

NorthWesternTM Energy

2008
-Montana-
Electric Distribution/Transmission
Annual Reliability Report



March 2009
Final Report

1.0 Executive Summary

The main goal of this report is to provide information and insight into NorthWestern Energy's (NWE) 2008 Electric Distribution and Transmission System reliability indices for the Montana region. These indices include SAIDI (System Average Interruption Duration Index – in minutes), CAIDI (Customer Average Interruption Duration Index – in minutes), SAIFI (System Average Interruption Frequency Index – in frequency) and Outage Counts.

System indices will be given for the entire Montana operating region and also broken down into the major operating areas of the state – Billings, Bozeman, Butte, Great Falls, Havre, Helena, Lewistown and Missoula. As with the previous years annual reports, the Institute of Electrical and Electronics Engineers (IEEE) Power and Energy Society Standard 1366-2003 will again be followed. This standard is directly related to the use of a statistically based definition for classification of Major Event Days (MED) – also commonly referred to as the 2.5 Beta Method. Major Event Days are days in which the regional SAIDI exceeds a statistically derived threshold value provided by IEEE/PES and represent days in which the electric system experienced stresses beyond normal operating conditions (such as a severe weather storm).

NorthWestern Energy has an active relationship with IEEE/PES to ensure a consistent and accurate portrayal of our utility's ability to report and benchmark reliability indices. MEDs are identified through a monthly process for each region and can be included or excluded per the data required. This report will provide all information, including and excluding MEDs, for all three indices to better demonstrate and analyze normal versus emergency conditions.

2.0 General

There were five major event days in 2008. The first was caused by a June snowstorm in the Great Falls and Helena Divisions. There were hail and windstorms that affected the Billings, Bozeman and Butte Divisions during the month of July. There was also another MED in the month of August due to substation outages in Livingston, Laurel, Helena Valley and Corvallis. October had two consecutive MEDs on the 11th and 12th respectively in the Billings area which were caused by a heavy snowstorm. The total region SAIDI for these five major event days was 58 minutes.

For a comparison there were zero MED events in 2003-2004, four in 2005, two in 2006 and four in 2007. Therefore, the average for the period 2003-2007 is two per year.

3.0 Montana – System Reliability

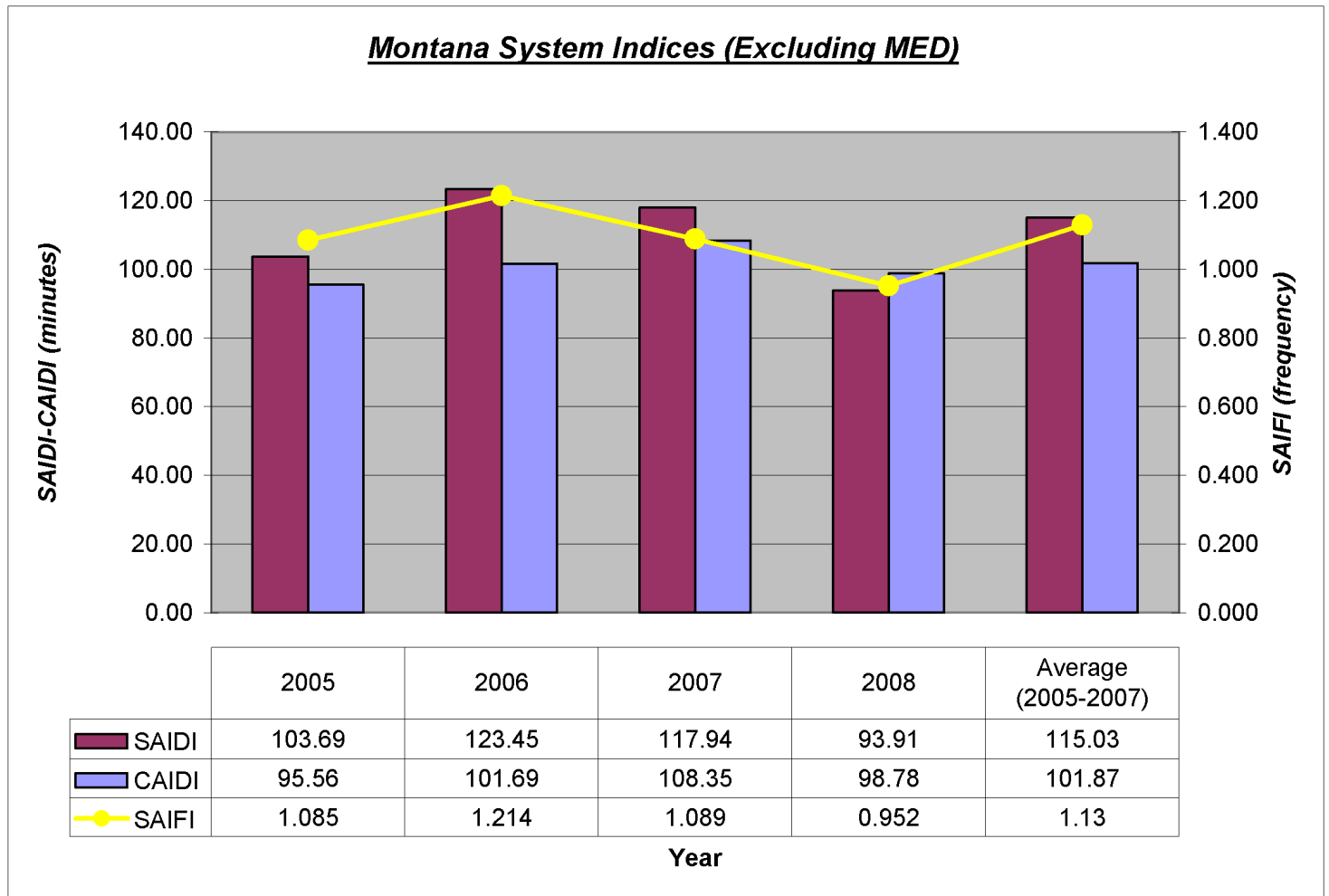


Figure 3.0a – Montana – System Indices (Excluding MED)

The figure above displays NorthWestern Energy’s Montana region indices for the years 2005-2008. Region indices shown for 2005 (excluding MEDs) are IEEE certified and the 2006 - 2007 data were taken from year-end audited data (excluding MEDs). Please note that SAIDI and CAIDI are given in minutes and SAIFI is given in the frequency of occurrence.

