



The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES



Thomas S. Burack, Commissioner

June 28, 2011

Mr. John MacDonald
Vice President – Generation
Northeast Utilities
Public Service of New Hampshire
780 North Commercial Street
Manchester, NH 03101

Re: Final Determination of the Baseline Mercury Input Including Responses to Comments

Dear Mr. MacDonald:

The New Hampshire Department of Environmental Services, Air Resources Division (DES) hereby issues a final determination of the baseline mercury input pursuant to RSA 125-O:14, I. A copy of the final determination, including the responses to comments, is enclosed.

Any person aggrieved by this final decision may file a petition for appeal with the Air Resources Council in accordance with RSA 21-O:14 and Env-AC 200, *Procedural Rules*. An appeal must be received by the Air Resources Council within 30 days of the date of this decision.

If you have any questions regarding this final determination, please contact Elizabeth Nixon of the Air Resources Division, Permitting & Environmental Health Bureau at (603) 271-0883 or via e-mail at elizabeth.nixon@des.nh.gov.

Sincerely,

Robert R. Scott
Director
Air Resources Division

rrs/ern

By certified mail # 7002 3150 0004 7245 5782

cc: William Smagula, PSNH
Lynn Tillotson, PSNH
Interested Parties (via e-mail)

FINAL DETERMINATION OF BASELINE MERCURY INPUT
June 28, 2011

RSA 125-O, *Multiple Pollutant Reduction Program*, was amended in 2006 to include strategies to reduce mercury emissions from coal-burning electric power plants in the State. Specifically, RSA 125-O:11-18 became effective on June 8, 2006, and requires statewide reductions in mercury emissions from “affected sources” defined as Merrimack Units 1 and 2 in Bow and Schiller Units 4, 5, and 6 in Portsmouth. RSA 125-O:13, II requires the total mercury emissions from the “affected sources” to be at least 80 percent less on an annual basis than the baseline mercury input, as defined in RSA 125-O:12, III, beginning on July 1, 2013. RSA 125-O:14, III(a), requires the “owner” of the “affected sources” to provide a written report to the Department of Environmental Services (DES) that includes the calculations used to determine the baseline mercury input. DES then verifies this data and makes a determination of the baseline mercury input and the baseline mercury emissions. On February 18, 2011, a public notice announcing the issuance of the preliminary determination and a record hearing was published in the Union Leader, the Concord Monitor, and the Portsmouth Herald. The public comment period ended on March 21, 2011. The following serves as DES’ final determination of the baseline mercury input pursuant to RSA 125-O:11-18.

Background

RSA 125-O:14, I, required PSNH to collect and analyze samples of coal on a monthly basis to determine the mercury content of the coal used in the “affected sources.” For purposes of the baseline mercury input determination, RSA 125-O:14, I(b) required coal sampling to occur at Merrimack Station Unit 1 and Unit 2 and at either Schiller Station Unit 4 or Unit 6 to serve as representative of all the Schiller Station units. Pursuant to RSA 125-O:14, I(a), coal sampling was conducted on a monthly basis beginning in August of 2006 and ending in July of 2007.

On August 30, 2006, PSNH submitted to DES, via fax, its baseline testing plan. In response, on October 2, 2006, DES sent PSNH a letter requesting additional information on, among other things, the coal sampling plan and a further explanation of how PSNH interpreted the phrase “coal used traditionally” as well as a demonstration that the samples were representative of such “traditional” coals. On December 12, 2006, DES and PSNH representatives met at the DES offices to discuss the information requested in the October 2, 2006 letter. Materials provided by PSNH at the December 12, 2006 meeting are in the DES file. As a follow-up to the meeting, on January 5, 2007, PSNH submitted to DES, via fax, a letter stating its position regarding the phrase “coal used traditionally” and “trial or test coal blends” as set forth in RSA 125-O:14, I(a).

On September 10, 2007, DES received from PSNH, via first-class mail, a Baseline Mercury Input Report (“the Report”). In the Report, PSNH calculated the average monthly mercury content for Merrimack Station Unit 1 (“MK1”) using a 2:1:1 blend of coal, consisting of 50% high sulfur coal, 25% Bailey (mid-sulfur) coal, and 25% Venezuelan (low sulfur) coal. For

Merrimack Unit 2 (“MK2”), PSNH calculated the average monthly mercury content based upon 100% Bailey (mid-sulfur) coal, arguing that Bailey coal is the “traditional” fuel used in Merrimack Unit 2. Lastly, for Schiller Station, PSNH calculated the average monthly mercury content using a simple average of the mercury content of the fuels since Schiller Station “traditionally” used a homogeneous blend of Venezuelan coals. Based upon these assumptions and the resulting calculations, PSNH asserted that the baseline mercury input for all “affected sources” was 326 pounds. On December 28, 2007, DES sent PSNH a letter requesting additional information so that DES could review the methodologies in the Report. DES sent a follow-up e-mail on August 12, 2008.

On October 27, 2009, PSNH submitted additional information related to coal type, tonnage, and mercury content. On October 29, 2009, DES sent a letter to PSNH requesting further additional information so that DES could finalize its review and determination of the baseline mercury input. On November 30, 2009, DES received from PSNH, via e-mail, its response to the October 29, 2009 letter. On February 5, 2010, DES sent PSNH another letter, stating that PSNH had submitted some, but not all, of the information requested in the October 29, 2009 letter.

On March 9, 2010, DES received a letter from PSNH with additional information for determining the baseline mercury input. In the letter, PSNH stated that it had previously calculated the average mercury content of coal and mercury baseline input using analytical data which was believed to be reported on an “as received” basis; however, further review of the lab analyses provided by coal suppliers revealed that the results were, in fact, reported on a dry basis rather than “as received.” Accordingly, PSNH updated its baseline mercury input calculation and concluded that the baseline mercury input was 308 pounds.

Analysis

RSA 125-O:12-14, establishes a comprehensive statutory scheme for defining, measuring and determining compliance with mercury emission reduction requirements at the existing coal-burning power plant units in the State, specifically, Merrimack Units 1 and 2 in Bow and Schiller Units 4, 5, and 6 in Portsmouth (defined in RSA 125-O:12, I as the “affected sources”).

RSA 125-O:12, III defines the “baseline mercury input” as the total annual mercury emissions from all of the affected sources, calculated in accordance with RSA 125-O:14, I. RSA 125-O:14, I(a) provides that the baseline mercury input shall be determined by collecting a “representative monthly sample of the coal used traditionally (not to include trial or test coal blends)” for a 12-month period, commencing on the first day of the second month following the effective date of the section (August 2006). RSA 125-O:14, I(a) then provides that:

“[t]he mercury content of the coal derived from this analysis shall be multiplied by the average annual throughput of coal for the period 2003, 2004, and 2005 (average tons of coal combusted per year) to yield the average pounds of mercury input per year into each affected source. The sum of these annual input pound averages from each affected source shall equal the baseline mercury input.”

The compliance provisions in RSA 125-O:13, II then provide that, beginning on July 1, 2013, the total mercury emissions from the affected sources shall be at least 80 percent less, on an annual basis, than the baseline mercury input.

RSA 125-O limits the representative sample to “coal used traditionally.” PSNH has argued that this phrase requires an inquiry into historical use going back many decades and would exclude even blends that have been consistently in use for many years prior to the sampling period. DES disagrees with this interpretation. In RSA 125-O:14, I(a), the phrase “coal used traditionally” is followed by a parenthetical stating “not to include trial or test coal blends”. This parenthetical serves as an explanation of the meaning of the phrase “coal used traditionally.” The term “traditionally” merely intends to exclude coal blends used on a “trial” or “test” basis in order to avoid anomalous results. The intent was to exclude “trial or test coal blends” because these would not be indicative of normal operation during the sampling period. Based on this determination, DES has recalculated the appropriate baseline mercury input using the proper coal blends for each of the “affected sources” below.

Merrimack Station

In its January 5, 2007 letter, PSNH stated that the Merrimack units were originally designed to burn higher sulfur coals and that prior to the implementation of the N.H. Multiple Pollutant Reduction Program and the Federal Title IV Acid Rain requirements, Merrimack Station’s two units began burning what PSNH refers to as “lower sulfur test coals and blends.” The N.H. Multiple Pollutant Reduction Program was enacted in 2002 and the Federal Acid Rain Program required emission reductions in 2000. Since the implementation of these programs, PSNH argues that MK1 used a blend of 50% high sulfur coal, 25% Bailey (mid-sulfur) coal, and 25% Venezuelan (low sulfur) coal. PSNH also states that MK2 has historically used 100% Bailey (mid-sulfur) coal. PSNH further states: “These coals remain the standard traditional coals, while a number of test blends have been investigated in an effort to identify alternate lower sulfur coal blends that will successfully burn in the cyclone boilers, can be dependably procured and are economically feasible, to meet new lower sulfur emission requirements.” These so-called “test blends” consisted of a number of low mercury coals including “Russian” coal, Pocahontas coal, and Venezuelan coal. PSNH has asserted that all of the low mercury coals were “test or trial blends.” See Attachment A (showing graphically PSNH’s indication of test blends).

With respect to “Russian” coal, DES agrees that the “Russian” coal appears to be a “trial or test coal blend” as there was only a short term, anomalous use of this coal. Specifically, during the sampling period, MK1 did not use any “Russian” coal. At MK2, only three percent (3%) of the total coal used during the sampling period was “Russian” coal. Between 1997 and 2008, PSNH only used Russian coal sporadically and for a very short amount of time. MK1 only used a very small percentage (less than three percent on a monthly basis) of Russian coal in October 2005. MK2 only used a small amount on a monthly basis (from 3 to 24 percent) from August 2005 through September 2006. Other than the brief period mentioned, PSNH did not use Russian coal. All of these factors taken together indicate that the “Russian” coal was a “trial or test coal blend.” However, based upon the information submitted by PSNH, DES does not agree that the other low mercury coals are “trial or test coal blends.”

In reviewing the coal usage back to January 1997, MK1 historically burned high sulfur coal (50-100%) mixed with either Indonesian coal or Bailey (mid-sulfur) coal. In late 1998 and 1999, MK1 used high sulfur coal (about 50-60%) mixed with Venezuelan and mid-sulfur (Bailey) coal. In 2000, MK1 used a coal blend with a 2:1:1 ratio of high sulfur coal, Bailey (mid-sulfur) coal, and Venezuelan coal. In 2001 and 2002, MK1 burned mixtures of high sulfur coal and Venezuelan coal or high sulfur coal sometimes mixed with either Bailey (mid-sulfur) and/or Pocahontas coal. In 2003 through mid 2008, MK1 primarily burned a coal blend with a 1:1:1 ratio of high sulfur coal, Venezuelan coal, and Pocahontas coal. Occasionally, during this time period Bailey (mid-sulfur) was also mixed into the blend.

MK2 used primarily Bailey (mid-sulfur) coal in 1997 and 1998, but in 1999, PSNH began using a small amount of Venezuelan coal and in 2001, began using Pocahontas coal. In 2003 and 2004, PSNH used a coal blend with about a 1:1:1 ratio of Venezuelan, Pocahontas, and mid-sulfur (Bailey) coal. In 2005 and 2006, PSNH continued to use Venezuelan and mid-sulfur (Bailey) coal and also mixed in Pocahontas, Russian, and high sulfur coal. In 2007 and 2008, PSNH primarily burned Venezuelan and Bailey (mid-sulfur) coal.

Consistent use of large quantities of these coal blends for nearly a decade leads to the conclusion that these are not “trial or test coal blends.” See Attachment B (showing graphical history of coal use).

Because PSNH excluded certain coals from its analysis as “trial or test coal blends,” the assertions regarding coal use by PSNH and the recommended mercury baseline proposed by PSNH are incorrect. For MK1, as stated above, PSNH argues that a blend of 50% high sulfur coal, 25% Bailey (mid-sulfur) coal, and 25% Venezuelan (low sulfur) coal was used. However, during the coal sampling period referenced in RSA 125-O:14, I(a), the coals used at MK1 consisted of approximately 36% high sulfur coal, 6% Bailey (mid-sulfur) coal, with the remaining 57% comprised of a mixture of Venezuelan and Pocahontas low mercury coals. Similarly, whereas PSNH claimed that 100% of coal used at MK2 was Bailey (mid-sulfur) coal, in actuality, Bailey coal comprised only 48% of the coal used during the applicable time period. The remainder consisted of less than 1% high sulfur coal, 41% Venezuelan coal, and 7% Pocahontas coal. The coals used during the sampling period referenced in RSA 125-O:14, I(a) (August 2006 through July 2007) are set forth in the following table:

Table1. MK1 and MK2 Coal Consumption (August 2006 – July 2007)(tons)

	High Sulfur	Bailey (Mid-Sulfur)	Venezuelan	Pocahontas	Russian	Total
MK1	124,184	20,719	92,879	103,542	-	341,324
MK2	5,580	437,469	381,368	59,615	31,218	915,250

Because DES agrees that PSNH has demonstrated that “Russian” coal was a trial or test coal blend, DES has excluded it from its analysis. However, DES used all of the remaining coals in its analysis.

