10.0 miles / 16.1 kilometers</b>	<b>ESE</b>	<b>6.9 mph / 11.1 km/h</b>	<b>-</b>	<b>N/A</b>	<b>Mostly Cloudy</b>
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**Astronomy**

Sunrise: <b>07:08 AM (HST)</b>	Moon Rise: <b>01:22 PM (HST) 12/31</b>
Sunset: <b>06:00 PM (HST)</b>	Moon Set: <b>01:25 AM (HST) 12/31</b>

Moon Phase

					
<b>Dec. 31</b>	<b>Jan. 07</b>	<b>Jan. 14</b>	<b>Jan. 21</b>	<b>Jan. 29</b>	 <a href="#">more...</a>

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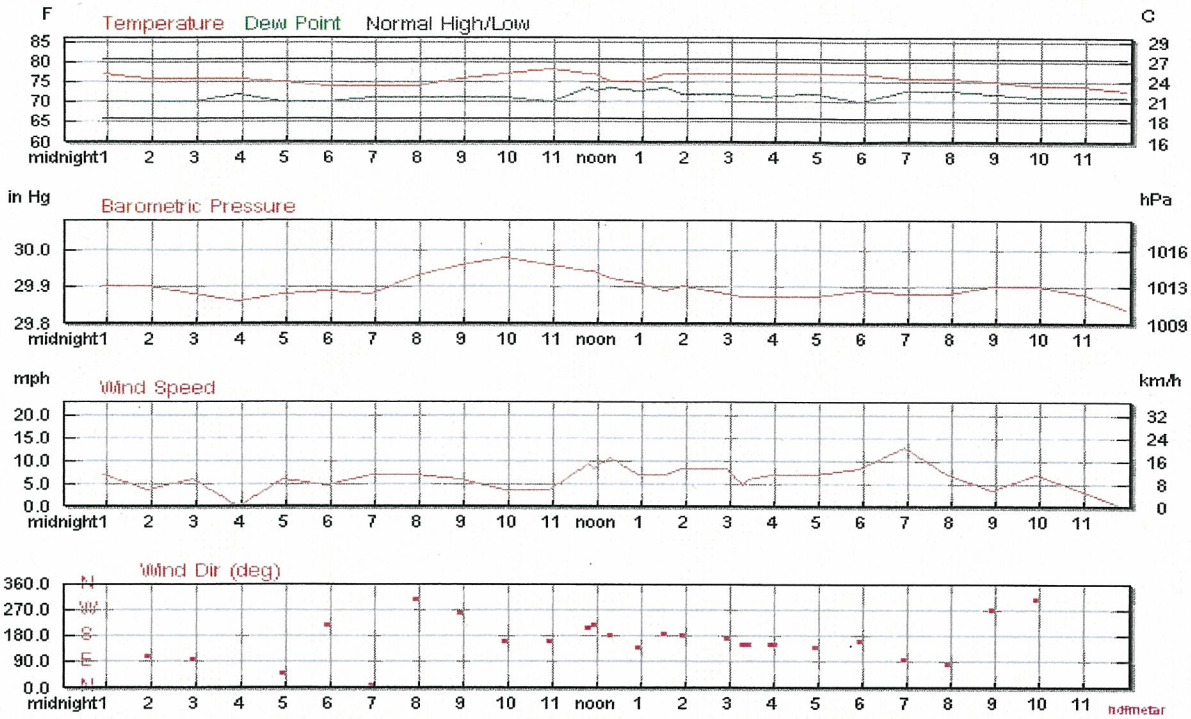
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## History for Honolulu, HI on Friday, December 31, 2004

December 31, 2004

### Daily Summary

	Actual	Average	Record
<b>Temperature</b>			
Mean Temperature	-	74 °F / 23 °C	
Max Temperature	79 °F / 26 °C	81 °F / 27 °C	85 °F / 29 °C (1986)
Min Temperature	73 °F / 22 °C	66 °F / 18 °C	56 °F / 13 °C (1958)
<b>Degree Days</b>			
Heating Degree Days	0	0	
Month to date heating degree days	0	0	
Since 1 July heating degree days	0	0	
Cooling Degree Days	11	9	
Month to date cooling degree days	324	303	
Year to date cooling degree days	5107	4561	
Growing Degree Days	26 (Base - )		
<b>Moisture</b>			
Dew Point	70 °F / 21 °C		
Average Humidity	84		
Maximum Humidity	94		
Minimum Humidity	74		
<b>Precipitation</b>			
Precipitation	0.10 in / 0.25 cm	0.09 in / 0.23 cm	2.50 in / 6.35 cm (1951)
Month to date precipitation	5.96	2.85	
Year to date precipitation	39.03	18.29	
<b>Snow</b>			
Snow	0.00 in / 0.00 cm	-	- ( )
Month to date snowfall	0.0		
Since 1 July snowfall	0.0		
Snow Depth	0.00 in / 0.00 cm		
<b>Wind</b>			
Wind Speed	6 mph / 9 km/h ( )		
Max Wind Speed	14 mph / 23 km/h		
Max Gust Speed	17 mph / 27 km/h		
<b>Visibility</b>	10 miles / 16 kilometers		
<b>Events</b>	Rain		
<b>Key:</b> T is trace of precipitation, MM is missing value			
<b>Source:</b> NWS Daily Summary			



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Time (HST)	Temperature	Dew Point	Humidity	Pressure	Visibility	Wind Direction	Wind Speed	Gust Speed	Precipitation	Events	Conditions
12:53 AM	77.0 °F / 25.0 °C	70.0 °F / 21.1 °C	79%	29.90 in / 1012.3 hPa	10.0 miles / 16.1 kilometers	ENE	6.9 mph / 11.1 km/h	-	N/A		Mostly Cloudy
1:53 AM	75.9 °F / 24.4 °C	70.0 °F / 21.1 °C	82%	29.90 in / 1012.5 hPa	10.0 miles / 16.1 kilometers	ESE	3.5 mph / 5.6 km/h	-	N/A		Mostly Cloudy
2:53 AM	75.9 °F / 24.4 °C	70.0 °F / 21.1 °C	82%	29.88 in / 1011.8 hPa	10.0 miles / 16.1 kilometers	East	5.8 mph / 9.3 km/h	-	N/A		Mostly Cloudy
3:53 AM	75.9 °F / 24.4 °C	72.0 °F / 22.2 °C	87%	29.86 in / 1011.2 hPa	10.0 miles / 16.1 kilometers	Calm	Calm	-	N/A		Scattered Clouds
4:53 AM	75.0 °F / 23.9 °C	70.0 °F / 21.1 °C	84%	29.88 in / 1011.6 hPa	10.0 miles / 16.1 kilometers	NE	5.8 mph / 9.3 km/h	-	N/A		Scattered Clouds
5:53 AM	73.9 °F / 23.3 °C	70.0 °F / 21.1 °C	87%	29.89 in / 1012.0 hPa	10.0 miles / 16.1 kilometers	SW	4.6 mph / 7.4 km/h	-	N/A		Mostly Cloudy
6:53 AM	73.9 °F / 23.3 °C	71.1 °F / 21.7 °C	91%	29.88 in / 1011.8 hPa	10.0 miles / 16.1 kilometers	North	6.9 mph / 11.1 km/h	-	N/A		Partly Cloudy