As can be seen by figure 3.0a, 2008 SAIDI, SAIFI, and CAIDI indices all decreased from the 2007 year-end, and all three indices were lower than the previous three-year averages. Overall, 2008 was a very good year for reliability for the Montana region. The contributing factors to these indices will be discussed later in this report and as each of the operating divisions of the Montana region are examined. Data and figures, which include identified MED information, are given in this section to demonstrate the significant increase in indices information if not removed.

Outages By Cause (excluding MEDs) is also shown in a following figure 3.0b of this section.

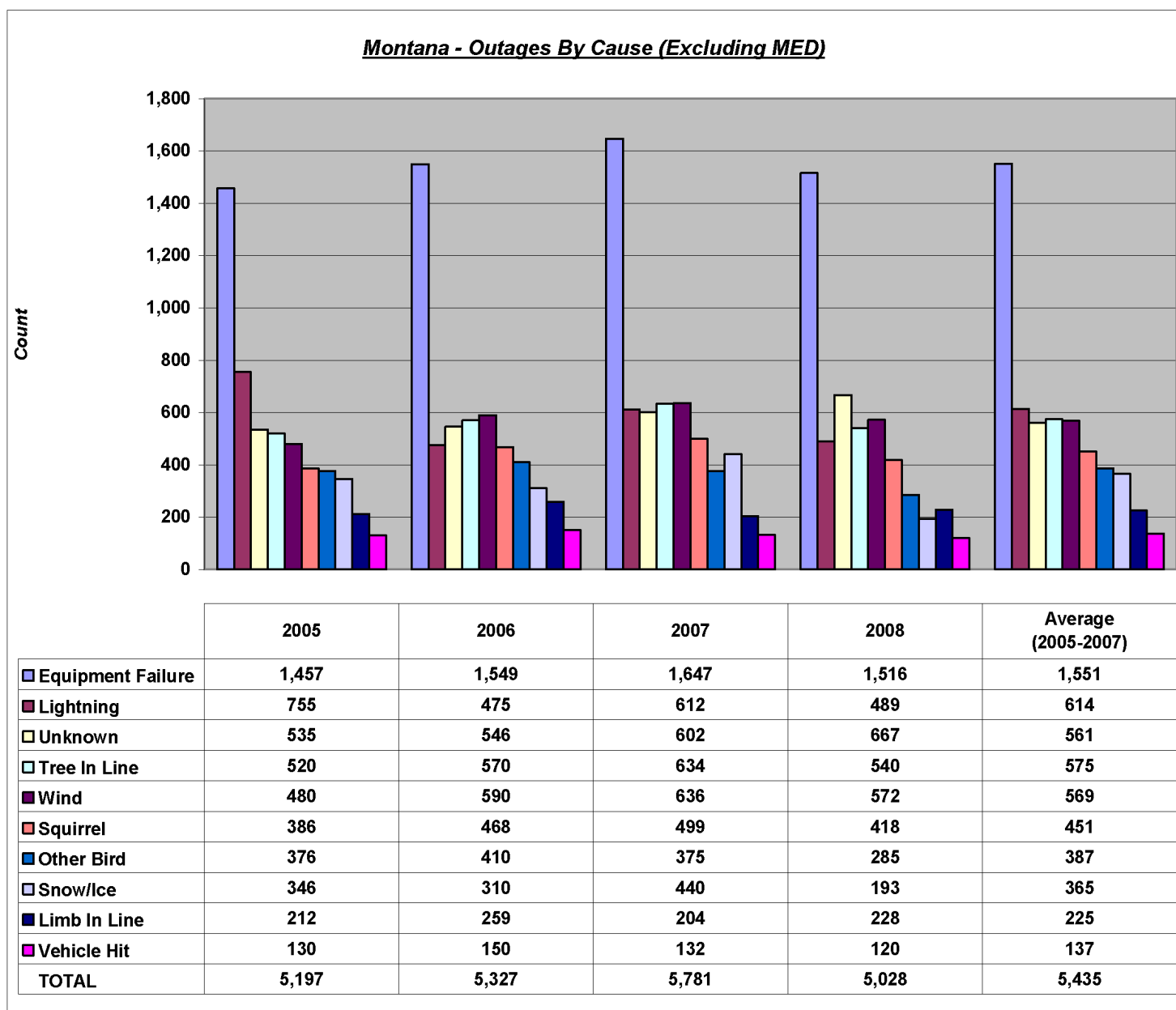


Figure 3.0b – Montana – Outages By Cause (Excluding MED)

As can be seen in the figure above, outages decreased by 753 from the 2007 operating year to the 2008 operating year which was also below the three year average (2005-2007). The outage causes represented in this table are the top ten major contributors for outages on the NorthWestern Energy Electric Distribution and Transmission system. Most outage cause categories decreased in the number of outages, with only the unknown and limb in line categories increasing. Continuing line patrols and an additional allocation to spot tree trimming near the end of 2008 should help mitigate the limb in line

cause category. Equipment Failure is the most common of the outage causes due to its broad and all-inclusive category nature. Outages can be related back to Equipment Failure in many different ways and it is the responsibility of the operations personnel to correctly identify the cause.