To determine the total adjusted amount of non-trial, test blend coal usage during the time period of August 2006 through July 2007, the total amount of trial coal (Russian) usage during the time

period (31,218 tons) was subtracted from the total coal usage during the time period (915,250 tons) for a total non-trial, non-test coal blend usage of 884,032 tons.

For the baseline period of August 2006 through July 2007, DES then calculated the coals used on a percentage basis by PSNH at MK1 and MK2 as shown in Table 2:

Table 2. MK1 and MK2 Coal Consumption (August 2006 – July 2007)(%)

	High Sulfur	Bailey (Mid-Sulfur)	Venezuelan	Pocahontas
MK1	36%	6%	27%	30%
MK2	1%	49%	43%	7%

Schiller Station

For Schiller Units 4, 5, and 6, DES agrees with PSNH that the coal used traditionally is 100% Venezuelan. Therefore, for Schiller Station, the baseline mercury input calculations shall be based on an assumption of 100% Venezuelan coal.

Determination of Baseline Mercury Input

The statute describes the method for calculating the baseline mercury input. The steps are as follows:

- 1) Determine the average mercury input by sampling and analyzing the coal used at each affected source to determine the average mercury content of the coal “traditionally” combusted from August 2006 through July 2007, expressed in pounds of mercury per ton of coal combusted at each affected source;
- 2) Determine the annual average coal throughput for each affected source for the years 2003, 2004, and 2005; and
- 3) Calculate the Baseline Mercury Input by multiplying the average mercury content of the coal used in each unit by the annual average coal throughput.

Step 1: Determining the Average Mercury Input

Based upon the analysis above, in order to determine the mercury content of the coal, PSNH was required to sample the coal used at the affected units from August 2006 through July 2007. The total monthly mercury input is then determined by taking the sum of the mercury input by coal type. Mercury input by coal type is calculated by multiplying the total monthly coal throughput by the percentage usage of each coal type by the average monthly mercury coal content of each coal type by a conversion factor (changing parts per million to pounds per ton) as set forth in Equation 1.

Equation 1.

$$\text{Monthly Mercury Input (M) (lb Hg/month)} = \sum (T \times P \times Hg \times k)$$

Where:

T = Total monthly coal throughput (in tons of coal)

P = Percentage usage by coal type (%)

Hg = Average monthly mercury coal content by coal type (ppm)

k = conversion factor = 2000/1,000,000 (to convert Hg concentration from ppm to lbs/ton)

Values are summed over all applicable coal types.

The average annual mercury input of the coal for each affected unit is then determined by summing the total monthly mercury input found in Equation 1 and dividing that total by the total coal consumed for the period of August 2006 through July 2007 as set forth in Equation 2.

Equation 2.

$$\text{Average Annual Mercury Input by Unit (lb Hg/ton of coal)} = \frac{\sum M}{C}$$

Where:

M= Monthly Mercury Input (lb Hg/month)

C= Total Baseline Coal Consumption (tons of coal/12-month baseline period)

Values are summed over the 12-month period.

Based upon this methodology, DES has completed detailed mercury input calculations by unit. The results of these calculations are shown in Tables 3, 4, and 5 that follow.

Table 3. Average Annual Mercury Input Calculation – MK1

	Mercury Content (ppm) by Coal Type										Mercury Input (lbs)				Average Mercury Input lb/ton coal
	Aug 2006-July 2007%	Bailey (6%)		Venezuelan (27%)		High Sulfur (36%)		Pocahontas (30%)		Bailey (6%)	Venezuelan (27%)	High Sulfur (36%)	Pocahontas (30%)	Mercury Input (lbs)	
	Total Coal Throughput (tons)														
Aug-06	34,161	0.118	0.034	0.088	0.078	0.49	0.63	2.16	1.59	0.49	0.63	2.16	1.59	4.87	4.87
Sep-06	4,801	0.131	0.037	0.075	0.057	0.08	0.10	0.26	0.16	0.08	0.10	0.26	0.16	0.60	0.60
Oct-06	27,517	0.117	0.030	0.070	0.052	0.38	0.45	1.40	0.86	0.38	0.45	1.40	0.86	3.09	3.09
Nov-06	28,916	0.121	0.027	0.061	0.044	0.42	0.42	1.27	0.76	0.42	0.42	1.27	0.76	2.88	2.88
Dec-06	29,442	0.103	0.031	0.105	0.050	0.36	0.50	2.22	0.89	0.36	0.50	2.22	0.89	3.97	3.97
Jan-07	32,573	0.141	0.032	0.131	0.052	0.55	0.56	3.08	1.01	0.55	0.56	3.08	1.01	5.21	5.21
Feb-07	26,943	0.143	0.014	0.161	0.052	0.46	0.21	3.13	0.84	0.46	0.21	3.13	0.84	4.64	4.64
Mar-07	28,874	0.129	0.031	0.079	0.095	0.45	0.48	1.64	1.64	0.45	0.48	1.64	1.64	4.20	4.20
Apr-07	31,333	0.125	0.040	0.069	0.095	0.47	0.68	1.56	1.78	0.47	0.68	1.56	1.78	4.49	4.49
May-07	33,359	0.115	0.040	0.080	0.061	0.46	0.72	1.92	1.22	0.46	0.72	1.92	1.22	4.32	4.32
Jun-07	29,329	0.126	0.036	0.198	0.054	0.44	0.57	4.19	0.94	0.44	0.57	4.19	0.94	6.15	6.15
Jul-07	34,065	0.131	0.035	0.308	0.057	0.54	0.64	7.56	1.17	0.54	0.64	7.56	1.17	9.91	9.91
Total	341,313					5.10	5.97	30.39	12.86	5.10	5.97	30.39	12.86	54.32	0.000159

Source: Coal Throughput – PSNH’s Annual Emission Reports; Mercury Content by Coal Type – PSNH Submittals dated 12/12/2006, 10/27/2009, 11/30/2009, and 3/9/2010
 Mid-Sulfur: Bailey
 High Sulfur: Emerald, Loveridge, Nelms
 C-Low Sulfur Venezuelan: Mina Norte, Pasa Diablo
 D-PRB Low Sulfur: Pocahontas

Table 4. Average Annual Mercury Input Calculation – MK2

Aug 2006 - July 2007%	Mercury Content (ppm) by Coal Type										Mercury Input (lbs)			Average Mercury Input lb/ton coal
	Total Coal Throughput (tons)	High Sulfur (1%)	Bailey (49%)	Venezuelan (43%)	Pocahontas (7%)	High Sulfur (1%)	Bailey (49%)	Venezuelan (43%)	Pocahontas (7%)	Mercury Input (lbs)	Mercury Input (lbs)			
Aug-06	96,238	0.088	0.118	0.034	0.078	0.17	11.17	2.81	1.05	15.20	15.20			
Sep-06	69,673	0.075	0.131	0.037	0.057	0.10	8.95	2.23	0.55	11.84	11.84			
Oct-06	92,176	0.070	0.117	0.030	0.052	0.13	10.53	2.39	0.67	13.72	13.72			
Nov-06	91,964	0.061	0.121	0.027	0.044	0.11	10.90	2.15	0.56	13.73	13.73			
Dec-06	76,279	0.105	0.103	0.031	0.050	0.16	7.72	2.06	0.54	10.48	10.48			
Jan-07	92,454	0.131	0.141	0.032	0.052	0.24	12.75	2.55	0.67	16.22	16.22			
Feb-07	64,351	0.161	0.143	0.014	0.052	0.21	9.01	0.80	0.47	10.48	10.48			
Mar-07	94,336	0.079	0.129	0.031	0.095	0.15	11.89	2.49	1.25	15.78	15.78			
Apr-07	49,307	0.069	0.125	0.040	0.095	0.07	6.03	1.70	0.65	8.46	8.46			
May-07	13,150	0.080	0.115	0.040	0.061	0.02	1.48	0.45	0.11	2.07	2.07			
Jun-07	83,669	0.198	0.126	0.036	0.054	0.33	10.35	2.60	0.63	13.91	13.91			
Jul-07	91,622	0.308	0.131	0.035	0.057	0.56	11.77	2.76	0.73	15.82	15.82			
Total	915,219					2.26	112.56	25.01	7.88	147.71	147.71		0.000161	

Source: Coal Throughput – PSNH's Annual Emission Reports; Mercury Content by Coal Type – PSNH Submittals dated 12/12/2006, 10/27/2009, 11/30/2009, and 3/9/2010

Mid-sulfur: Bailey

High Sulfur: Emerald, Loveridge, Nelms

C-Low Sulfur Venezuelan: Mina Norte, Pasa Diablo

D-PRB Low Sulfur: Pocahontas

Table 5. Average Annual Mercury Input Calculation – Schiller

Aug 2006 - July 2007%	Mercury Content (ppm) by Coal Type		Mercury Input (lbs)	Average Mercury Input lb/ton coal
	Total Coal Throughput (tons)	Venezuelan (100%)		
Aug-06	11,944	0.067	1.60	
Sep-06	13,237	0.037	0.99	
Oct-06	4,662	0.030	0.28	
Nov-06	6,583	0.027	0.36	
Dec-06	14,868	0.038	1.13	
Jan-07	15,394	0.032	0.99	
Feb-07	15,180	0.014	0.44	
Mar-07	13,174	0.031	0.81	
Apr-07	14,228	0.040	1.14	
May-07	14,889	0.083	2.48	
Jun-07	14,737	0.039	1.15	
Jul-07	11,275	0.035	0.79	
Total	150,171		12.14	0.000081

Source: Coal Throughput – PSNH's Annual Emission Reports; Mercury Content by Coal Type – PSNH Submittals dated 12/12/2006, 10/27/2009, 11/30/2009, and 3/9/2010
 C-Low Sulfur Venezuelan: Mina Norte, Pasa Diablo

Step 2: Determining the Annual Average Coal Throughput

RSA 125-O:14, I(a) specifies that the average annual coal throughput for the period of 2003, 2004, and 2005 (in average tons of coal combusted per year) for each affected unit shall be used in the baseline mercury input calculation. Table 6 summarizes the annual coal throughput for each of the affected sources as well as the average annual coal throughput.

Table 6. Annual Coal Throughput (tons per year)

	MK1	MK2	SR4	SR5	SR6
2003	363,074	768,968	151,299	154,756	150,286
2004	339,021	841,129	155,695	166,809	163,842
2005	354,865	870,802	157,304	157,879	164,952
Average Annual Throughput	352,320	826,966	154,766	159,815	159,693

Step 3: Calculating the Baseline Mercury Input

In order to determine the baseline mercury input, the average mercury input (lbs mercury/ton of coal) for each affected source (determined in Step 1) must be multiplied by the average coal throughput (tons of coal per year) for each affected source (determined in Step 2). The total baseline mercury input is then the sum of the average annual mercury input for all units as shown below in Table 7.

Table 7. Baseline Mercury Input

	Average Mercury Input (lb/ton)	Average Throughput (2003-2005) (tpy)	Average Annual Mercury Input (lbs/yr)
MK1	0.000159	352,320	56
MK2	0.000161	826,966	133
SR4	0.000081	154,766	13
SR5	0.000081	159,815	13
SR6	0.000081	159,693	13
Baseline Mercury Input			228

Baseline Mercury Input and 80 Percent Emission Reduction

Based upon the analysis above, DES has made a determination that the baseline mercury input for the affected sources is 228 pounds per year. Accordingly, pursuant to RSA 125-O:13, II, the total mercury emissions from the affected sources shall be at least 80 percent less than 228 pounds per year, or 46 pounds per year, beginning on July 1, 2013.

Comments and Responses

DES received several comments during the public comment period. Comments were received in support of and in opposition to DES' preliminary determination of the baseline mercury input. PSNH, Conservation Law Foundation, New Hampshire Sierra Club, and members of NH Sierra Club all submitted comments. These comments and DES' response are discussed below.

PSNH

1. Definition of traditionally and use of parenthetical statement

Comment: PSNH commented that DES relied on “a mistaken interpretation of the phrase ‘coal used traditionally’.” PSNH states that “the terms must be considered as a whole and accorded their *plain* and *ordinary* meaning.” PSNH states that “the term ‘traditionally’ derives from the word ‘tradition,’ which means ‘customary,’ ‘continuing pattern,’ ‘handed-down,’ ‘customary or characteristic method or manner’.” Synonyms include ‘established’ and ‘conventional.’ Thus, the question is what coal has been used in a continuing pattern on a customary, established basis?”