3:53 PM	77.0 °F / 25.0 °C	71.1 ° F / 21.7 ° C	82%	29.87 in / 1011.4 hPa	10.0 miles / 16.1 kilometers	SSE	6.9 mph / 11.1 km/h	-	N/A		Mostly Cloudy
4:00 PM	77.0 °F / 25.0 °C	71.6 ° F / 22.0 ° C	83%	29.87 in / 1011.4 hPa	10.0 miles / 16.1 kilometers	SSE	6.9 mph / 11.1 km/h	-	N/A		Overcast
4:53 PM	77.0 °F / 25.0 °C	72.0 ° F / 22.2 ° C	84%	29.87 in / 1011.5 hPa	10.0 miles / 16.1 kilometers	SE	6.9 mph / 11.1 km/h	-	N/A		Overcast
5:53 PM	77.0 °F / 25.0 °C	70.0 ° F / 21.1 ° C	79%	29.89 in / 1012.0 hPa	10.0 miles / 16.1 kilometers	SSE	8.1 mph / 13.0 km/h	-	N/A		Mostly Cloudy
6:53 PM	75.9 °F / 24.4 °C	73.0 ° F / 22.8 ° C	91%	29.88 in / 1011.9 hPa	10.0 miles / 16.1 kilometers	East	12.7 mph / 20.4 km/h	-	0.00 in / 0.0 cm	Rain	Light Rain
7:53 PM	75.9 °F / 24.4 °C	73.0 ° F / 22.8 ° C	91%	29.88 in / 1011.7 hPa	10.0 miles / 16.1 kilometers	East	6.9 mph / 11.1 km/h	-	0.00 in / 0.0 cm		Mostly Cloudy
8:53 PM	75.0 °F / 23.9 °C	72.0 ° F / 22.2 ° C	90%	29.90 in / 1012.4 hPa	10.0 miles / 16.1 kilometers	West	3.5 mph / 5.6 km/h	-	N/A		Mostly Cloudy
9:53 PM	73.9 °F / 23.3 °C	71.1 ° F / 21.7 ° C	91%	29.90 in / 1012.4 hPa	10.0 miles / 16.1 kilometers	NW	6.9 mph / 11.1 km/h	-	N/A		Mostly Cloudy
10:53 PM	73.9 °F / 23.3 °C	71.1 ° F / 21.7 ° C	91%	29.88 in / 1011.6 hPa	10.0 miles / 16.1 kilometers	Variable	3.5 mph / 5.6 km/h	-	0.00 in / 0.0 cm		Mostly Cloudy
11:53 PM	73.0 °F / 22.8 °C	71.1 ° F / 21.7 ° C	93%	29.84 in / 1010.5 hPa	8.0 miles / 12.9 kilometers	Calm	Calm	-	N/A		Haze

**Astronomy**

Sunrise: 07:09 AM (HST)	Moon Rise: 10:37 PM (HST) 12/31
Sunset: 06:00 PM (HST)	Moon Set: 10:51 AM (HST) 12/31

Moon Phase

[more...](#)

Dec. 31   Jan. 03   Jan. 10   Jan. 17   Jan. 25





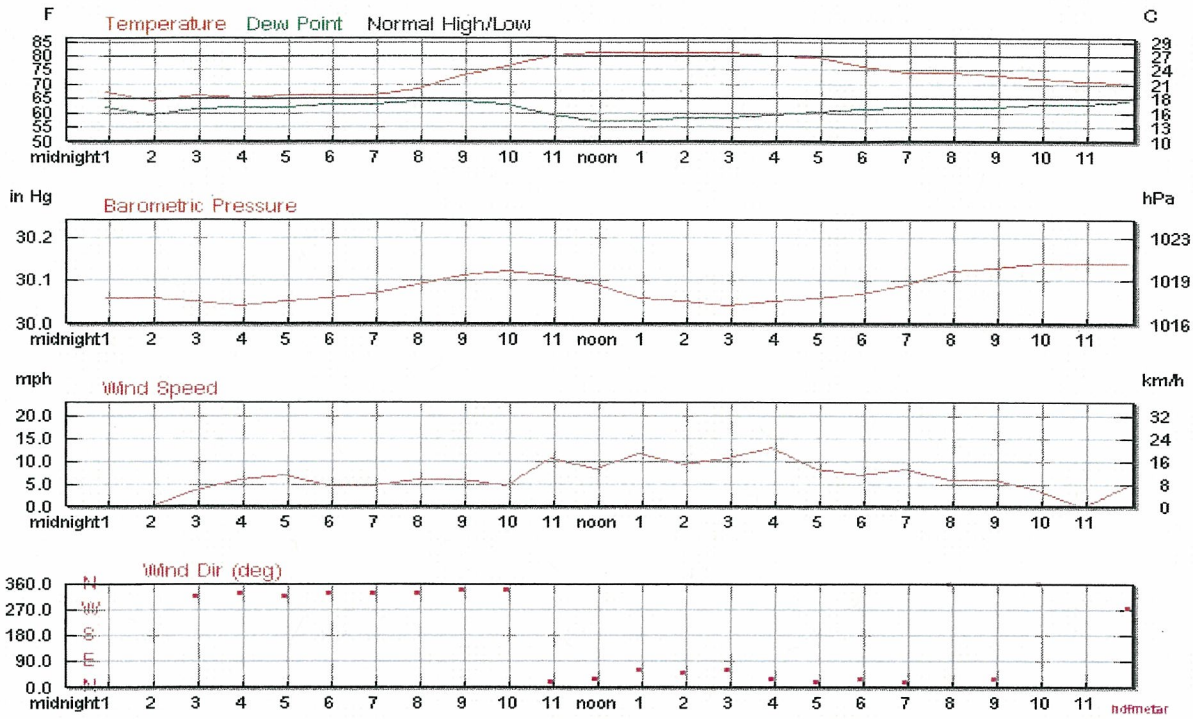
# wunderground.com

## History for Honolulu, HI on Saturday, December 31, 2005

December 31, 2005

### Daily Summary

	Actual	Average	Record
<b>Temperature</b>			
Mean Temperature	-	74 °F / 23 °C	
Max Temperature	84 °F / 28 °C	81 °F / 27 °C	85 °F / 29 °C (1986)
Min Temperature	65 °F / 18 °C	66 °F / 18 °C	56 °F / 13 °C (1958)
<b>Degree Days</b>			
Heating Degree Days	0	0	
Month to date heating degree days	0	0	
Since 1 July heating degree days	0	0	
Cooling Degree Days	10	9	
Month to date cooling degree days	270	303	
Year to date cooling degree days	4971	4561	
Growing Degree Days	23 (Base - )		
<b>Moisture</b>			
Dew Point	62 °F / 16 °C		
Average Humidity	68		
Maximum Humidity	93		
Minimum Humidity	43		
<b>Precipitation</b>			
Precipitation	0.00 in / 0.00 cm	0.09 in / 0.23 cm	2.50 in / 6.35 cm (1951)
Month to date precipitation	0.37	2.85	
Year to date precipitation	15.61	18.29	
<b>Snow</b>			
Snow	0.00 in / 0.00 cm	-	- ( )
Month to date snowfall	0.0		
Since 1 July snowfall	0.0		
Snow Depth	0.00 in / 0.00 cm		
<b>Wind</b>			
Wind Speed	6 mph / 10 km/h ( )		
Max Wind Speed	16 mph / 26 km/h		
Max Gust Speed	18 mph / 29 km/h		
<b>Visibility</b>	9 miles / 15 kilometers		
<b>Events</b>			
<b>Key:</b> T is trace of precipitation, MM is missing value			
<b>Source:</b> NWS Daily Summary			