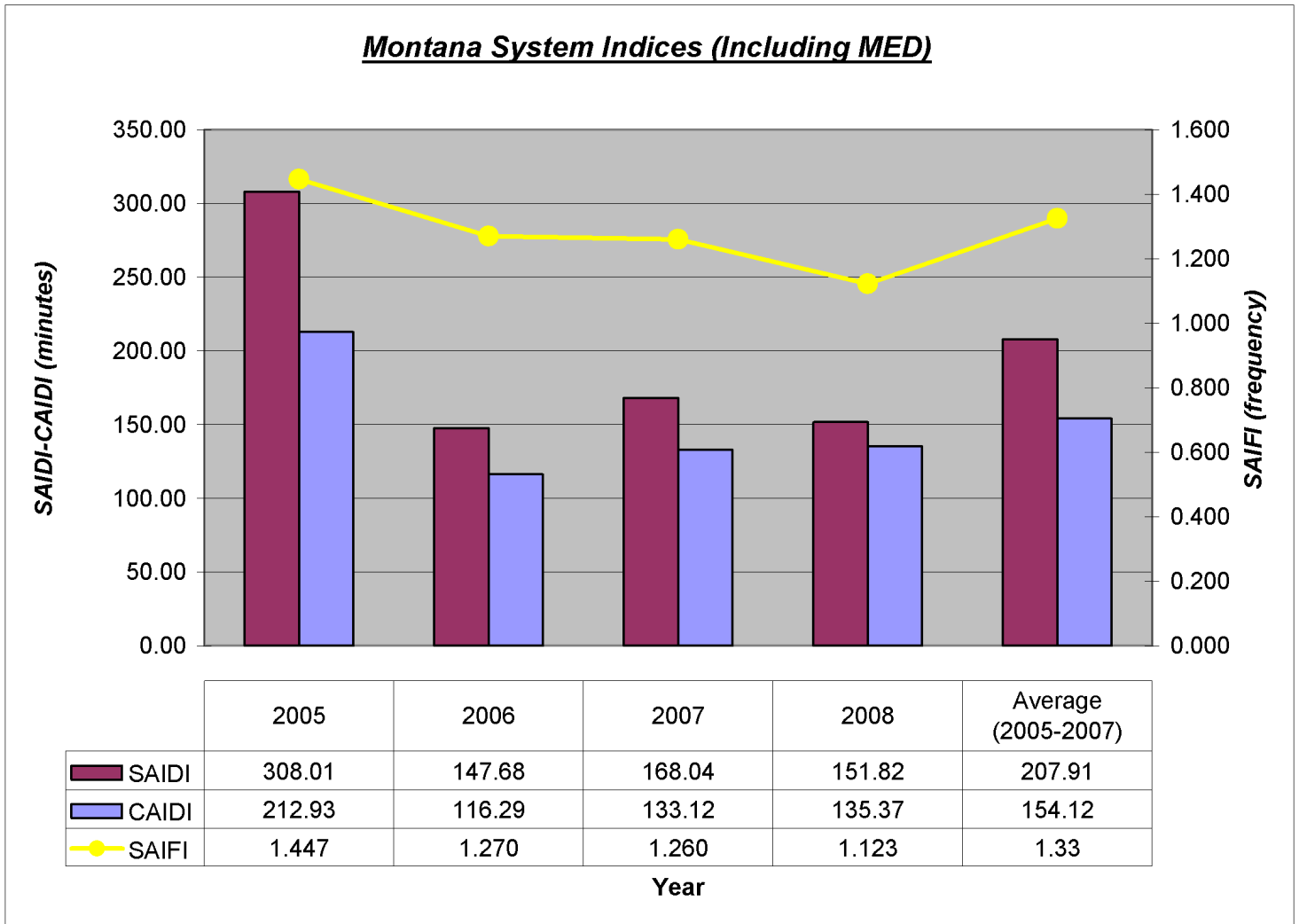


Figure 3.0c – Montana – System Indices (Including MED)

Montana - Outages By Cause (Including MED)

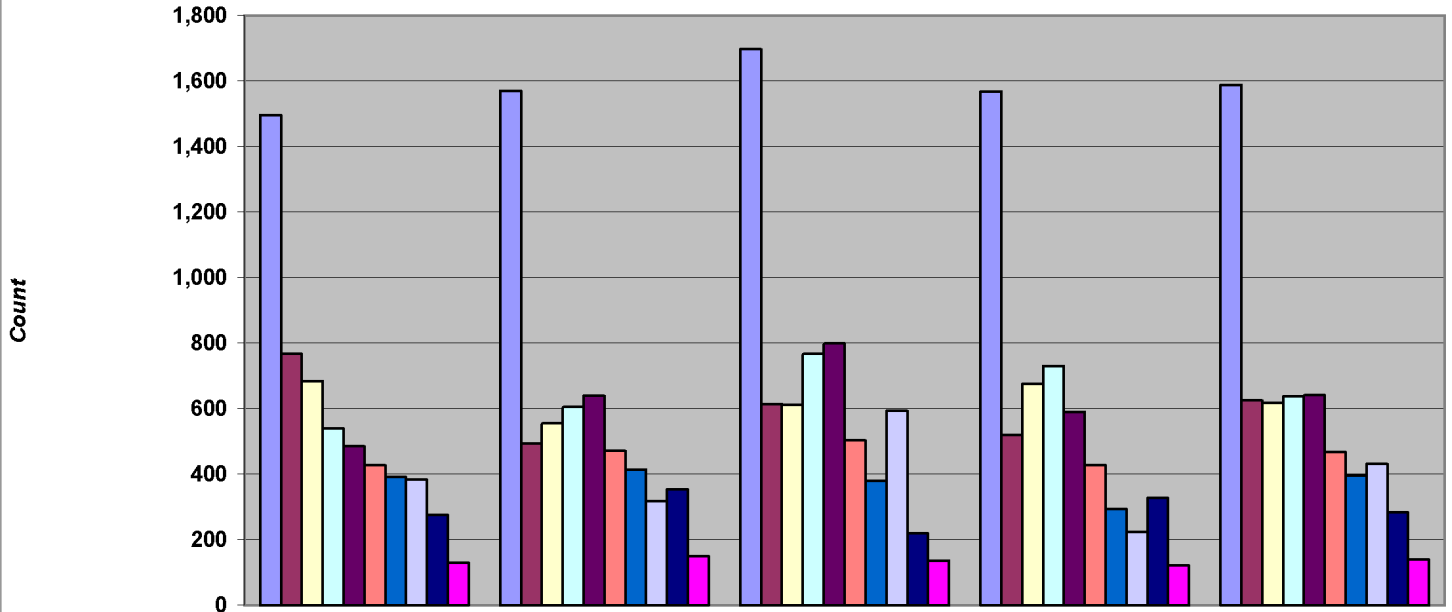


Figure 3.0d – Montana – Outages By Cause (Including MED)

4.0 Billings – System Reliability

4.1 Discussion: Billings Division was involved in three of the five major event days with some outages from the July wind and hail storm as well as major outages due to the major snow storm in October. Lightning, snow/ice and wind outages were down appreciably, but tree and limb outage numbers are up significantly, probably due to “hang over” tree problems from the major events. As can be expected, tree outages are up when MEDs are included.