PSNH says that DES defined “traditionally” by reference exclusively to the parenthetical statement. PSNH states that such an interpretation “violates the rules of the statutory construction.” PSNH states that “[t]he parenthetical here is meant to clarify that under no circumstances should trial coal or test blend coal be used in the calculations to determine coals ‘traditionally’ used. That is all the parenthetical is meant to do.” PSNH states that Merrimack Unit 2 has been operating since 1968; therefore, the first 30 years of operation must be taken into consideration in determining the coal used “consistently and traditionally.” PSNH says that inventory records show that Bailey coal and Loveridge coal are the coals used traditionally at Merrimack Station.

In PSNH's comment, it provided an example of four types of coal: Type A, Type B, Type C, and Type D. “Type A has been used consistently for 20 or 30 years and is clearly ‘traditional’ coal. Type B is a trial fuel and has been used intermittently but has caused operational problems and is not an option for future long-term use. Type C is used in varying blended amounts in test fuel blends, generally in efforts tied to achieving emissions reductions, while monitoring operational impact and availability. Type D is the world of coal which exists beyond that used traditionally at PSNH facilities and which has not been used on a trial basis or in a test blend. This is a fuel of critical importance (demonstrating the importance of fuel flexibility), since such fuel provides future options, and, going forward, may be used in a trial run or test blended as fuel, but which is clearly not traditional.”

PSNH explains that even if a fuel has been used for several years, it may not be traditional because of “availability and price and operational impact.” In addition, PSNH states that because a coal is not a “trial or test blend” coal, does not make it a “traditionally used” coal. PSNH states that “DES made this error by violating the canons

of statutory construction, as articulated in the cases cited above, which require a focus on the operative term, not on the parenthetical which is subservient to the operative term.”

Response: As discussed above, RSA 125-O:14, I(a) states the following:

Baseline mercury input shall be determined as follows: (a) No later than the first day of the second month following the effective date of this section, and continuing for 12 months thereafter, a representative monthly sample of the coal used traditionally (not to include trial or test blends) by each affected source shall be collected from each of the units identified in subparagraph (b) and analyzed to determine the average mercury content of the fuel for each unit expressed in pounds of mercury input per ton of coal combusted at each affected source.

As PSNH indicates in its comments above, the critical term is the word “traditionally.” DES has carefully considered the arguments set forth by PSNH and understands the standard rules for statutory construction; however, DES is not persuaded by the interpretation proposed by PSNH. Use of the parenthetical as an explanatory phrase, or appositive, best comports with the plain meaning of the words of the statute taken as a whole, with the structure of the statute, and with the purpose of the statute.

In addition, even if DES accepted PSNH’s assertion that the “plain and ordinary” meaning of the word “traditionally” must be used without limitation or explanation from the parenthetical, the coals at issue must still be included in any analysis. PSNH proposes that the plain meaning of the word “traditionally” includes meanings such as “customary” and “established.” The coals at issue have been in use for a significant amount of time. The facts indicate that such use is now “customary” and that this use has certainly been well established. Therefore, the coals at issue must be included in the DES baseline analysis when using any reasonable definition of “traditionally.”

In its comment letter, PSNH argues that Venezuelan coal is a coal type that has been used for four or five years. However, PSNH does not consider it to be a “traditional coal” because constraints with availability, cost, and operational conditions exist. PSNH argues that because of these constraints and the variability of the coal usage, Venezuelan coal cannot be considered traditional.

Based on review of the coal consumption records, DES notes that Venezuelan coal has been used for approximately ten years. This type of coal has been used for a significant period of time, and DES considers it a coal that is regularly used by PSNH. These facts support the conclusion that it is a traditional coal. There is no language in the statute that would support the exclusion of Venezuelan coal based on PSNH’s claims. PSNH would seemingly exclude any coal if the use of such coal could change based on economic factors or availability. Presumably, all coals are chosen based on factors that include economic or regulatory considerations. Using this parameter to determine which coal may be considered “traditional” provides neither a reasonable nor a workable interpretation of the statute.

2. Trial or Test Blend Coals

Comment: PSNH states that since 1968, it has used Bailey and Loveridge coals. In the late 1990s and early 2000s, with the issuance of the *New Hampshire Clean Power Strategy* (NHCPS) and the passage of the New Hampshire Clean Power Act, PSNH used various coals and coal blends to reduce sulfur dioxide emissions. PSNH stated that the mid- to low-sulfur coals were tested for multiple years to determine a low-cost, effective fuel. PSNH stated that in 2004, it began to test fuels for compatibility with the activated carbon injection program funded with the grant from the Department of Energy (DOE). PSNH states that the DOE testing on MK2 took place from April 2, 2006, through April 2, 2008.

PSNH comments that the final DOE report states: “The Unit 2 boiler is 336 MW Babcock & Wilcox (B&W) cyclone-fired unit that is firing a test blend of medium-sulfur eastern bituminous and Venezuelan coals to maintain a target goal of 1.2% for SO₂ and mercury control.” (Merrimack Final Scientific/Technical Report at 7).

Response: PSNH states that in the late 1990s and early 2000s, it began to test various types of coals to meet the sulfur reduction requirements of the New Hampshire Clean Power Strategy. In addition, in 2004, PSNH states that it began to test additional fuels to evaluate various methods to reduce mercury emissions. PSNH states that it began to test fuels to determine compatibility with an activated carbon injection program funded by a grant from the Department of Energy. PSNH references the DOE report stating that PSNH used “test blend” coals during the DOE program which was conducted on MK2 from April 2006 – April 2008. As previously discussed, PSNH has burned a similar pattern of coals since about 2001; therefore, these fuel types cannot be considered trial or test blends. Over a decade of similar coal type usage supports the conclusion that the coal is traditional. The only type of coal burned during the sampling period that was used on a trial or test basis was Russian coal.

3. Changing Coals during Sampling Period

Comment: PSNH states that the facility should not be penalized for using test coals during the sampling period. In hindsight, PSNH states that it would have switched to the traditional, high sulfur, high mercury coals.

Response: As previously stated, DES considers that coal burned before, during, and after the sampling period are traditional coals, because PSNH has used them for over a decade. The statute does not limit consideration to only the coal types used prior to calendar year 2000.

4. Basis was Clean Power Act

Comment: PSNH stated that *The New Hampshire Clean Power Strategy* (NHCPS) was the basis for the emission reductions required by the statute. PSNH states that the NHCPS calculated the annual baseline mercury emission as 328 pounds per year using a

baseline period of 1996-1997. PSNH says that “328 pounds was touted repeatedly over the years following the publication of the New Hampshire Clean Power Strategy as a basis for legislative action and, in fact, was relied on by the legislators and by the company.”

Response: The original Clean Power Act, effective on July 1, 2002, did not include specific requirements for mercury reductions even though the NHCPS discussed a proposed strategy. At that time, the legislature did not incorporate any mercury emission limitations, nor reference any baseline mercury data from the NHCPS. The law that addresses mercury reduction requirements from affected units did not become effective until June 8, 2006. This is over five years from the original adoption of the Multiple Pollutant Reduction Program. The NHCPS may have served as a starting point for the legislation, but other factors contributed to the final version. For example, on March 15, 2005, the United States Environmental Protection Agency issued the Clean Air Market Rule (CAMR) requiring mercury reductions from electric utilities, and on May 31, 2006, EPA issued a final decision regarding the reconsideration requests.

PSNH states that the baseline period and the baseline mercury input stated in the law were based on the NHCPS. However, if the legislature had intended to use the baseline period and the baseline mercury input data from the NHCPS, then the statute would have been more prescriptive. For example, if the Legislature had intended the baseline period to be a time period other than that for which the sampling occurred, the language would have specifically stated that time frame. Also, if the Legislature had intended the baseline mercury input to be 328 pounds per year then the statute would have explicitly established the baseline as 328 pounds per year. Instead the statute required sampling to determine a baseline mercury input. The mercury emission estimates (of 328 pound/year) for 1996/1997 in the NHCPS were based on the US EPA’s *Compilation of Air Pollutant Emission Factors* (AP-42) data and not actual coal sampling or stack test data specific to the PSNH facilities.

5. Type of coal used and fuel flexibility

Comment: PSNH commented that it will not be able to meet the emission reduction requirements using the traditional coals that work best in the cyclone boilers. PSNH states, “That outcome is directly contrary to what the legislature intended because it effectively reads the word ‘traditionally’ right out of the statute. PSNH would be compelled to use blends of non-traditional coals that could create operational and availability risks as well as increased costs for our customers.” PSNH states that DES’ preliminary determination of the baseline mercury input takes away fuel flexibility that would have allowed for the “optimization of operations, the avoidance of supply disruption, the maintenance of reliability, and the opportunity to control fuel costs.”

Response: PSNH has burned similar types of coals since about 2001. These coals are regularly used for purposes of meeting both operational and environmental needs. DES therefore concludes that these coals are traditional fuels. Over a decade of similar coal type usage defines a coal as traditional. A fuel that is used on a continuous basis for a

period extending to a decade, goes far beyond the defined testing period. PSNH has been using what DES has considered in its analysis to be “traditional” coals for over a decade to meet the Multiple Pollutant Emission Reduction Program.

PSNH states that fuel flexibility “allows for the optimization of operations, the avoidance of supply disruption, the maintenance of reliability, and the opportunity to control fuel costs.” PSNH also states that the DES’ preliminary determination constrains them and “compels them to use potentially unavailable blend of coals that is overly reliant on foreign sources (most notably Venezuelan).” PSNH also states that the supplier of the Venezuelan coal has declared force majeure events that prevent it from supplying the contracted amounts of coal. Lastly, PSNH states that the Venezuelan coal supplier will not enter into long-term contracts. In response, DES notes that the statute is not prescriptive as to the type of coal that PSNH must use, instead it allows for flexibility in meeting mercury reduction requirements. With the use of the scrubber (Flue Gas Desulfurization), PSNH can vary the coal types. As shown in Attachment B, the type of coals used by PSNH has varied over time. From a sulfur and mercury perspective, the Pocahontas coal and Venezuelan coal are similar in that they both have a low mercury and low sulfur content. The statute and this decision are not prescriptive in the type of coal that PSNH must use or other measures that it may use to meet mercury reduction goals.

Sierra Club

1. Baseline Mercury Input does not meet MACT

Comment: The New Hampshire Sierra Club stated that DES’ mercury emission limitation must be the Maximum Achievable Control Technology (MACT) standard for hazardous air pollutants (HAPs) for Merrimack Station Units 1 and 2 and Schiller Station Units 4, 5, and 6 per 42 USC 7412(j)(2) and 42 USC 7412(c)(2) and (3). In addition, NH Sierra Club states that the emission limit must take into account “a health threshold with an adequate margin of safety.”

Response: NH’s statute requiring mercury emission reductions is a state requirement, not a federal requirement. This statute requires statewide reductions in mercury emissions from “affected sources” defined as Merrimack Units 1 and 2 located in Bow and Schiller Units 4, 5, and 6 located in Portsmouth. RSA 125-O:13, II requires the total mercury emissions from the “affected sources” to be at least 80 percent less, on an annual basis, than the baseline mercury input, as defined in RSA 125-O:12, III, beginning on July 1, 2013. The Multiple Pollutant Reduction Program codified as RSA 125-O is a state-specific program and is not intended to fulfill the case-by case MACT requirement. On March 16, 2011, the USEPA Administrator signed the proposed utility MACT to fulfill the federal requirements. The proposal was published in the Federal Register on May 3, 2011 (76 FR 24976). Once these federal MACT requirements become final, affected facilities will be required to meet the new federal emissions standards, in addition to any applicable state requirements.

2. MACT should require the lowest mercury content coal

Comment: Sierra Club comments that the MACT must look at the amount of mercury input versus the emissions output. Sierra Club states that PSNH should burn the cleanest coal, with the lowest mercury content. Sierra Club says that a common sense approach is not taken because PSNH should be required to use coal with less mercury so that less mercury is emitted.

Response: The statute does not dictate specific coal types to be used, but instead requires PSNH to meet an overall state-wide 80 percent reduction from the baseline mercury input of the affected units. The statute specifically provides flexibility in both fuel type and operations such that PSNH can choose how to demonstrate compliance with the requirements. The statute allows for additional fuel flexibility by requiring the installation and operation of a scrubber at PSNH Merrimack Station. As stated previously, the statutory requirements of RSA 125-O:11-18 are state-specific requirements and are not intended to fulfill any federal case-by case MACT requirement.

3. The baseline mercury input does not specify the mercury content of the coal

Comment: Sierra Club comments that the baseline mercury input determination does not specify a mercury content for the coal. In addition, DES relies on summary data provided by PSNH without any laboratory specific analysis. The determination is based on an average of the coals burned from 1995 to 2006. The determination allows Merrimack Station to burn the entire 228 pounds of mercury if Schiller Station is not operating, “potentially compounding the already dangerous mercury hot spots downwind of Merrimack Station.” Sierra Club also states that PSNH can burn the “same dirty coal that it has burned over the years.”