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Time (HST)	Temperature	Dew Point	Humidity	Pressure	Visibility	Wind Direction	Wind Speed	Gust Speed	Precipitation	Events	Conditions
12:53 AM	68.0 °F / 20.0 °C	63.0 °F / 17.2 °C	84%	30.06 in / 1018.0 hPa	10.0 miles / 16.1 kilometers	Calm	Calm	-	N/A		Clear
1:53 AM	64.9 °F / 18.3 °C	60.1 °F / 15.6 °C	84%	30.06 in / 1017.8 hPa	10.0 miles / 16.1 kilometers	Calm	Calm	-	N/A		Clear
2:53 AM	66.9 °F / 19.4 °C	62.1 °F / 16.7 °C	84%	30.05 in / 1017.4 hPa	10.0 miles / 16.1 kilometers	NW	3.5 mph / 5.6 km/h	-	N/A		Clear
3:53 AM	66.2 °F / 19.0 °C	62.6 °F / 17.0 °C	88%	30.04 in / 1017.2 hPa	10.0 miles / 16.1 kilometers	NNW	5.8 mph / 9.3 km/h	-	N/A		Clear
4:53 AM	66.9 °F / 19.4 °C	63.0 °F / 17.2 °C	87%	30.05 in / 1017.5 hPa	10.0 miles / 16.1 kilometers	NW	6.9 mph / 11.1 km/h	-	N/A		Clear
5:53 AM	66.9 °F / 19.4 °C	64.0 °F / 17.8 °C	90%	30.06 in / 1017.8 hPa	10.0 miles / 16.1 kilometers	NNW	4.6 mph / 7.4 km/h	-	N/A		Clear
6:53 AM	66.9 °F / 19.4 °C	64.0 °F / 17.8 °C	90%	30.07 in / 1018.2 hPa	10.0 miles / 16.1 kilometers	NNW	4.6 mph / 7.4 km/h	-	N/A		Partly Cloudy

<b>8:53 PM</b>	73.9 °F / 23.3 °C	63.0 ° F / 17.2 ° C	68%	30.13 in / 1020.3 hPa	10.0 miles / 16.1 kilometers	NNE	5.8 mph / 9.3 km/h	-	N/A	Mostly Cloudy
<b>9:53 PM</b>	73.0 °F / 22.8 °C	64.0 ° F / 17.8 ° C	73%	30.14 in / 1020.6 hPa	6.0 miles / 9.7 kilometers	North	3.5 mph / 5.6 km/h	-	N/A	Haze
<b>10:53 PM</b>	72.0 °F / 22.2 °C	64.0 ° F / 17.8 ° C	76%	30.14 in / 1020.6 hPa	4.0 miles / 6.4 kilometers	Calm	Calm	-	N/A	Haze
<b>11:53 PM</b>	71.1 °F / 21.7 °C	64.9 ° F / 18.3 ° C	81%	30.14 in / 1020.7 hPa	5.0 miles / 8.0 kilometers	West	4.6 mph / 7.4 km/h	-	N/A	Haze

**Astronomy**

Sunrise: <b>07:09 AM (HST)</b>	Moon Rise: <b>08:01 AM (HST) 12/31</b>
Sunset: <b>06:00 PM (HST)</b>	Moon Set: <b>06:58 PM (HST) 12/31</b>

Moon Phase



Dec. 31 Jan. 06 Jan. 14 Jan. 22 Jan. 29

[more...](#)