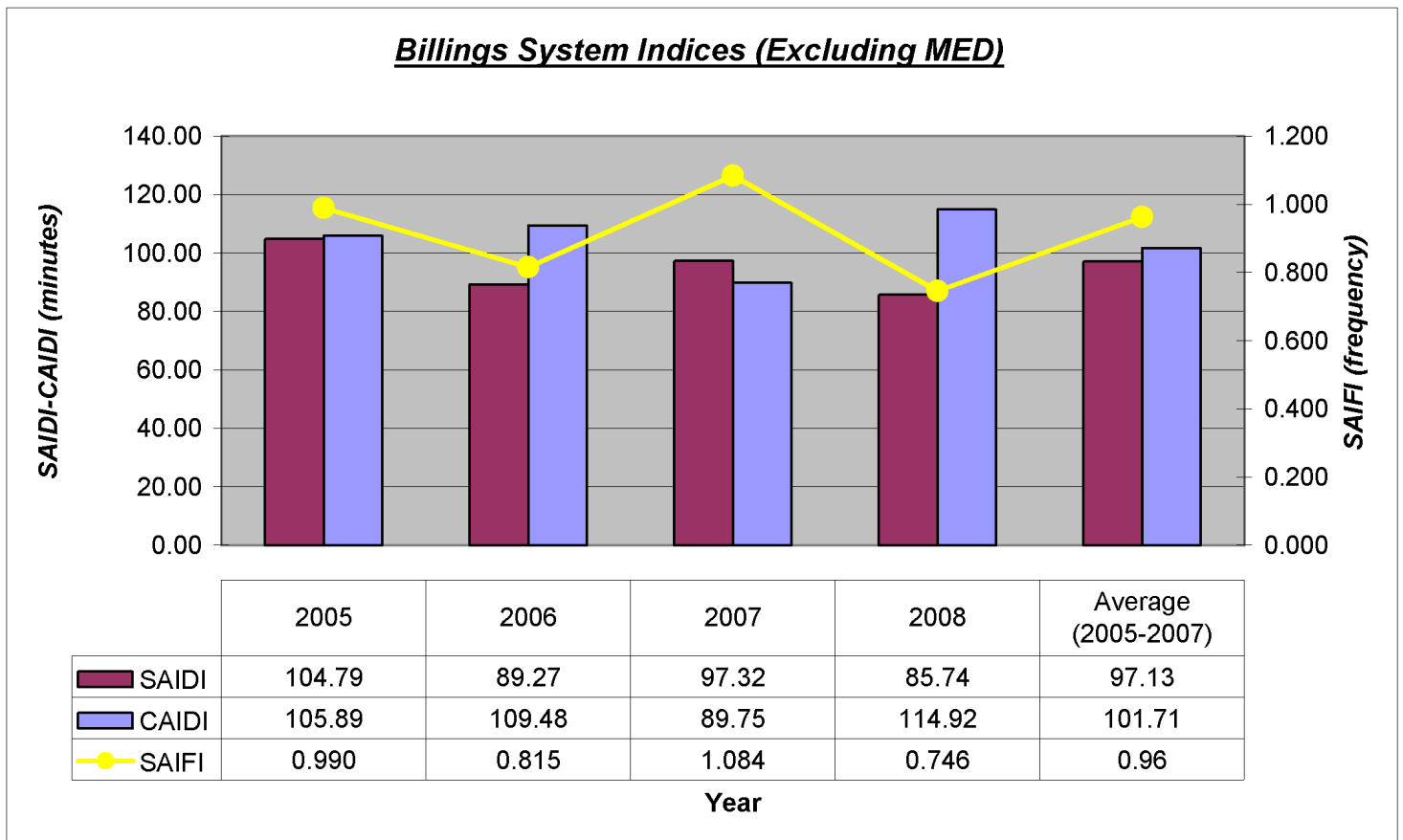


Figure 4.0a – Billings – System Indices (Excluding MED)

Billings - Outages By Cause (Excluding MED)