Response: The baseline mercury input is calculated as follows:

- 1) Determine the average mercury input by sampling and analyzing the coal used at each affected source to determine the average mercury content of the coal traditionally combusted from August 2006 through July 2007, expressed in pounds of mercury per ton of coal combusted at each affected source;
- 2) Determine the annual average coal throughput for each affected source for the years 2003, 2004, and 2005; and
- 3) Calculate the Baseline Mercury Input by multiplying the average mercury content of the coal used in each unit by the annual average coal throughput.

Step 1: Determining the Average Mercury Input

Based upon the analysis above, in order to determine the mercury content of the coal, PSNH was required to sample the coal used at the affected units from August 2006 through July 2007. The total monthly mercury input is then determined by taking the

sum of the mercury input by coal type. Mercury input by coal type is calculated by multiplying the total monthly coal throughput by the percentage usage of each coal type by the average monthly mercury coal content of each coal type by a conversion factor (changing parts per million to pounds per ton) as set forth in Equation 1.

Equation 1.

$$\text{Monthly Mercury Input (M) (lb Hg/month)} = \sum (T \times P \times Hg \times k)$$

Where:

T = Total monthly coal throughput (in tons of coal)

P = Percentage usage by coal type (%)

Hg = Average monthly mercury coal content by coal type (ppm)

k = conversion factor = 2000/1,000,000 (to convert Hg concentration from ppm to lbs/ton)

Values are summed over all applicable coal types.

The average annual mercury input of the coal for each affected unit is then determined by summing the total monthly mercury input found in Equation 1 and dividing that total by the total coal consumed for the period of August 2006 through July 2007 as set forth in Equation 2.

Equation 2.

$$\text{Average Annual Mercury Input by Unit (lb Hg/ton of coal)} = \frac{\sum M}{C}$$

Where:

M= Monthly Mercury Input (lb Hg/month)

C= Total Baseline Coal Consumption (tons of coal/12-month baseline period)

Values are summed over the 12-month period.

Sierra Club indicated that the preliminary determination calculated an average of the coal type combusted for the time period 1995-2006. Sierra Club's interpretation of the statute is incorrect. The coal sampling requirement specified in RSA 125-O:14, is based on the timeframe from August 2006 through July 2007, and the coal throughput period is calendar years 2003, 2004, and 2005.

Sierra Club also stated that if Schiller Station is not operating, then Merrimack Station could burn the entire 228 pounds of mercury. This statute limits total mercury emissions from all affected units (including Merrimack Station Units 1 and 2, and Schiller Stations Units 4, 5, and 6 when burning coal) to an 80 percent reduction from the baseline mercury input. The total mercury emissions translate to 80 percent of 228 pounds per year or 46 pounds per year. As stated by Sierra Club, it is a combined cap on the affected units.

Sierra Club stated that “the multi-year averaging methodology allows PSNH to continue using the same dirty coal that it has burned over the years.” As discussed above, the statute provides flexibility as to the type of coal that can be burned, as long as PSNH reduces overall mercury emissions by 80 percent below the baseline mercury input. The use of the scrubber to achieve reductions in both mercury and sulfur dioxide emissions will also provide flexibility as to the type of coal that can be burned in the affected units. Sierra Club again stated that this averaging methodology allowed by the statute is not MACT. As discussed above, the statute is not intended to be MACT. Instead the US EPA proposed the MACT on March 16, 2011 and published the proposal in the Federal Register on May 3, 2011 (76 FR 24976). Once the federal MACT standard is final, PSNH will be required to meet both state and federal applicable requirements.

4. Mercury accumulates in species and is a health risk

Comment: Sierra Club stated that elevated levels of mercury have been found in species in the Merrimack River and other New Hampshire water bodies. Sierra Club also stated that mercury accumulates in the species and poses a risk to humans.

Response: In 1998, DES issued the *New Hampshire Mercury Reduction Strategy* discussing various strategies to reduce mercury emissions and thus mercury deposition. In 1999, DES formed the Mercury Task Force to oversee the implementation of these reduction strategies. New Hampshire has already implemented many of these mercury reduction strategies, including reducing emissions from large and small municipal waste combustors; collecting and recycling items in the waste stream such as batteries, mercury-containing lamps, mercury thermometers, and mercury-added thermostats; and closing hospital/medical/infectious waste incinerators.

Coal-fired power plants were also included in the strategy as a source to reduce mercury emissions. In June 2006, RSA 125-O:11-18 became effective to reduce 80 percent of mercury emissions from New Hampshire’s coal-fired power plants, Merrimack Station and Schiller Station. With all of these mercury emission reduction strategies, including the coal-fired power plant emission reductions, New Hampshire will significantly reduce mercury deposition in local water bodies and decrease the accumulations in the species of these waters.

Conservation Law Foundation (CLF)

1. DES Properly Determined the Baseline and Traditional Coal

Comment: CLF supports the methodology that DES used to determine the baseline mercury input, and noted that the coals that PSNH wants to exclude in the determination comprise 57 percent of coal used by MK1 and 48 percent of the coal used by MK2 during the sampling period.

Response: DES notes that Table 8 shows the coal usage (on a percentage basis) for the period of time from August 2006 through July 2007. Note that for this determination, PSNH says that the following coal usage assumptions should be used to define traditional coal: 100% Bailey coal at MK2 and 50% high sulfur, 25% Bailey, and 25% South American at MK1.

Table 8. MK1 and MK2 Coal Consumption (August 2006 – July 2007)

	High Sulfur	Bailey (Mid-Sulfur)	Venezuelan	Pocahontas
MK1	36%	6%	27%	30%
MK2	1%	49%	43%	7%

Sierra Club Members

1. The Need for a Health-Based Mercury Standard

Comment: Sierra Club members requested a requirement for a health threshold for mercury. They commented that mercury is a neurotoxin that “bio-accumulates in our bodies and in wildlife.” Sierra Club members state that in New Hampshire, the fish are too dangerous to eat. Sierra Club members also commented that the real health costs of mercury emissions are high.

Response: The statute requires PSNH to reduce mercury emissions by 80 percent from the baseline mercury input from affected units. As part of establishing the baseline mercury input, the statute does not require a health analysis, nor the evaluation of the health costs of reducing mercury emissions. However, as noted previously, the *New Hampshire Mercury Reduction Strategy* recognized that mercury emission reductions are necessary. With the reduction in mercury emissions from coal-fired power plants as required by this statute and other sources such as municipal waste combustors and hospital/medical/infectious waste incinerators, mercury deposition and bio-accumulation will decrease.

2. No Aggregation of the Emissions from Merrimack and Schiller

Comment: Sierra Club members commented that the determination should not “aggregate the pollution from Merrimack Station and Schiller Station because the Clean Air Act requires a mercury standard for each and every plant.” The commenters asked to “lower the mercury baseline then lower it a little bit more.”

Response: The statute requires the baseline mercury input to be combined for all affected units. Specifically, RSA 125-O:12 III defines baseline mercury input as “the total annual mercury input found in the coal used by all of the affected sources, calculated in accordance with RSA 125-O:14, I. The commenter also stated that the Clean Air Act requires a standard for each plant. This is a state law and is not as a result of the federal Clean Air Act. The US EPA recently proposed a federal MACT standard for utility boilers. Once the federal MACT requirements become final, affected sources will be

required to meet both state and federal applicable requirements. The commenter also wanted the mercury baseline to be reduced. RSA 125-O-13, V requires that any mercury reductions achieved greater than the 80 percent must be “sustained insofar as the proven operational capability of the system, as installed, allows.”

3. Move away from coal-burning and shutdown Merrimack Station

Comment: A few Sierra Club members commented that it is time to move away from the use of coal and time to find a different source of energy, including green sources. Commenters want to shutdown Merrimack Station because they say the plant is old and dirty and the power is not needed in the state since NH is a net exporter of power.

Response: The statute is applicable to the existing coal-burning power plants in the state. The law requires the installation of a scrubber as the method for achieving the mercury reductions. DES does not have the statutory authority to require PSNH to shut down its coal-fired power plants nor has it been determined that such measures would be in the public interest.

4. Need for a lower acceptable mercury emission level

Comment: A Sierra Club member said that “228 lbs of emitted mercury is not an acceptable level.”

Response: Based upon this final determination, the baseline mercury input is 228 pounds of mercury per year. The statute requires an 80 percent reduction from the baseline mercury input beginning on July 1, 2013; therefore, the total mercury emissions from all affected units cannot exceed 46 pounds of mercury per year.

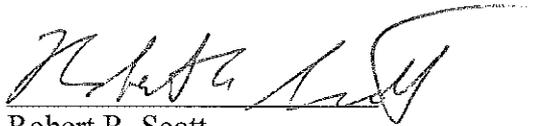
Decision

After consideration of the information provided by PSNH and all public comments received, DES hereby issues this final determination. The baseline mercury input is 228 pounds per year. Accordingly, pursuant to RSA 125-O:13, II, the total mercury emissions from the affected sources shall be at least 80 percent less than 228 pounds per year, or 46 pounds per year, beginning on July 1, 2013.

In accordance with RSA 21-O:14 and Env-AC 200, *Procedural Rules*, any person aggrieved by this final decision may file a petition for appeal with the Air Resources Council, which must be received within 30 days of the date below. Such appeal and 15 copies shall be filed in accordance with the provisions of Env-AC 200, *Procedural Rules*, and forwarded to the Chair of the Air Resources Council at the address below:

Air Resources Council
Attn: Appeals Clerk
c/o DES, Legal Unit
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

If no petition is received within the 30-day period, this decision will become final.



Robert R. Scott
Director
Air Resources Division

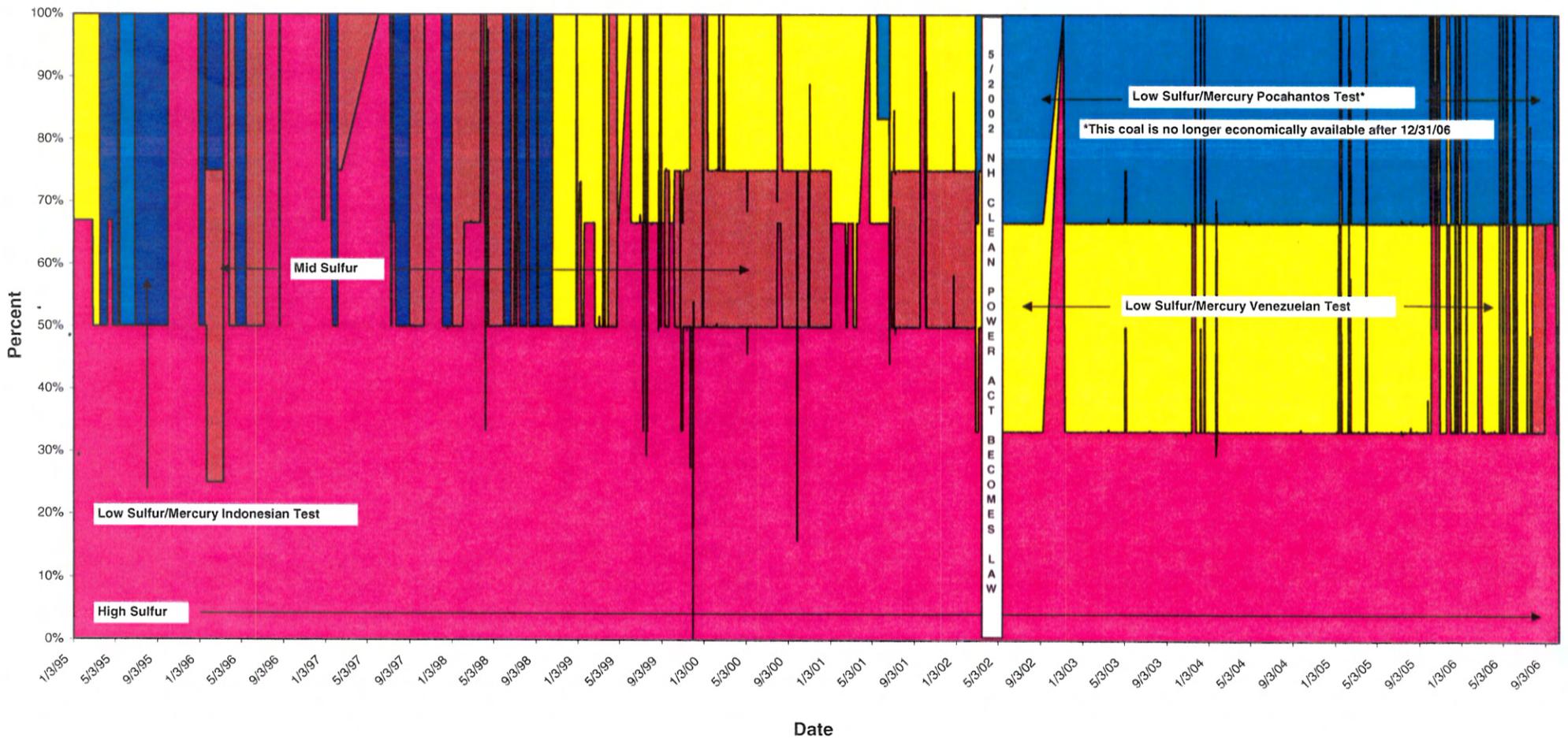
28 June, 2011
Date

cc: William Smagula, PSNH
Lynn Tillotson, PSNH
Interested Parties (via e-mail)