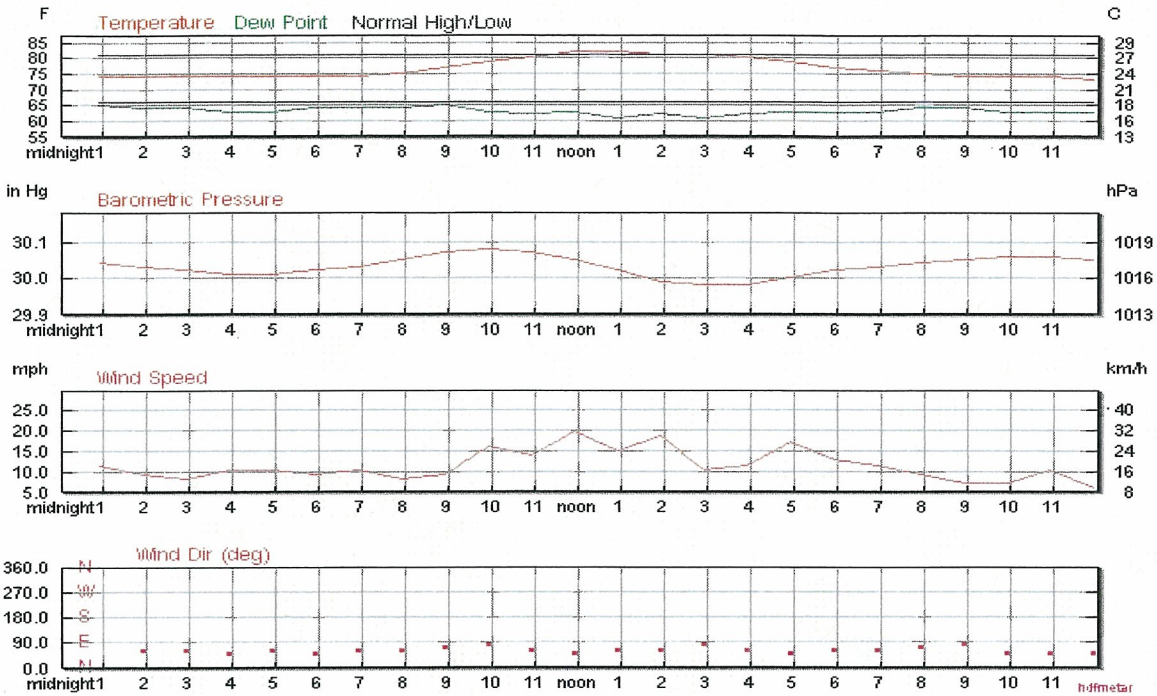
# wunderground.com

## History for Honolulu, HI on Sunday, December 31, 2006

December 31, 2006

## Daily Summary

	Actual	Average	Record
<b>Temperature</b>			
Mean Temperature	-	74 °F / 23 °C	
Max Temperature	83 °F / 28 °C	81 °F / 27 °C	85 °F / 29 °C (1986)
Min Temperature	73 °F / 22 °C	66 °F / 18 °C	56 °F / 13 °C (1958)
<b>Degree Days</b>			
Heating Degree Days	0	0	
Month to date heating degree days	0	0	
Since 1 July heating degree days	0	0	
Cooling Degree Days	13	9	
Month to date cooling degree days	352	303	
Year to date cooling degree days	4523	4561	
Growing Degree Days	28 (Base - )		
<b>Moisture</b>			
Dew Point	64 °F / 17 °C		
Average Humidity	60		
Maximum Humidity	73		
Minimum Humidity	47		
<b>Precipitation</b>			
Precipitation	0.00 in / 0.00 cm	0.09 in / 0.23 cm	2.50 in / 6.35 cm (1951)
Month to date precipitation	0.58	2.85	
Year to date precipitation	29.62	18.29	
<b>Snow</b>			
Snow	0.00 in / 0.00 cm	-	- ( )
Month to date snowfall	0.0		
Since 1 July snowfall	0.0		
Snow Depth	0.00 in / 0.00 cm		
<b>Wind</b>			
Wind Speed	11 mph / 18 km/h ( )		
Max Wind Speed	21 mph / 34 km/h		
Max Gust Speed	24 mph / 39 km/h		
<b>Visibility</b>	10 miles / 16 kilometers		
<b>Events</b>			
<b>Key:</b> T is trace of precipitation, MM is missing value			
<b>Source:</b> NWS Daily Summary			



Show full METARS (help) - Comma Delimited File

Time (HST)	Temperature	Dew Point	Humidity	Pressure	Visibility	Wind Direction	Wind Speed	Gust Speed	Precipitation	Events	Conditions
12:53 AM	73.9 °F / 23.3 °C	64.9 °F / 18.3 °C	73%	30.04 in / 1017.1 hPa	10.0 miles / 16.1 kilometers	ENE	11.5 mph / 18.5 km/h	-	N/A		Partly Cloudy
1:53 AM	73.9 °F / 23.3 °C	64.0 °F / 17.8 °C	71%	30.03 in / 1016.8 hPa	10.0 miles / 16.1 kilometers	ENE	9.2 mph / 14.8 km/h	-	N/A		Partly Cloudy
2:53 AM	73.9 °F / 23.3 °C	64.0 °F / 17.8 °C	71%	30.02 in / 1016.6 hPa	10.0 miles / 16.1 kilometers	ENE	8.1 mph / 13.0 km/h	-	N/A		Partly Cloudy
3:53 AM	73.9 °F / 23.3 °C	63.0 °F / 17.2 °C	68%	30.01 in / 1016.3 hPa	10.0 miles / 16.1 kilometers	NE	10.4 mph / 16.7 km/h	-	N/A		Partly Cloudy
4:53 AM	73.9 °F / 23.3 °C	63.0 °F / 17.2 °C	68%	30.01 in / 1016.3 hPa	10.0 miles / 16.1 kilometers	ENE	10.4 mph / 16.7 km/h	-	N/A		Partly Cloudy
5:53 AM	73.9 °F / 23.3 °C	64.0 °F / 17.8 °C	71%	30.02 in / 1016.6 hPa	10.0 miles / 16.1 kilometers	NE	9.2 mph / 14.8 km/h	-	N/A		Partly Cloudy
6:53 AM	73.9 °F / 23.3 °C	64.0 °F / 17.8 °C	71%	30.03 in / 1016.9 hPa	10.0 miles / 16.1 kilometers	ENE	10.4 mph / 16.7 km/h	-	N/A		Scattered Clouds
7:53 AM	75.0 °F / 23.9 °C	64.0 °F / 17.8 °C	69%	30.05 in / 1017.4 hPa	10.0 miles / 16.1 kilometers	ENE	8.1 mph / 13.0 km/h	-	N/A		Partly Cloudy

<b>10:53 PM</b>	<b>73.9 °F / 23.3 °C</b>	<b>63.0 °F / 17.2 °C</b>	<b>68%</b>	<b>30.06 in / 1017.8 hPa</b>	<b>10.0 miles / 16.1 kilometers</b>	<b>NE</b>	<b>10.4 mph / 16.7 km/h</b>	<b>-</b>	<b>N/A</b>	<b>Partly Cloudy</b>
<b>11:53 PM</b>	<b>73.0 °F / 22.8 °C</b>	<b>63.0 °F / 17.2 °C</b>	<b>71%</b>	<b>30.05 in / 1017.6 hPa</b>	<b>10.0 miles / 16.1 kilometers</b>	<b>NE</b>	<b>5.8 mph / 9.3 km/h</b>	<b>-</b>	<b>N/A</b>	<b>Partly Cloudy</b>

**Astronomy**

Sunrise: <b>07:09 AM (HST)</b>	Moon Rise: <b>03:28 PM (HST) 12/31</b>
Sunset: <b>06:00 PM (HST)</b>	Moon Set: <b>04:29 AM (HST) 12/31</b>

Moon Phase








**Dec. 31**   Jan. 03   Jan. 11   Jan. 18   Jan. 25



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# Rain served as New Year's air filter

By Leila Fujimori

lfujimori@starbulletin.com

Rain apparently helped reduce the amount of fireworks smoke on Oahu in the first hour of the New Year, however most locations were still at unhealthy air quality levels.

The amount of airborne particles in Kapolei and Honolulu was down significantly at 1 a.m. Jan. 1, compared to last year at the same time. But there was more smoke in Liliha and Kihei.

In Kapolei the count plunged 66 percent, to 321 micrograms per cubic meter from 968 the same time last year. And in Honolulu, the number fell by more than half to 222 from 452 last year.

Liliha saw a big jump to 637 from 476 last year, as did Kihei

## New Year's smoke

Several state air-monitoring stations recorded less smoke from New Year's fireworks this year compared to last year. The figures are micrograms of particulates per cubic meter.

	2004	2003
Honolulu (1250 Punchbowl St.)	222	452
Liliha (1486 Aala St.)	637	476
Pearl City (860 4th St.)	823	891
Kapolei (Kapolei Business Park)	321	968
Kihei (Hale Piliani Park)	106	15

Source: State Department of Health

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to 106 from 15.

Pearl City remained about the same with 823 from 891.

Topography and weather conditions accounted for differences in the numbers, said Wilfred Nagamine, Department of Health Clean Air Branch manager.

Last year's weather was clear, and light variable winds

helped disperse the smoke, while this year had no winds, he said.

However, this year's "rains throughout the evening, and also high humidity, helped scrub some of the particulates out," he said.

The Health Department released the air quality data for Dec. 31 and Jan. 1 yesterday

from its monitoring stations at Kapolei, Honolulu, Liliha, Pearl City and Kihei, Maui, which are key areas of interest.