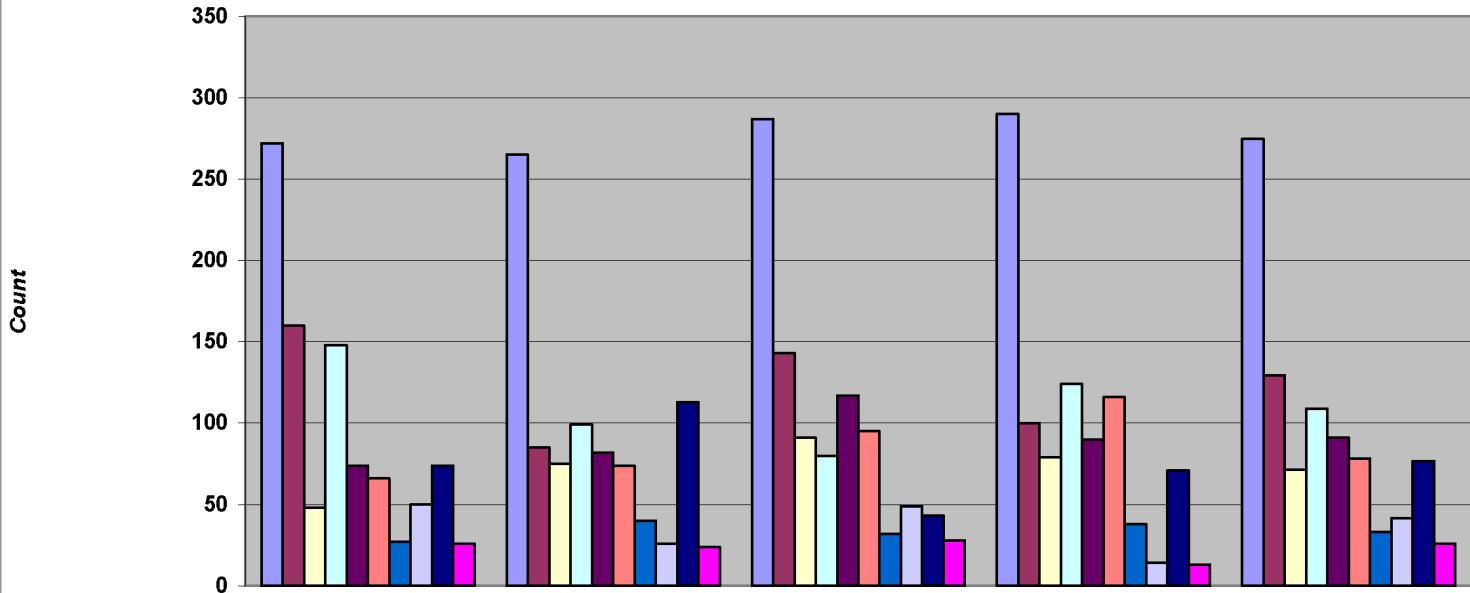


Figure 4.0b – Billings – Outages By Cause (Excluding MED)

Billings System Indices (Including MED)

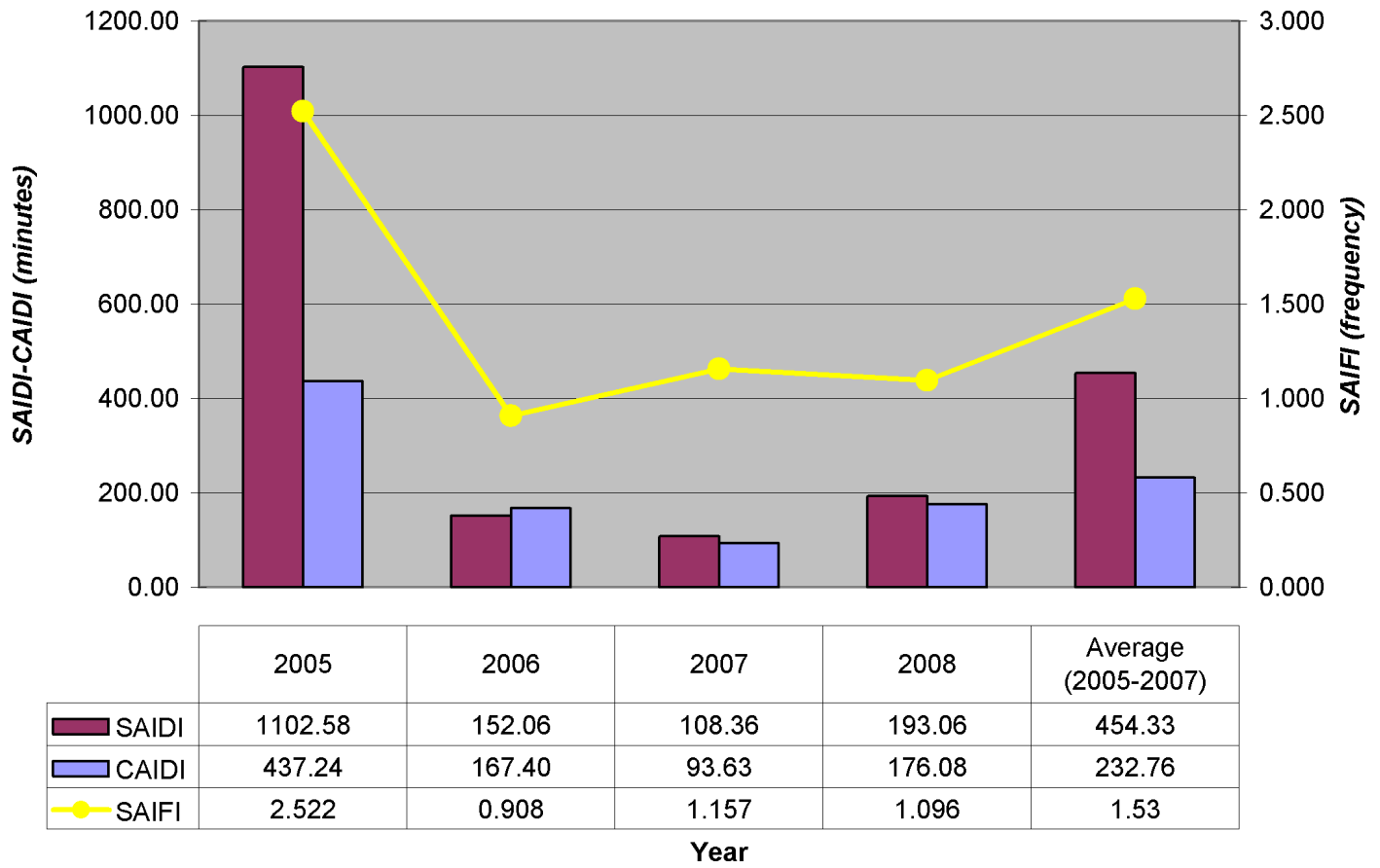


Figure 4.0c – Billings – System Indices (Including MED)

Billings - Outages By Cause (Including MED)