ATTACHMENT A

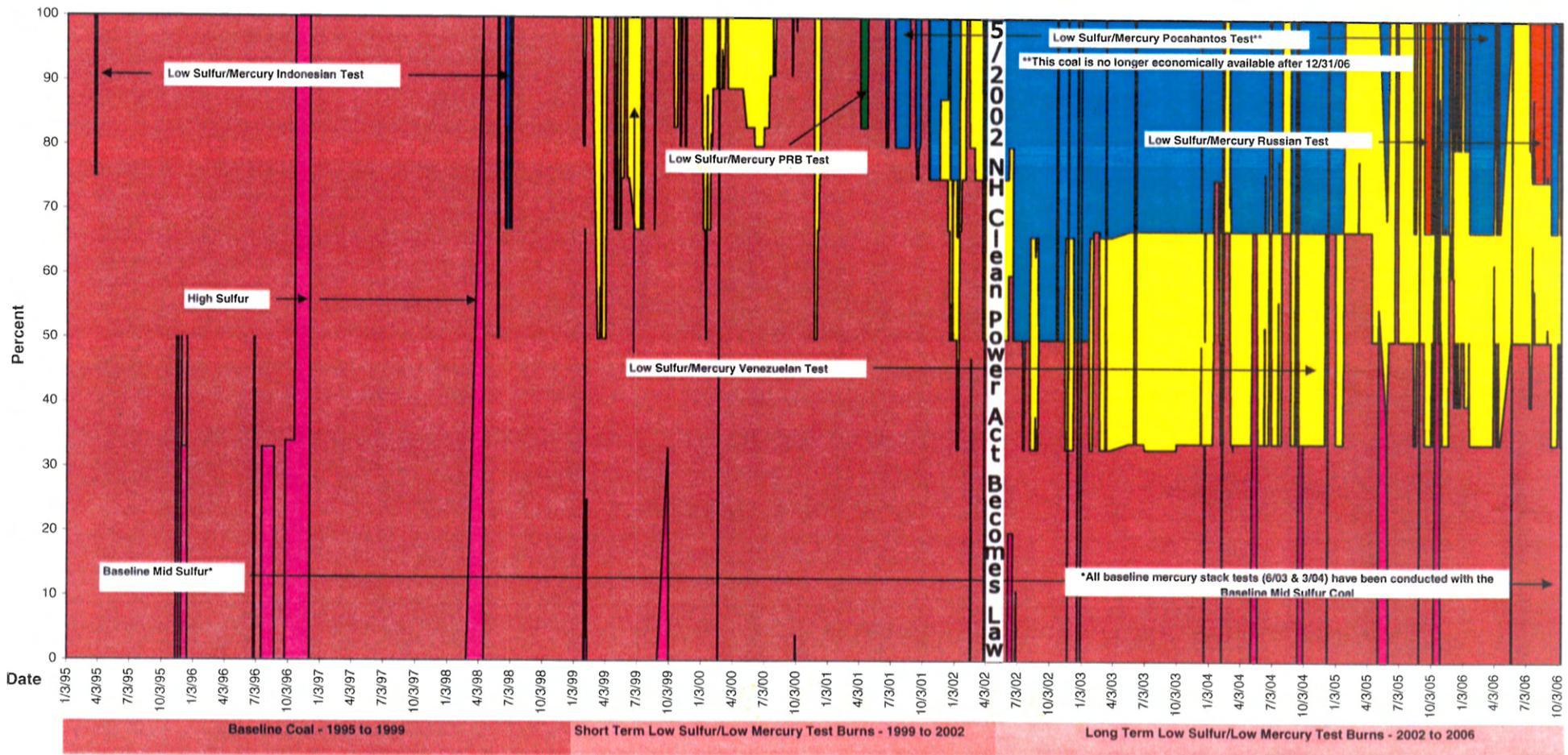
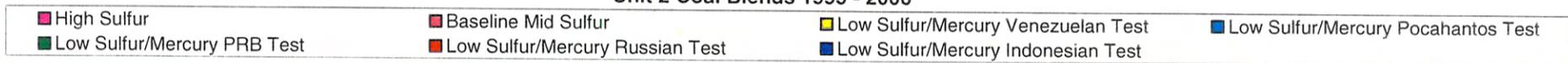
Unit 1 Coal Blends 1995-2006

■ High Sulfur
 ■ Mid Sulfur
 ■ Low Sulfur/Mercury Venezuelan Test
 ■ Low Sulfur/Mercury Pocahantos Test
 ■ Low Sulfur/Mercury Russian Test
 ■ Low Sulfur/Mercury Indonesian Test