Anything over 150 particles per cubic meter is considered unhealthy by the federal government.

However, the measurement is taken as a 24 hour average, so the state did not exceed the state and national standards for safe air quality, Nagamine said.

He said smoke in any quantity is unhealthy and may exacerbate health conditions, but the average amount of smoke on Dec. 31 and Jan. 1 was not a health risk.

"It's hard to look at one number," Nagamine said, since "air moves so fast. Anything can happen, given the dynamics of wind and weather."

# Pearl City rang in smokiest New Year

Star-Bulletin staff

Pearl City had the worst of Oahu's fireworks smoke on New Year's Eve, according to the state Health Department's Clean Air Branch.

In the four years that sampling of air quality has been done on New Year's Eve, some of the highest levels of smoke were recorded during the latest celebration, the branch reported yesterday.

More than 7,076 permits were sold on Oahu for fireworks by Dec. 30, compared with 6,100 the previous year. And the predicted nasty weather did not materialize to hold down the smoke.

"Oh boy, was I discouraged," said Wilfred Nagamine, Clean Air Branch chief. "We didn't get the rain and we didn't get the wind."

The air was sampled hourly for particulate matter of 10 microns or less at five monitoring stations — in Honolulu, Liliha, Pearl City and Kapolei on Oahu and Kihei, Maui. Ten microns is the size of talcum powder particles, Nagamine said.

State and Federal Air Quality Standards for particulate matter that is 10 microns or less is 150 micrograms per cubic meter of air.

Pearl City averaged 195 micrograms per cubic meter for 24 hours on Saturday.

The 24-hour averages at the other stations were below the state and federal standards. Liliha averaged 94 micrograms per cubic meter of air for Saturday, followed by Honolulu at 64, Kapolei at 54 and Kihei at 22.

The highest levels of particulates in the air were recorded

between 9 p.m. last Friday and 3 a.m. Saturday.

Nagamine said the 24-hour average last Friday was 131 micrograms per cubic meter of air. "It doesn't start rising until everybody does their thing at midnight. We have loading in the atmosphere."

The highest hourly reading in Pearl City on Saturday was 1,521 micrograms per cubic meter of air at 1 a.m., he said. The number dropped rapidly, with dramatic improvement by 4 a.m., according to the monitors.

Claudia Clement, program associate at the Honolulu branch of the American Lung Association, said it received a lot of calls before New Year's Eve from people who "were really scared ... not knowing what to do."

Most calls were from people

concerned that the fireworks would trigger an asthma attack, she said. "Really, all you can do is encourage them not to be in it (the smoke)."

The association offered a number of options through its Safe Haven Program. Turtle Bay Resort, Ohana East and the Radisson Prince Kuhio worked with the association to offer hotel rooms at preferential rates to people with respiratory ailments.

Clement said the association received about 15 requests from people for hotels, but it is not known how many actually checked in. The association also suggested Camp Timberline to escape the smoke.

Gaspro donated masks to protect people during peak hours of smoke, and about 45 were distributed by the association office, Clement said.



# Fireworks smoke worse than 2000

Pearl City suffered the worst air quality on New Year's Day

BY KAREN BLAKEMAN  
Advertiser Staff Writer

It's official: air quality on O'ahu early New Year's Day was worse than even the 2000 millennium celebration, and the worst place for a person trying to breathe was in Pearl City.

The increased nastiness was because of heavy fireworks use during a spate of uncooperative weather, said Wilfred Nagamine, clean air branch chief for the Department of Health.

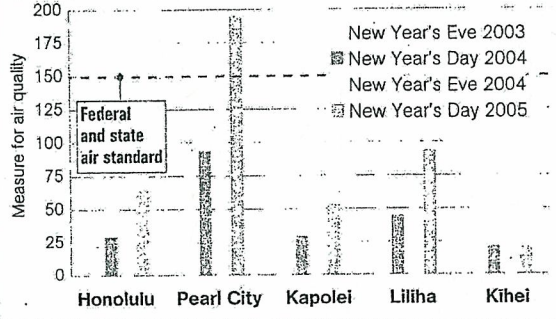
"We didn't get the rains that were forecast or the high winds I was looking forward to," Nagamine said.

The wind and rain would have cleaned the air, he said. Instead, the smoke lingered beneath still, heavy skies.

The American Lung Association had advised people with breathing difficulties to stay in-

## HIGHEST LEVELS OF SMOKE REPORTED

The state's Department of Health reported high levels of smoke over the New Year's holiday. Pollution over a 24-hour period in Pearl City exceeded the federal and state standard of 150 micrograms of particulate matter per cubic meter of air. All areas showed an increase in air pollution over last year.



Source: Department of Health

The Honolulu Advertiser

doors and run air conditioning throughout the hours fireworks were being used.

Nonetheless, three people suffering severe respiratory prob-

lems were treated in O'ahu emergency rooms, said Dan Galanis of the Health Department's injury prevention program.

The Pearl City area averaged

195 micrograms of particulate matter per cubic meter of air throughout the day on Jan. 1, exceeding the state and federal air quality standard of 150 micrograms over a 24-hour period. The levels beat the Pearl City average of 164 micrograms on Jan. 1, 2000, Nagamine said.

Pearl City measures are taken by a monitor at 860 4th St., and the worst came at 1 a.m. the first day of this year, showing 1,521 micrograms of particulate matter.

Light winds started to stir in the hours just before dawn New Year's Day — as fireworks use began to lessen — and air quality started to improve. Smoke cleared gradually throughout the day and by midnight on Jan. 2, the air in Pearl City contained only 30 micrograms of particulate matter.

Particulate matter in Liliha reached 1,354 micrograms at 1 a.m. and Honolulu hit a high of 832 micrograms at the same time.

Reach Karen Blakeman at 535-2430 or [kblakeman@honoluluadvertiser.com](mailto:kblakeman@honoluluadvertiser.com).

# New Year's a bit clearer

Pearl City gets off to usual smoky start, but it doesn't last

BY MIKE GORDON  
Advertiser Staff Writer

New Year's celebrations in Hawai'i are all about tradition: fireworks, noise and, for a single hour every year in Pearl City, some of the worst air quality in the state.

It was no different this year and even though state health officials yesterday announced some of the best overall New Year's air quality in recent years, they still had to shrug when it came to Pearl City.

Daily averages at four Health Department monitoring stations were lower than last year — even in Pearl City. But at midnight, the folks in Pearl City were living in a cloud of smoke.

At 1 a.m. Sunday, the amount of particulates floating past the Health Department's monitoring station at 860 4th St. were more than 11 times greater than the dai-

ly average allowed by federal clean air regulations.

In the next hour, though, levels at the station plunged from the peak of 1,709 micrograms, thanks to wind and rain. The clearing conditions helped the Pearl City station record a daily average of 87 micrograms for the first day of the year, well below the federal daily average of 150 micrograms.