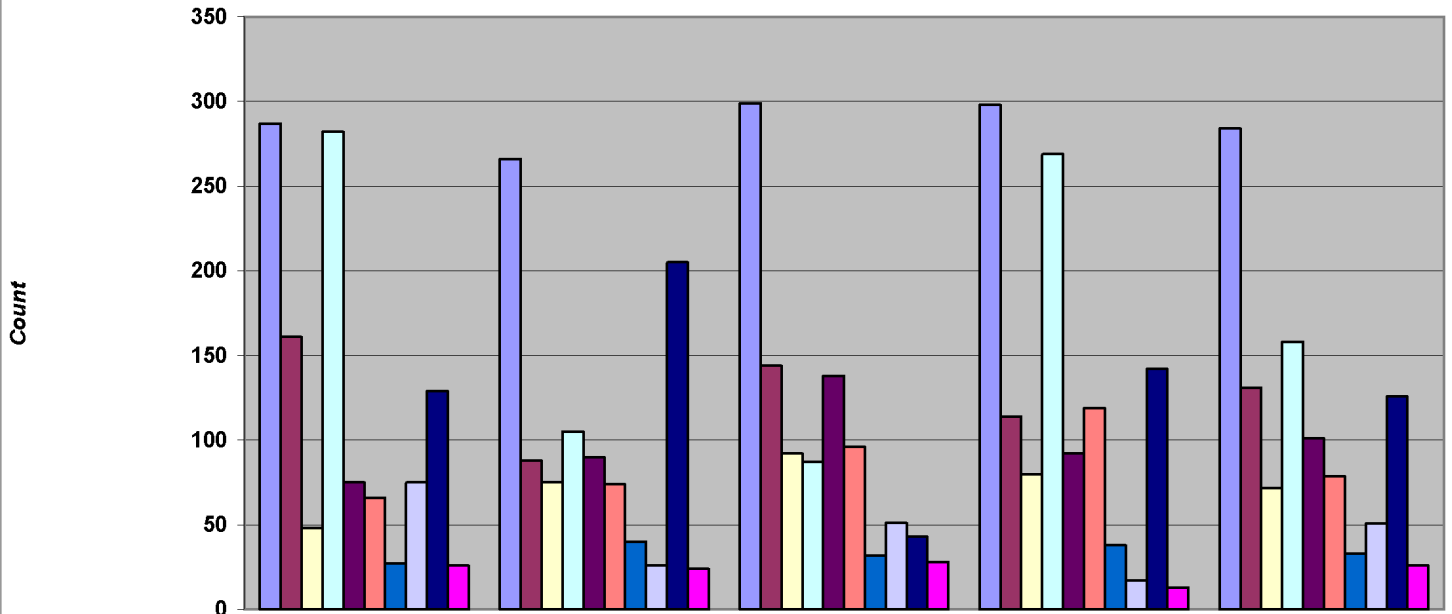


Figure 4.0d – Billings – Outages By Cause (Including MED)

5.0 Bozeman – System Reliability

5.1 Discussion: Bozeman Division had many outages from strong winds and hail on July 22, but avoided storm problems on the other major event days. A substation transformer failure in August though resulted in some Livingston customers being out for 16 hours. Another large outage involved a school bus that broke a junction pole northwest of Bozeman. Equipment failures and tree problems are down from 2007, but unknown causes are up. SAIDI and SAIFI (excluding MEDs) were both significantly down.