Submitted by PSNH on 12/12/2006

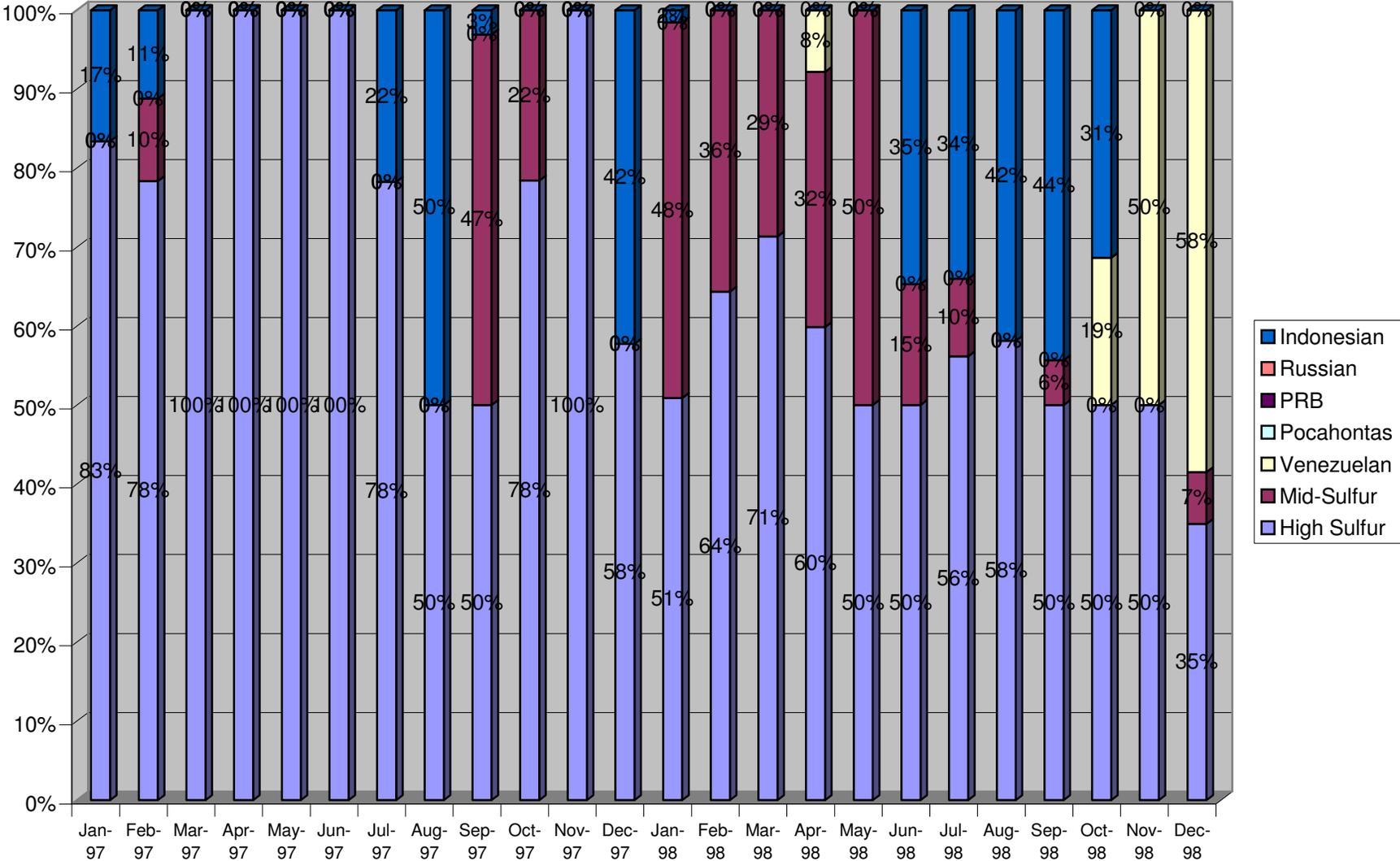
Unit 2 Coal Blends 1995 - 2006



Submitted by PSNH on 12/12/06

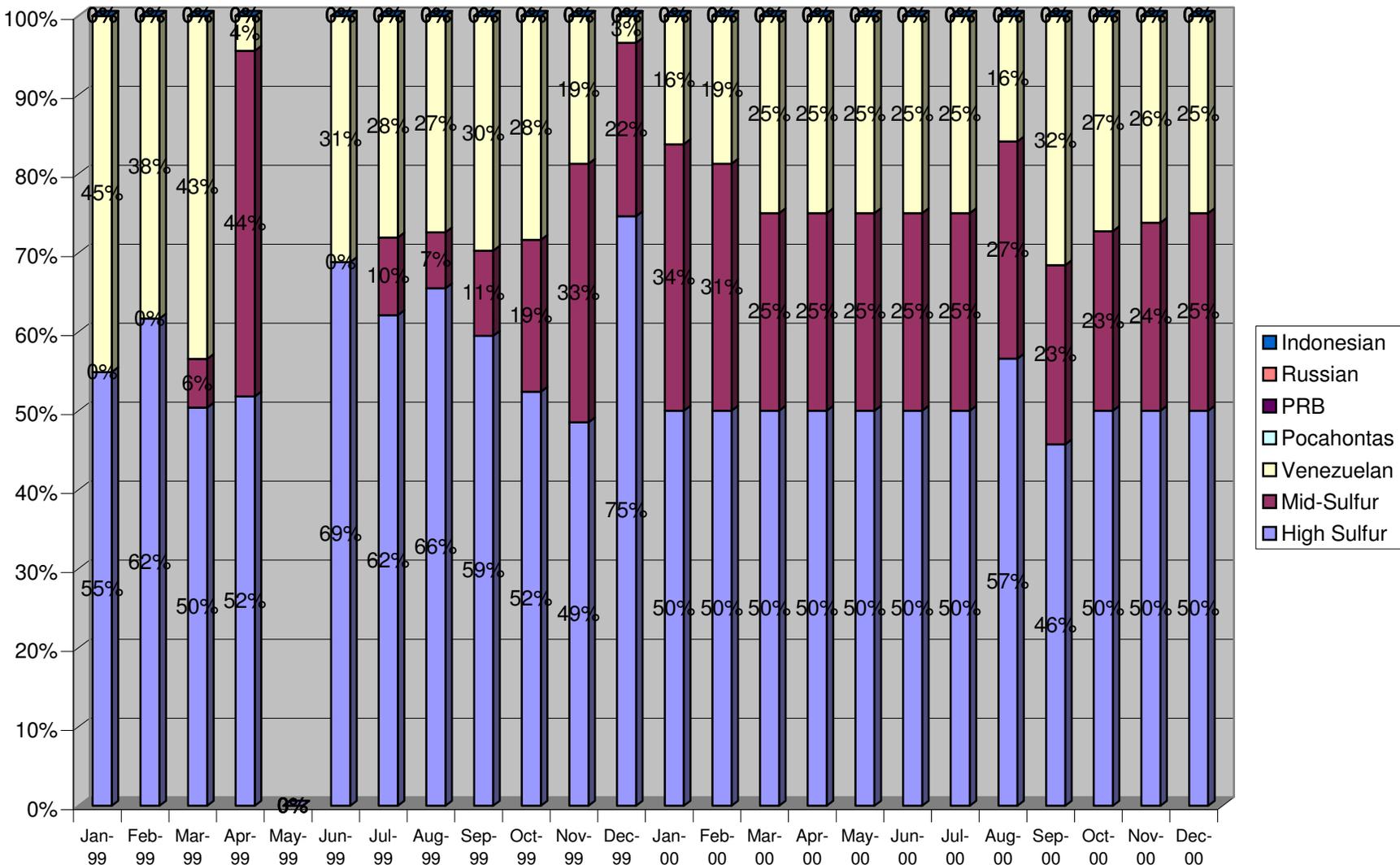
ATTACHMENT B

MK1 1997 1998



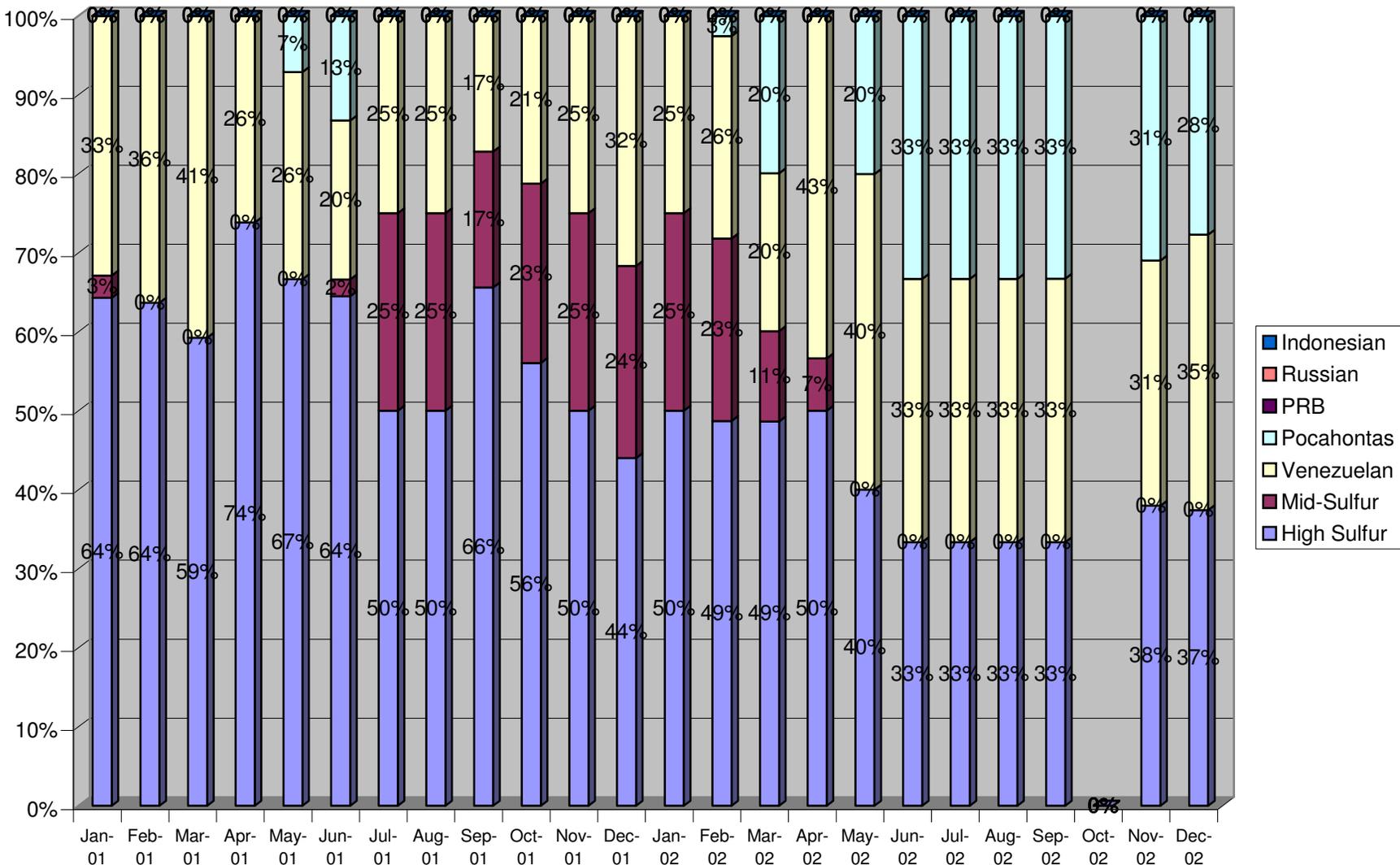
Source: PSNH submittals dated 10/27/2009 and 11/30/2009

MK1 1999 2000



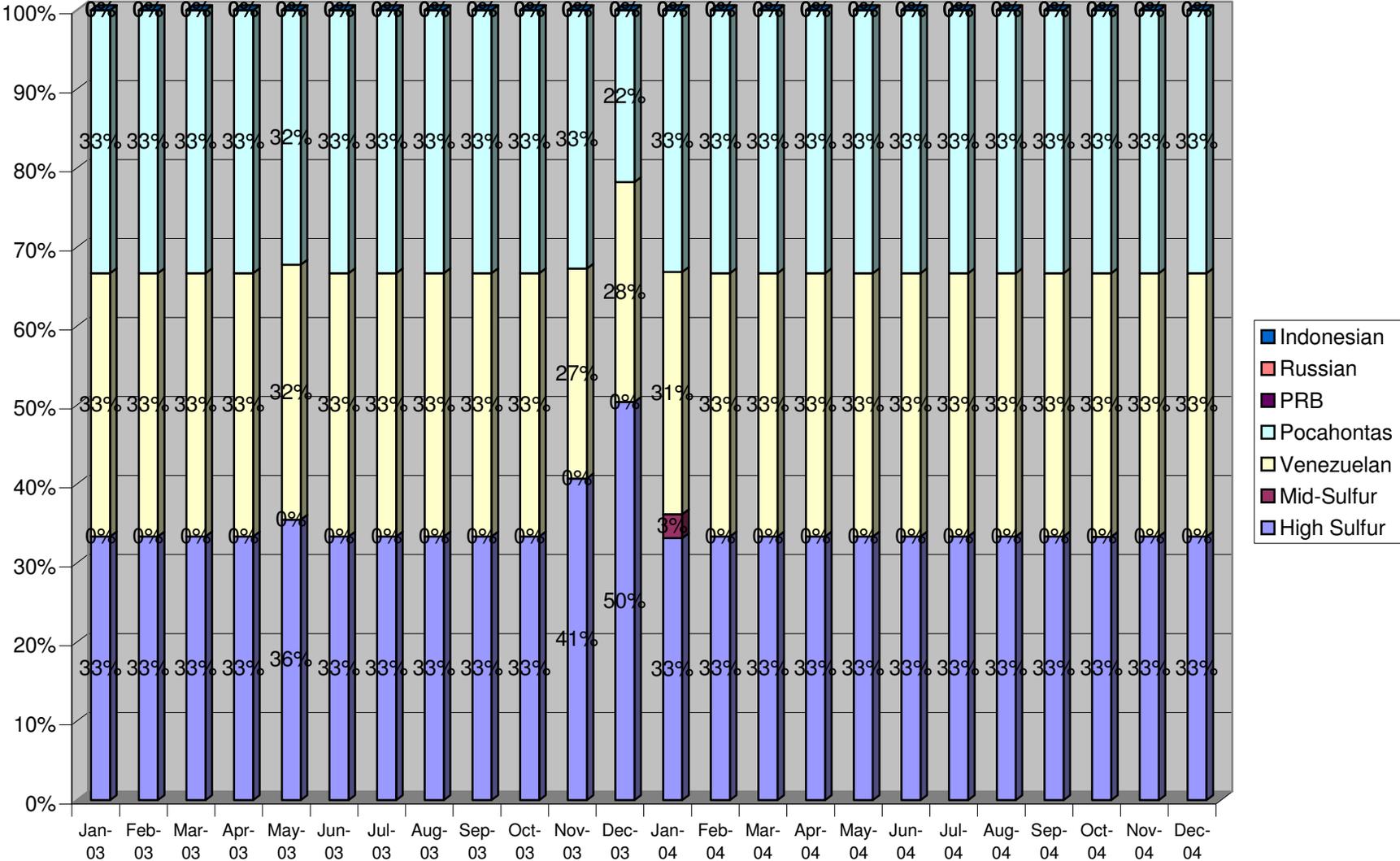
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MK1 2001 2002



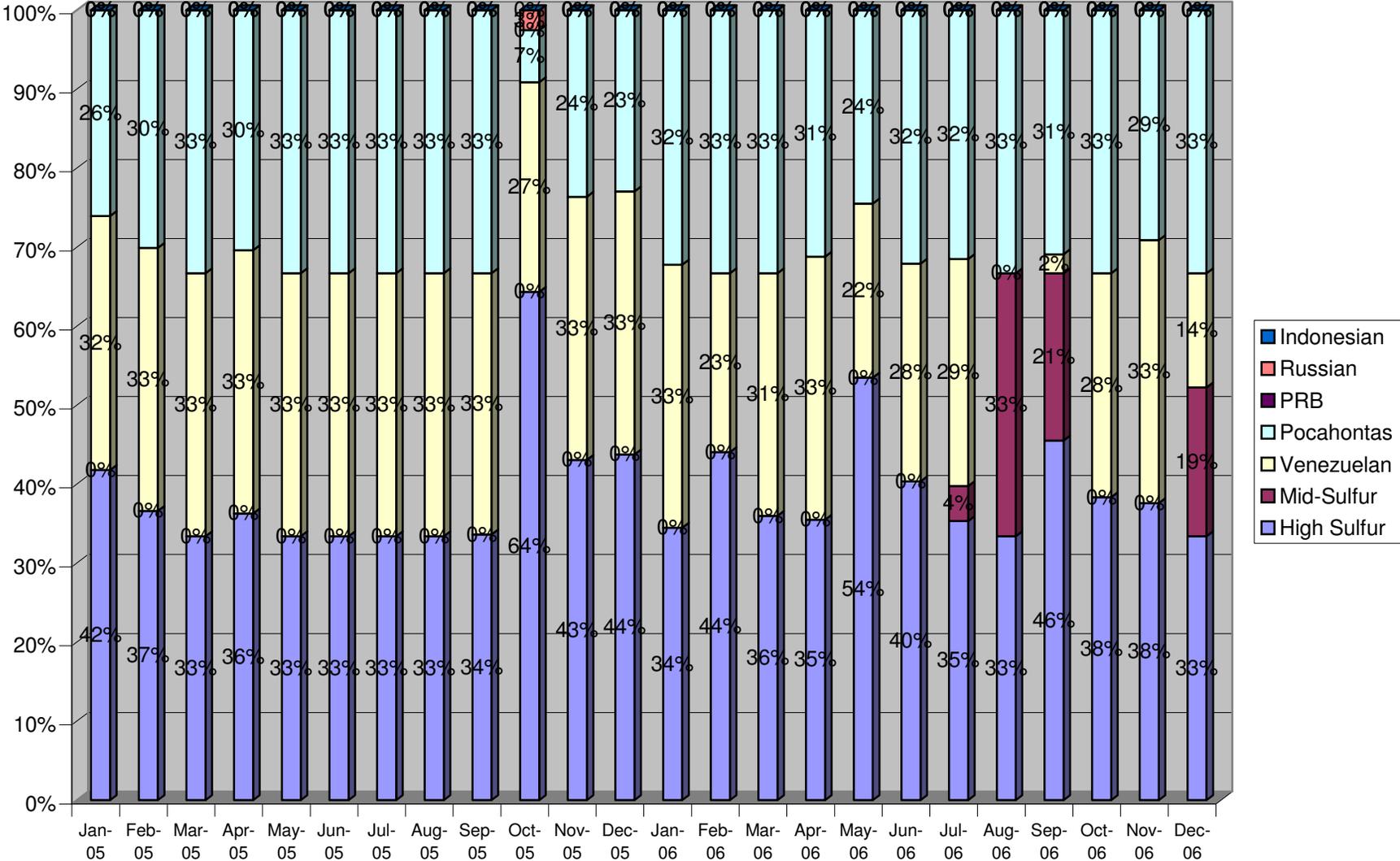
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MK1 2003 2004