"We don't have any reason for that," said Wilfred Nagamine, chief of the Department of Health's Clean Air Branch. "There are all kinds of guesses and unless we do a full-blown investigation it is difficult to say."

Last year's levels were worse than the 2000 millennium celebration. At Pearl City, the daily average was 195 micrograms. And at 1 a.m. Jan. 1, 2005, the station peaked at 1,521 micrograms.

But levels this year were the best in at least three years, Nagamine said. The air began to thicken about 8 p.m. New Year's Eve and peaked at 1 a.m. New Year's Day. Conditions had improved everywhere by 2 a.m.

The state also monitors air

quality in Liliha and Kapolei and in Kihei, Maui. It also monitors air quality in Honolulu, but could not this year because of construction on the building used.

"We are at the mercy of the weather," Nagamine said. "Fortunately this year, and I give it to the weathermen, they were on the nose. They predicted exactly that you would have trade winds in the late evening and light rains."

By comparison, the weather forecast for Dec. 31, 2004 included high-wind advisories and conditions that never materialized, he said.

"We cursed the weathermen," he said.

Even with the cleaner air, people still reported breathing difficulties. Honolulu Emergency Medical Services personnel responded to nine cases between 8 p.m. New Year's Eve and 2 a.m. New Year's Day, according to the department.

But as conditions cleared, their case load dropped: They only had four more cases before sunrise.

The Hawai'i chapter of the American Lung Association had feared the worst this year. Several days of light winds and dry conditions created a frenzy among people seeking free masks, said Claudia Clement, who oversees air quality issues for the chapter.

Instead of the usual 40 requests for masks on O'ahu, the chapter fielded more than 450 requests, Clement said.

"Everyone was really just being extra careful this year and expecting really bad smoke to linger because there were no trade winds," she said.

Nationally, the American Lung Association gives Hawai'i a "D" grade for air quality, Clement said, largely because of a small slice of time at the start of each year.

"Every year we have perfect air until the fireworks hit and they linger long and we get this bad grade," she said.

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Reach Mike Gordon at [mgor don@honoluluadvertiser.com](mailto:mgor don@honoluluadvertiser.com) or 525-8012.

# New Year's smoke yields to wind

*Monitoring stations reported the worst fireworks pollution was in Pearl City*

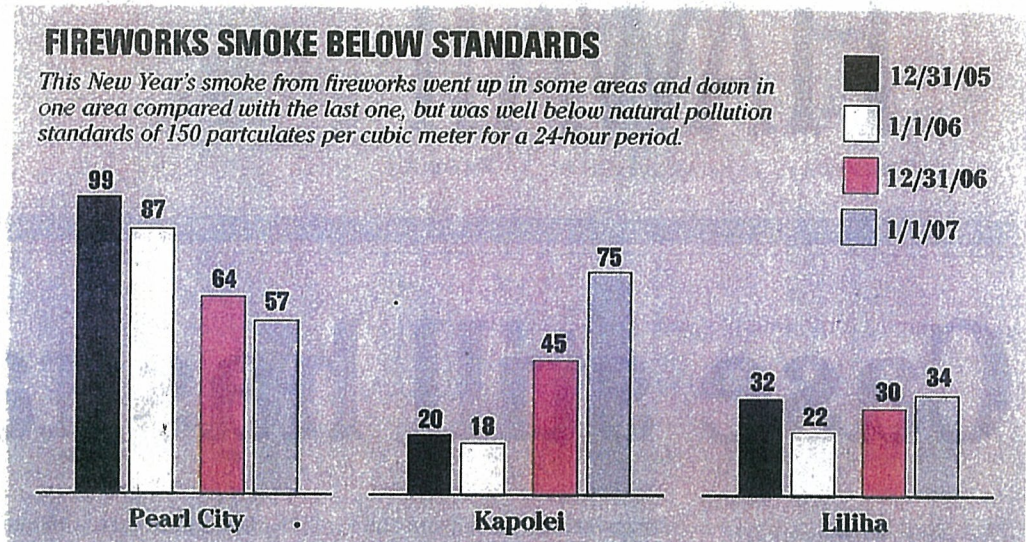
**By Mary Adamski**  
madamski@starbulletin.com

Air pollution spiked after midnight Sunday as island residents ushered in the New Year with fireworks, but the state Department of Health said readings fell within state and federal air quality standards.

Clean Air Branch Manager Wilfred Nagamine credited tradewinds with dispersing pollutants and giving some relief to those who suffer from breathing difficulties.

Pearl City recorded the worst pollution from fireworks between 10 p.m. Sunday and 1 a.m. Monday, according to a Health Department release.

Air quality levels are tracked at monitoring stations in downtown Honolulu, Liliha, on 4th Street in Pearl City, Kapolei Business Park and in Kihei, Maui. The Clean Air Branch and state Laboratories Division



Source: State Department of Health Clean Air Branch

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sampled the air hourly for particulate matter of 10 microns or less. Nagamine described 10 microns as the size of talcum powder particles.

State and federal air quality standards call for not more than 150 micrograms of particulate matter that size per cubic meter of air during a 24-hour period.

The highest hourly reading at Pearl City was 954 micrograms

at 1 a.m. Monday. But the 24-hour average for Monday was 57. Last year, the high reading at Pearl City was 1,521 micrograms at 1 a.m., and the 24-hour average for Jan. 1 was 195 micrograms per cubic meter.

The Kapolei readings — peaking with 752 micrograms at 1 a.m. — were higher than last year, and that might be attributed to a lack of wind in the

area in the early morning hours, officials said.

Last April, the American Lung Association rated Honolulu the third-cleanest city in the nation for long-term air pollution, one of only 34 major cities with no smog or ozone pollution in unhealthy ranges. But the association gave Honolulu a D grade for the 24-hour particle pollution on New Year's Eve.

State of Hawaii  
Department of Health  
Clean Air Branch

Documentation for Exceptional Events Excluded Data  
New Year's Fireworks Events 2004 to 2006  
24-Hour PM<sub>2.5</sub>

**Attachment 2**

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## Attachment 2

Figure 1. Kapolei (150030010) 2005 New Year's Event  
Normal PM<sub>2.5</sub> Fluctuations: October 2004 to March 2005  
(1 in 3 days sampling)