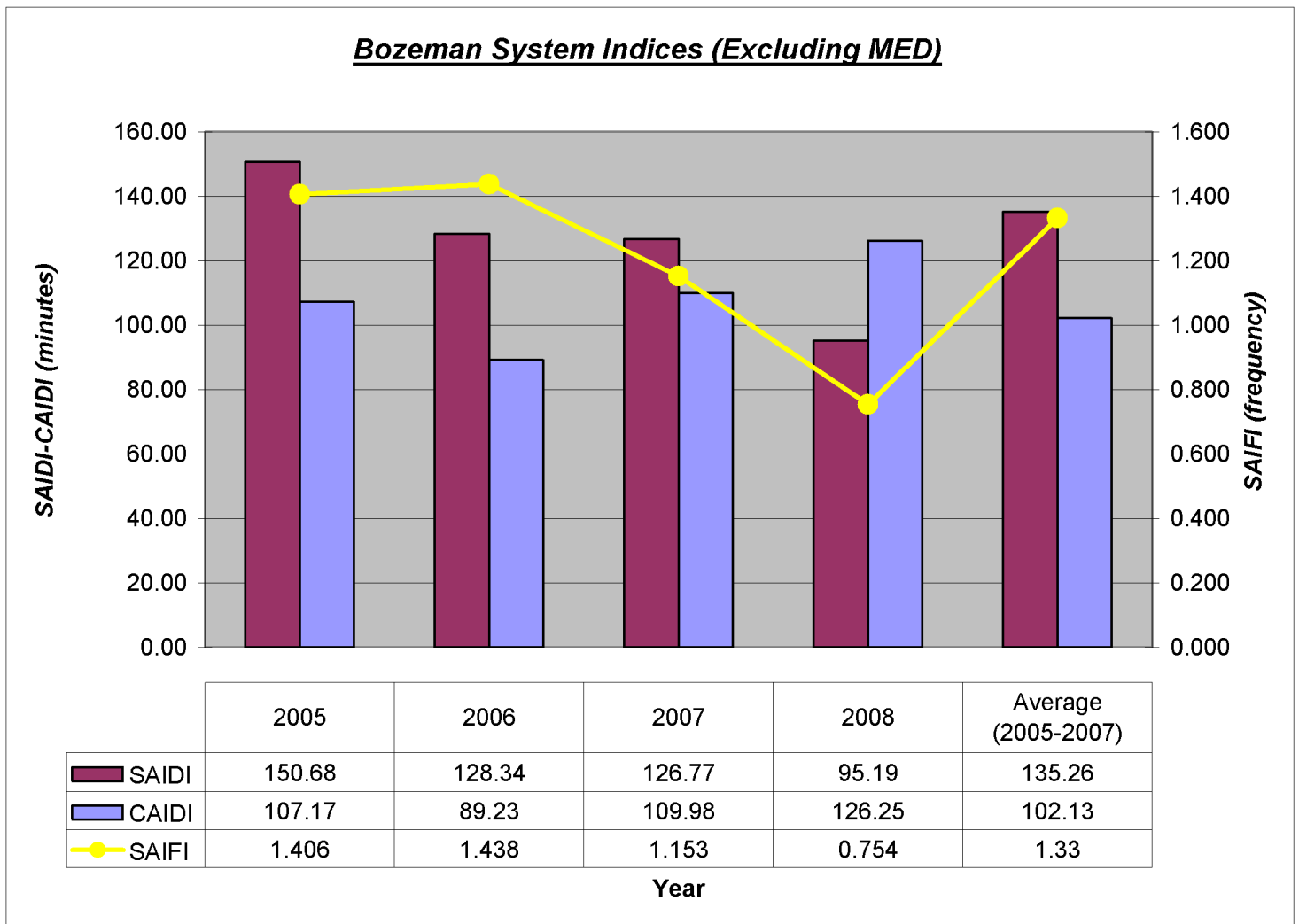
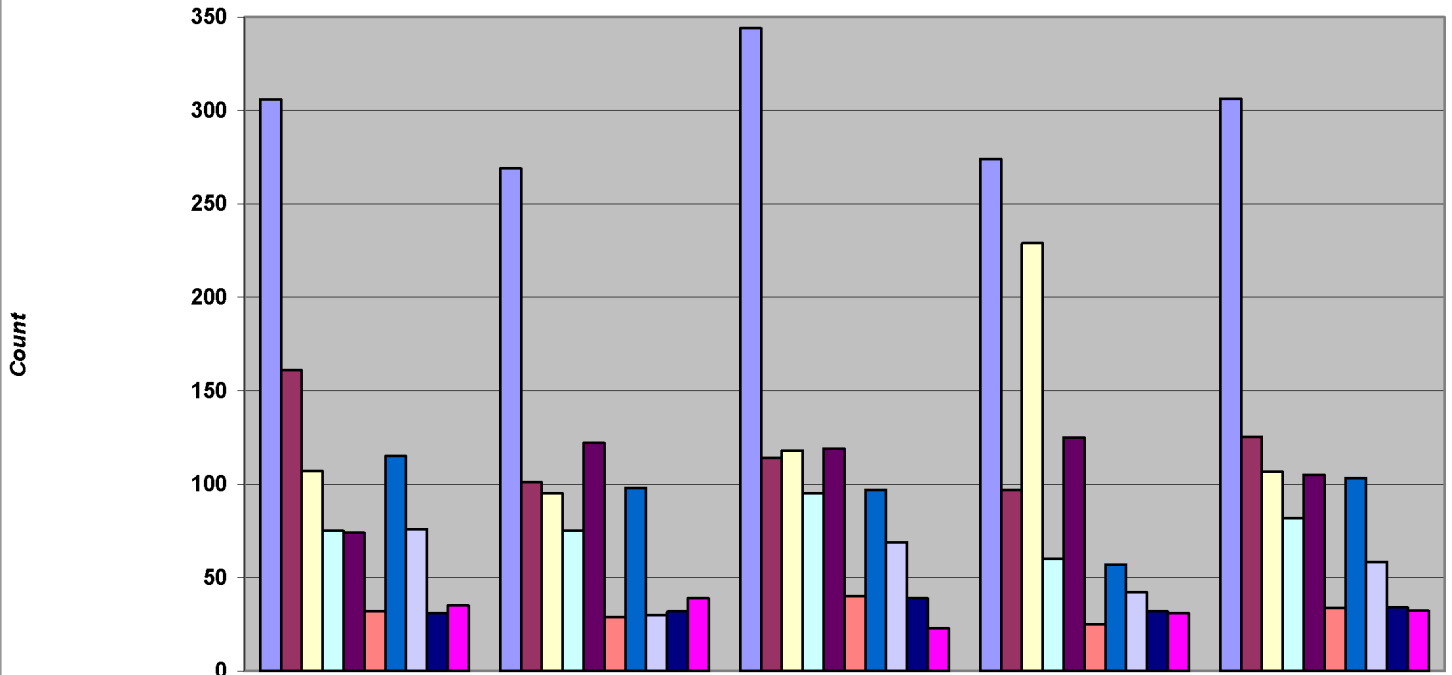


Figure 5.0a – Bozeman – System Indices (Excluding MED)

Bozeman - Outages By Cause (Excluding MED)



	2005	2006	2007	2008	Average (2005-2007)
Equipment Failure	306	269	344	274	306
Lightning	161	101	114	97	125
Unknown	107	95	118	229	107
Tree In Line	75	75	95	60	82
Wind	74	122	119	125	105
Squirrel	32	29	40	25	34
Other Bird	115	98	97	57	103
Snow/Ice	76	30	69	42	58
Limb In Line	31	32	39	32	34
Vehicle Hit	35	39	23	31	32
TOTAL	1,012	890	1,058	972	987

Figure 5.0b – Bozeman – Outages By Cause (Excluding MED)

Bozeman System Indices (Including MED)