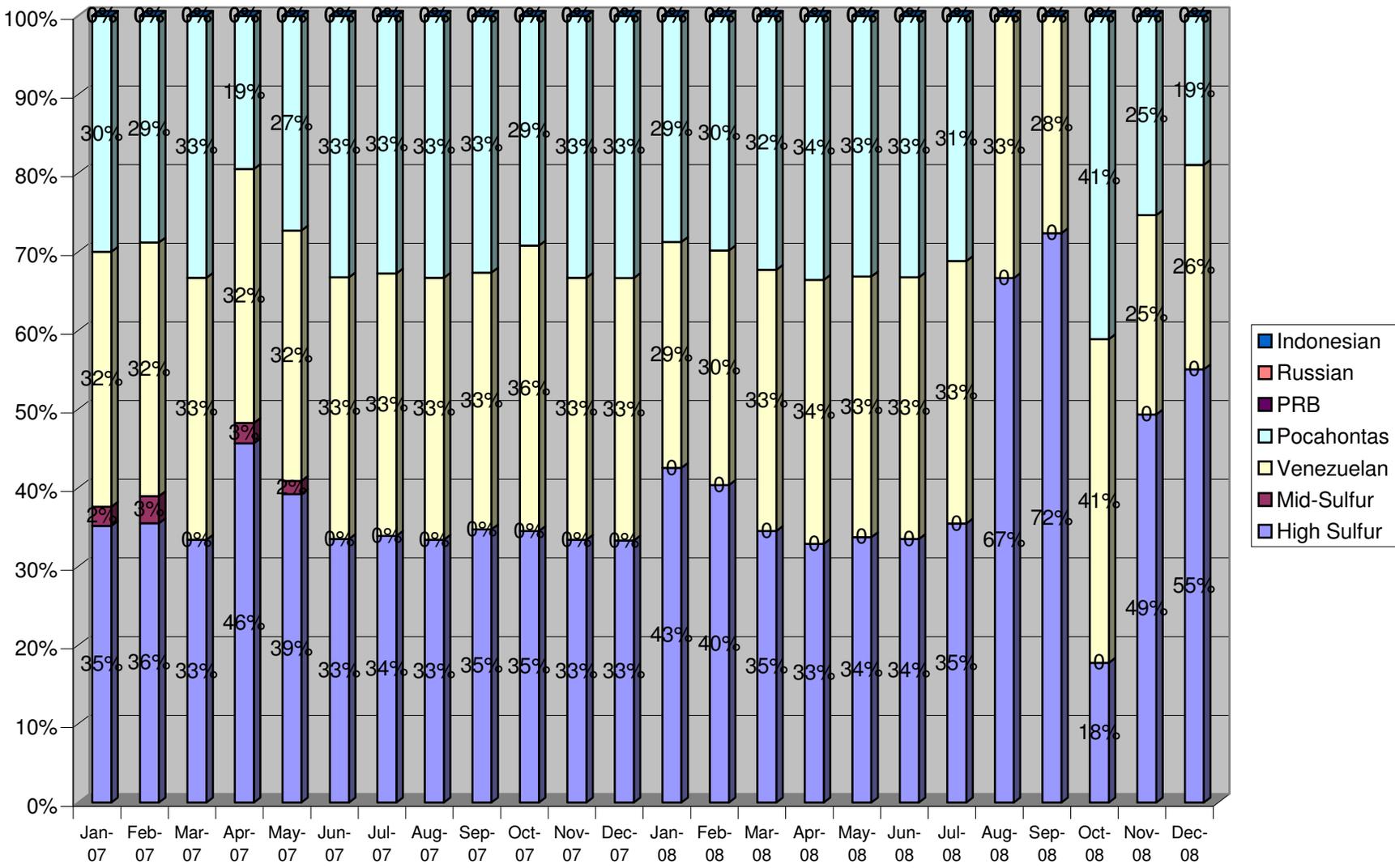
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MK1 2005 2006



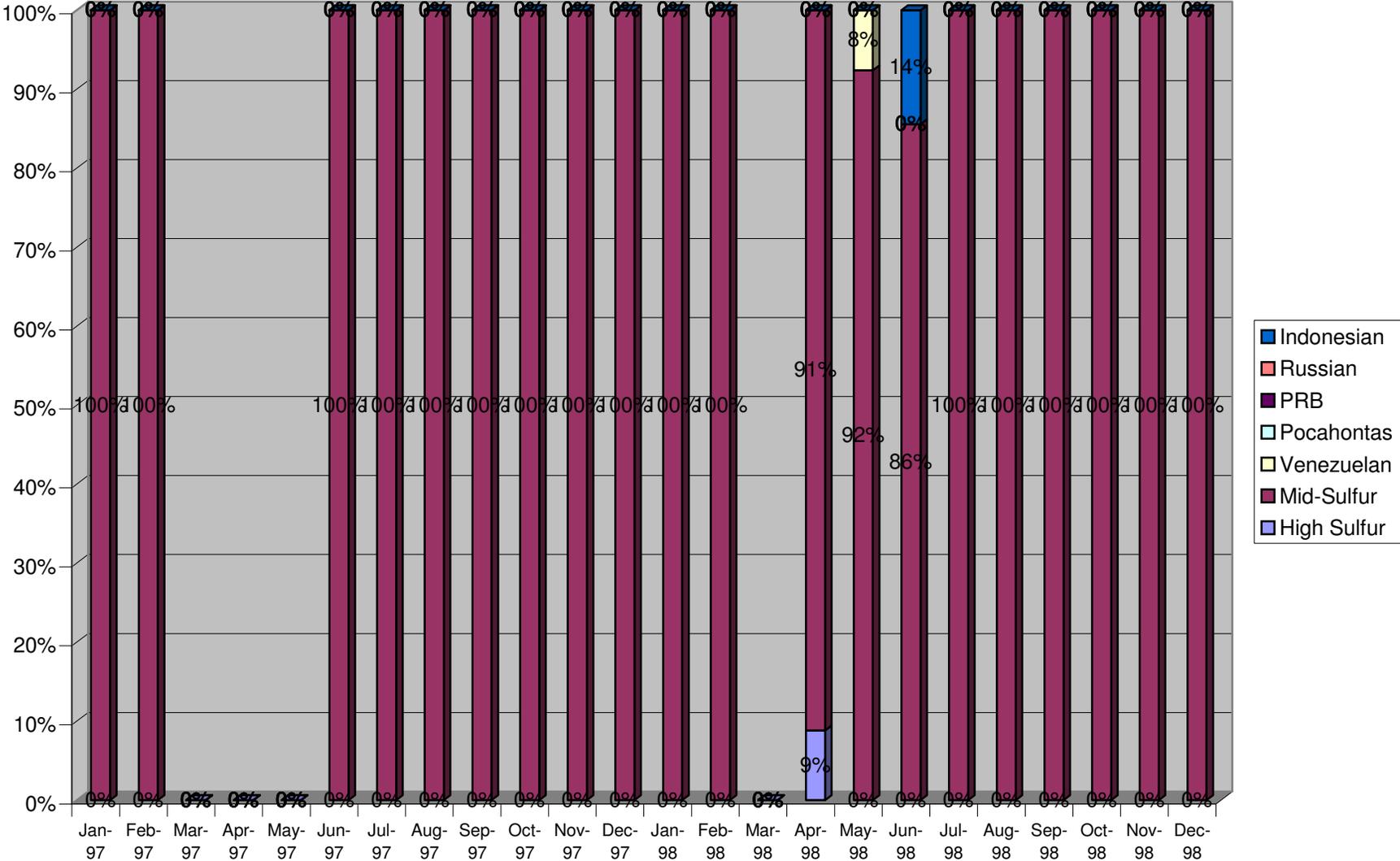
Source: PSNH submittals dated 10/27/2009 and 11/30/2009

MK1 2007 2008



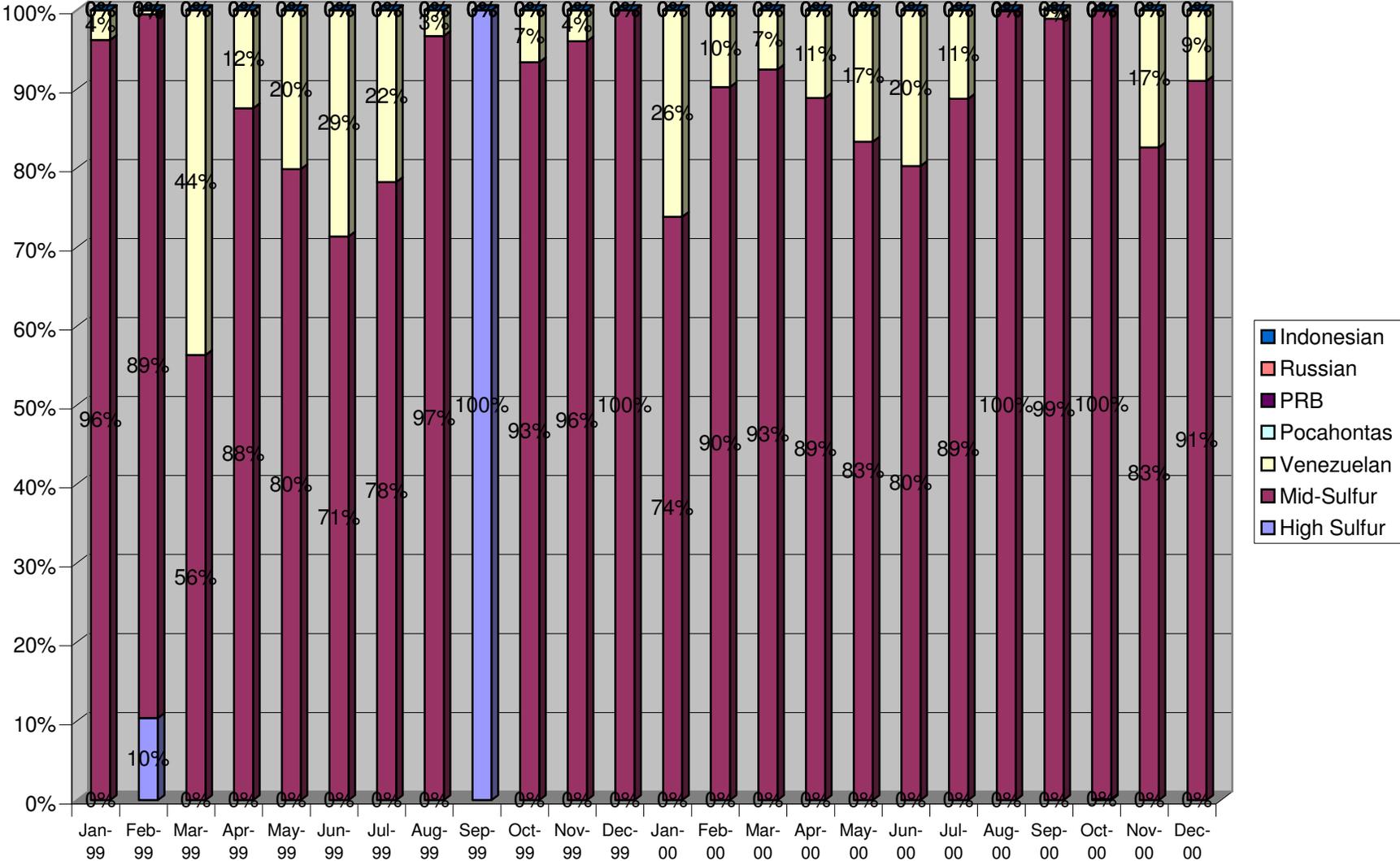
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MK2 1997 1998



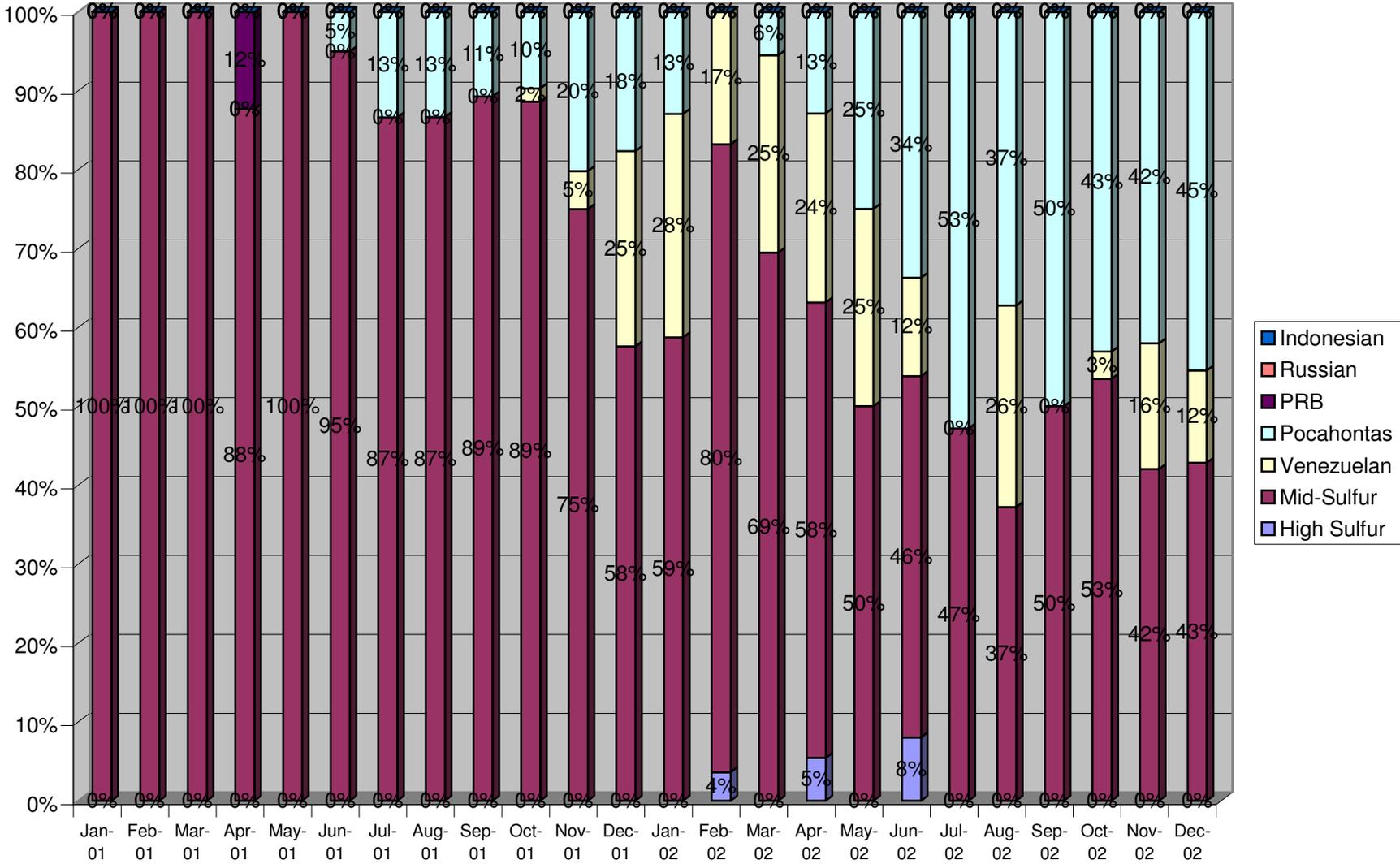
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MK2 1999 2000