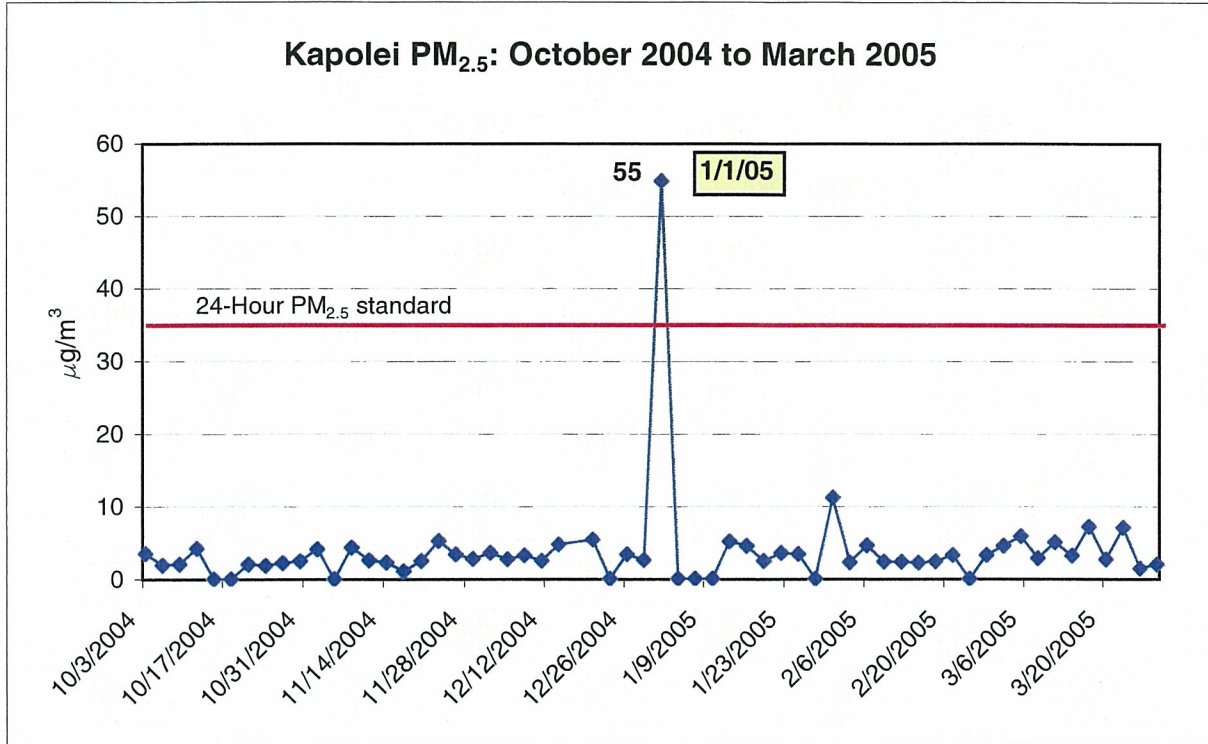
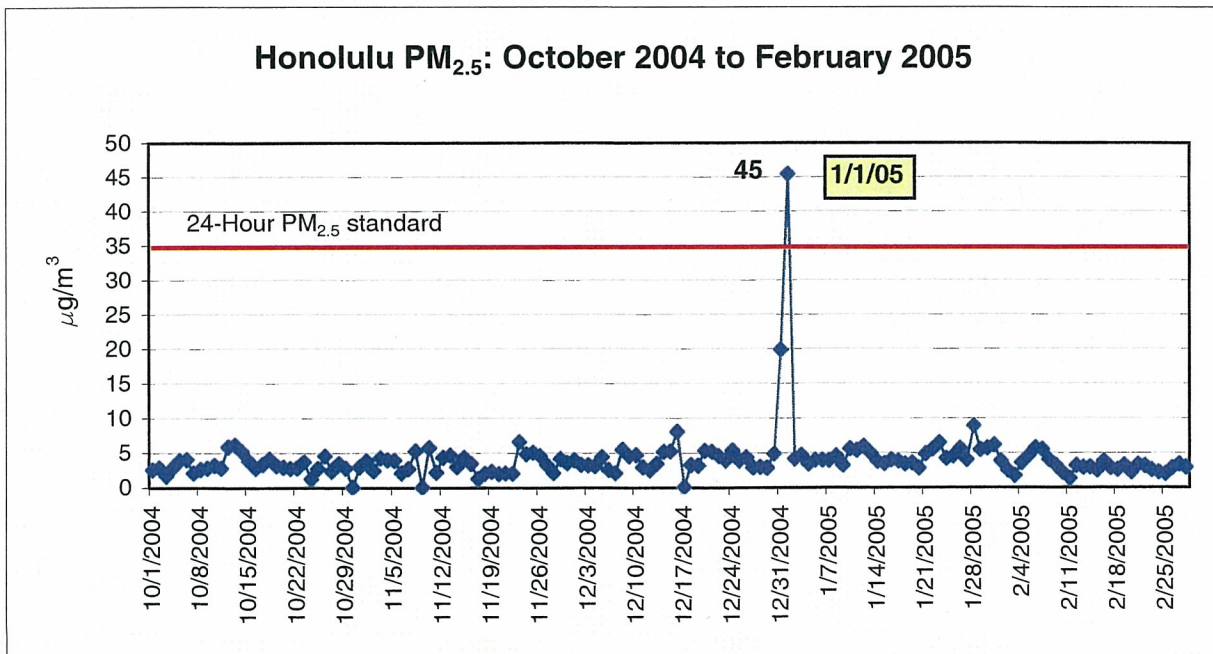


Figure 2. Honolulu (150031001) 2005 New Year's Event  
Normal PM<sub>2.5</sub> Fluctuations: October 2004 to March 2005  
(Daily sampling)



## Attachment 2 (continued)

Figure 3. Pearl City (150032004) 2004 New Year's Event  
Normal PM<sub>2.5</sub> Fluctuations: October 2003 to February 2004  
(Daily sampling)

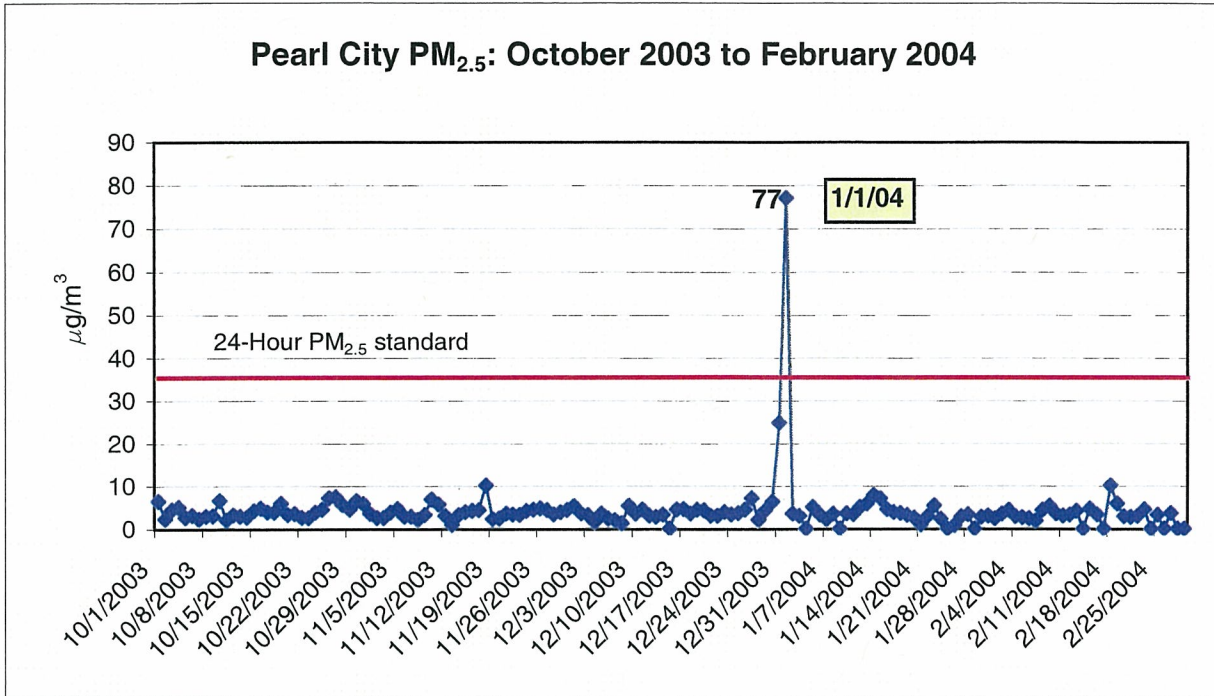
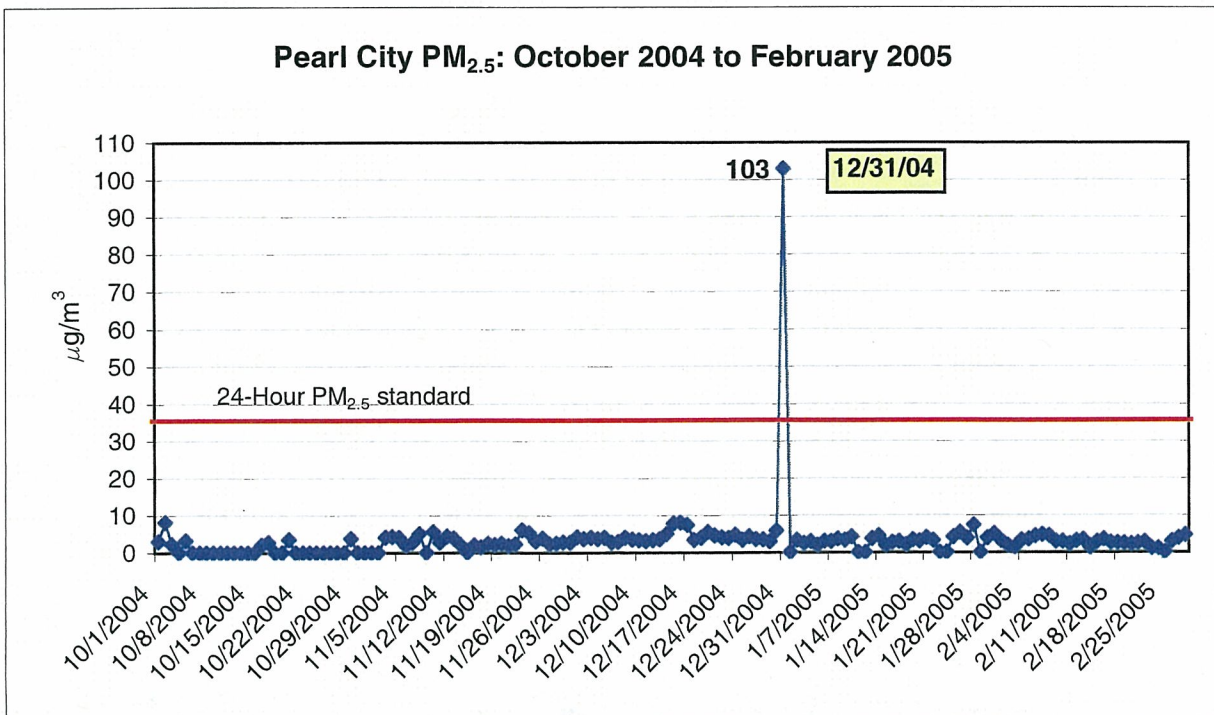


Figure 4. Pearl City (150032004) 2005 New Year's Event  
Normal PM<sub>2.5</sub> Fluctuations: October 2004 to February 2005  
(Daily sampling)



## Attachment 2 (continued)

Figure 5. Pearl City (150032004) 2006 New Year's Event  
Normal PM<sub>2.5</sub> Fluctuations: October 2005 to March 2006  
(Daily sampling reduced to 1 in 3 days in 2006)

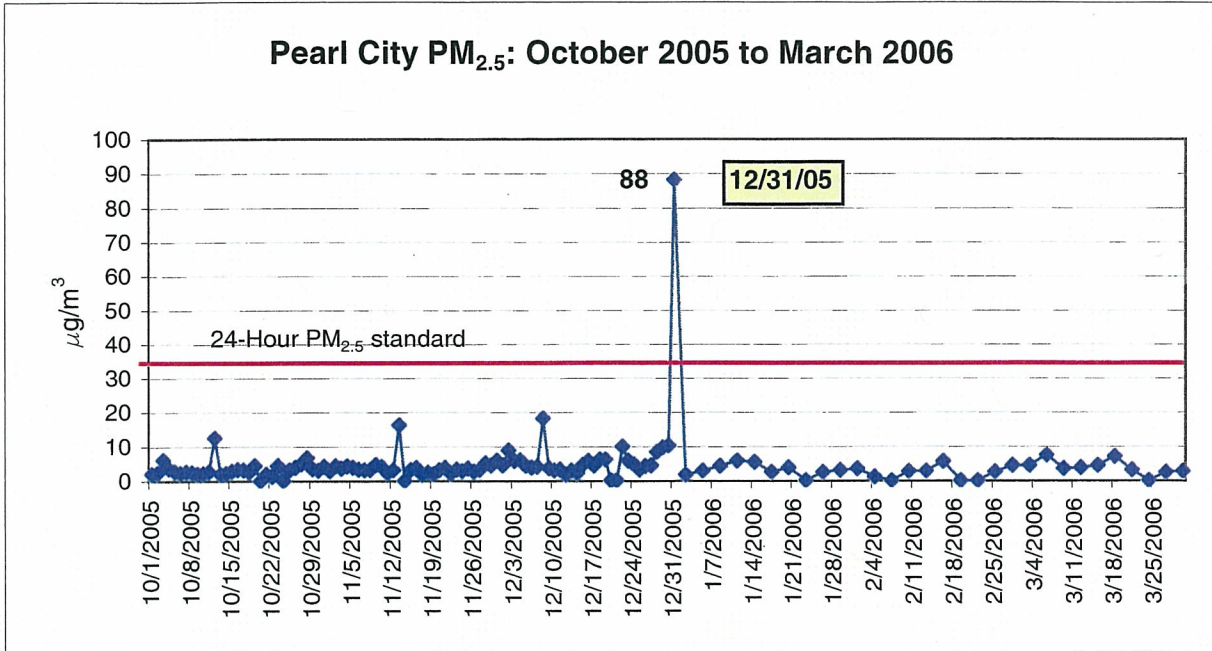


Figure 6. Pearl City (150032004) 2007 New Year's Event  
Normal PM<sub>2.5</sub> Fluctuations: October 2006 to March 2007  
(1 in 3 days sampling)