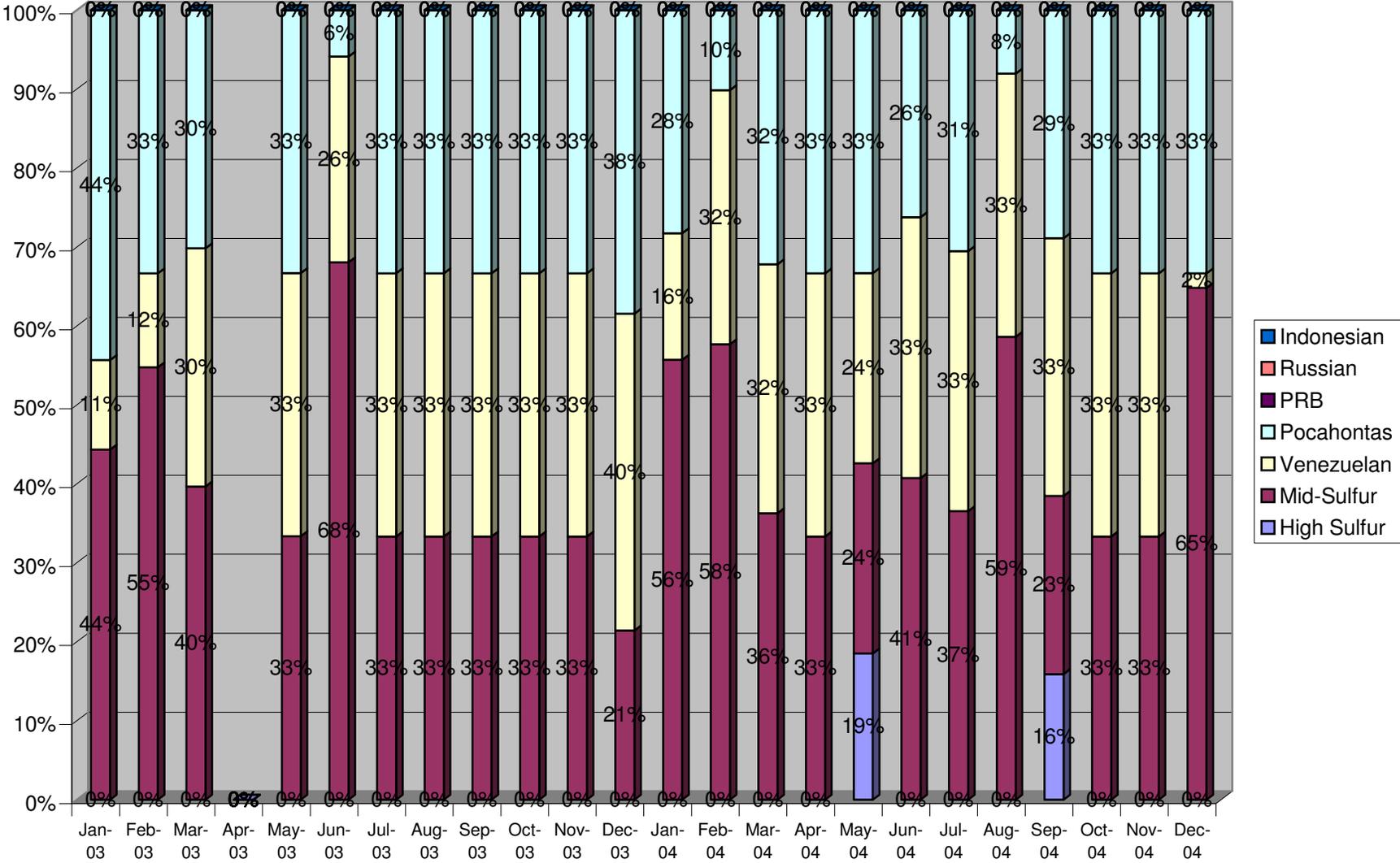
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MK2 2001 2002



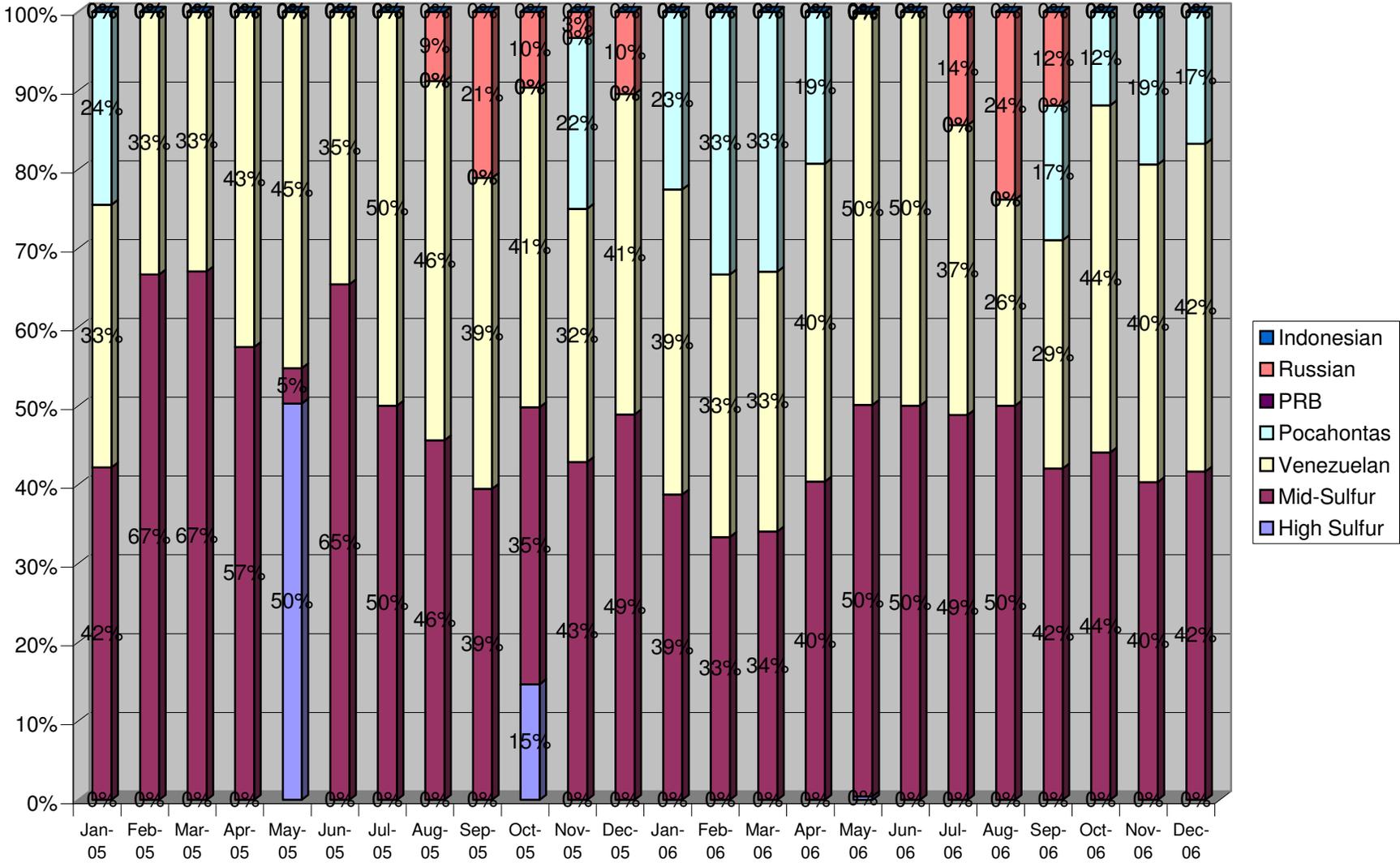
Source: PSNH submittals dated 10/27/2009 and 11/30/2009

MK2 2003 2004



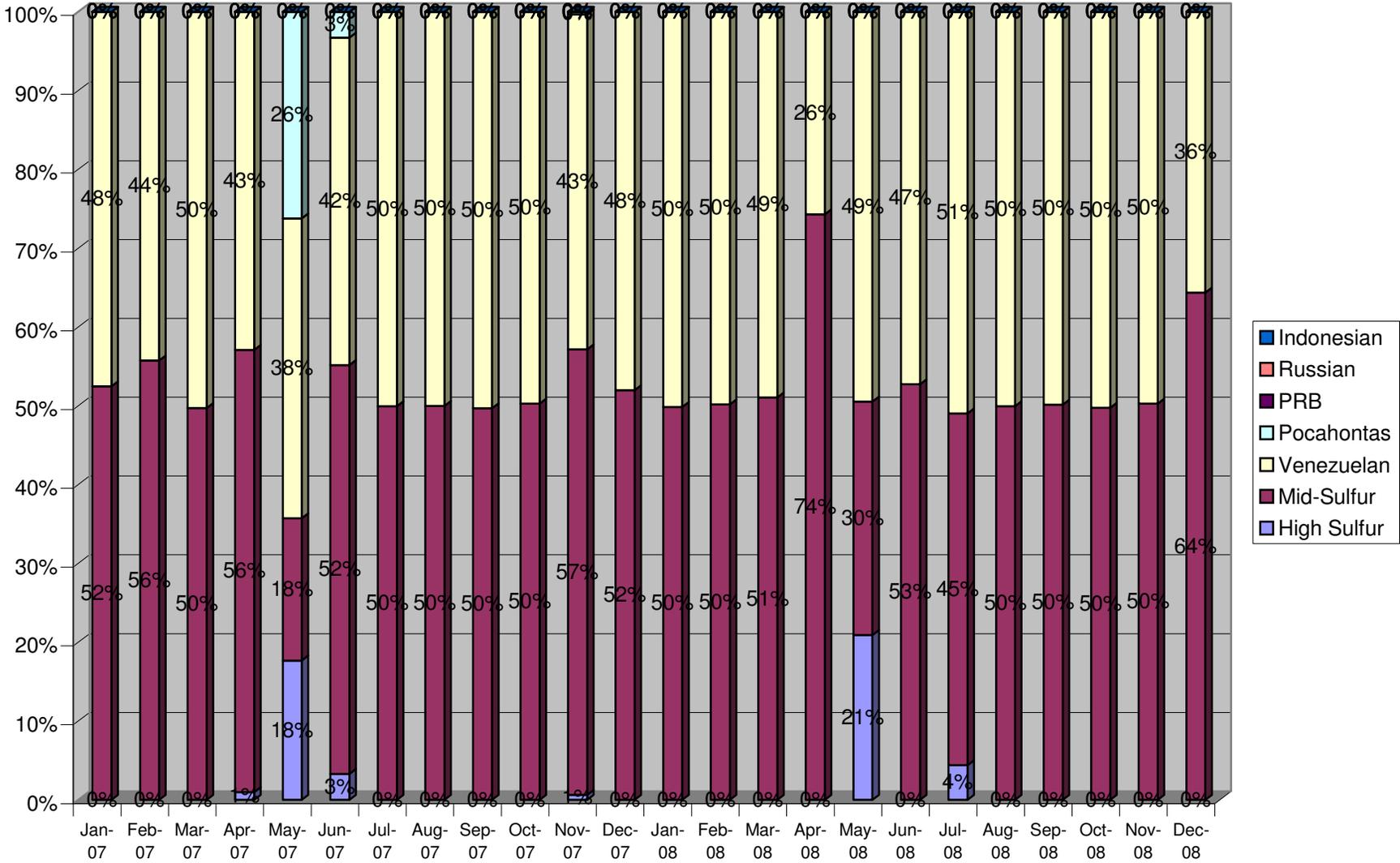
Source: PSNH submittals dated 10/27/2009 and 11/30/2009

MK2 2005 2006



Source: PSNH submittals dated 10/27/2009 and 11/30/2009

MK2 2007 2008



Source: PSNH submittals dated 10/27/2009 and 11/30/2009