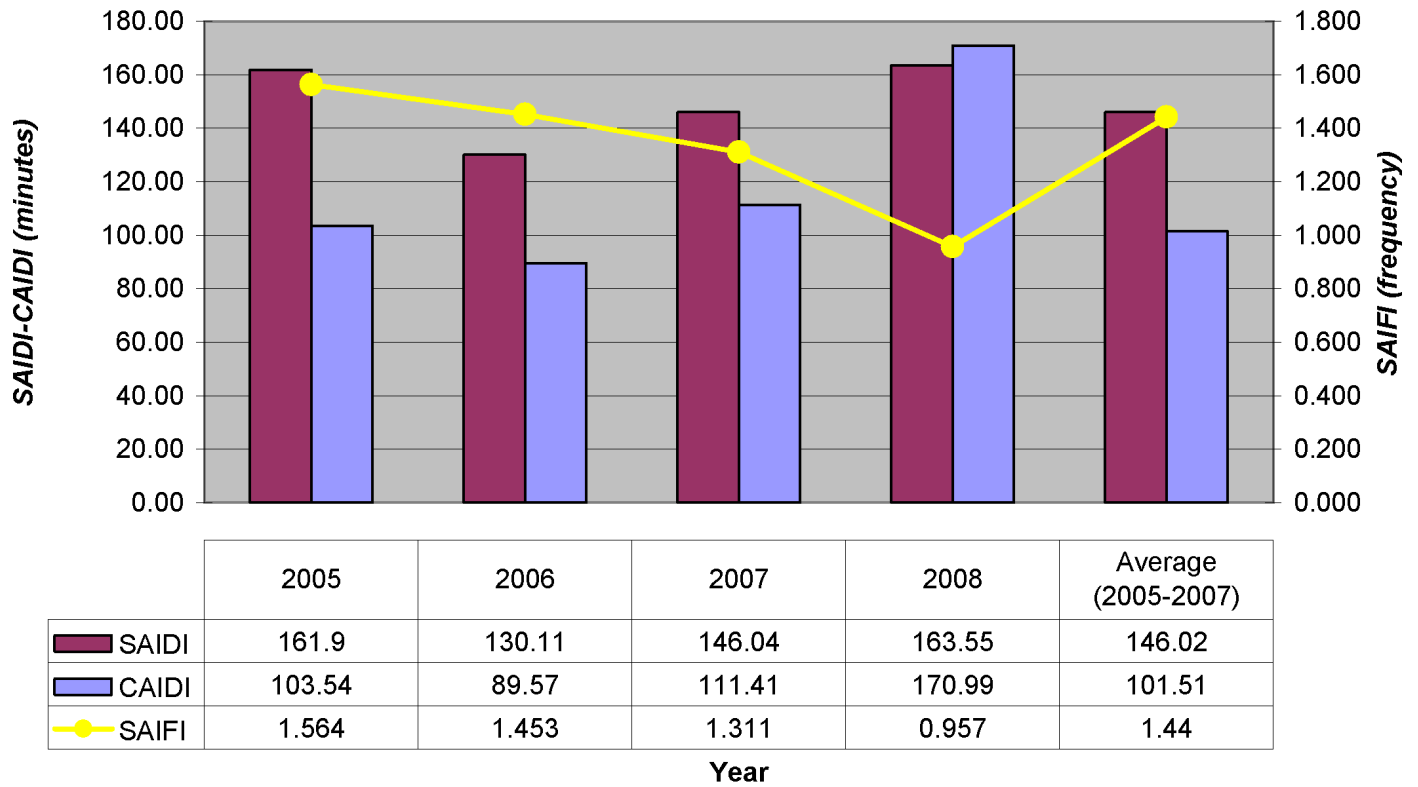
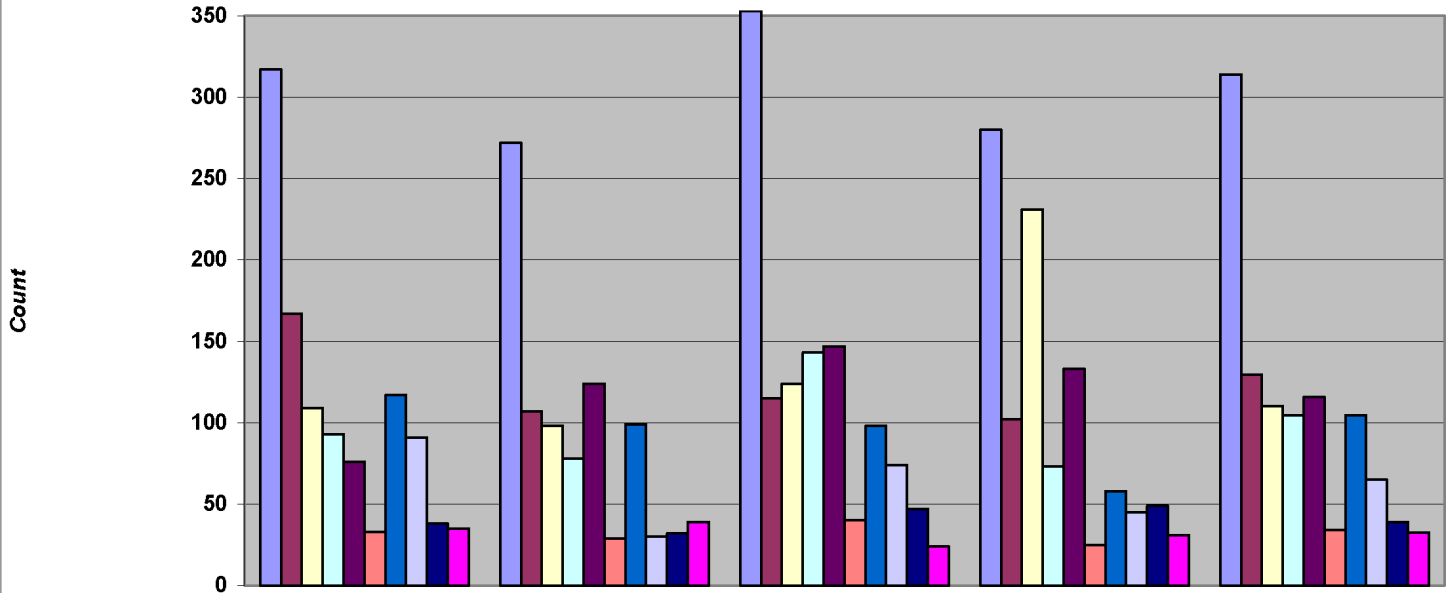


Figure 5.0c – Bozeman – System Indices (Including MED)

Bozeman - Outages By Cause (Including MED)



	2005	2006	2007	2008	Average (2005-2007)
Equipment Failure	317	272	353	280	314
Lightning	167	107	115	102	130
Unknown	109	98	124	231	110
Tree In Line	93	78	143	73	105
Wind	76	124	147	133	116
Squirrel	33	29	40	25	34
Other Bird	117	99	98	58	105
Snow/Ice	91	30	74	45	65
Limb In Line	38	32	47	49	39
Vehicle Hit	35	39	24	31	33
TOTAL	1,076	908	1,165	1,027	1,050

Figure 5.0d – Bozeman – Outages By Cause (Including MED)

6.0 Butte – System Reliability

6.1 Discussion: After a tough year in 2007, Butte Division did not suffer major storms in 2008. The July 22nd major event day did cause some outages from wind and hail, but no other major storms affected this division. Only the SAIFI index increased in 2008, although it is still in line with the regional average. Equipment failure was the only cause type to increase notably while the others stayed about the same or decreased.

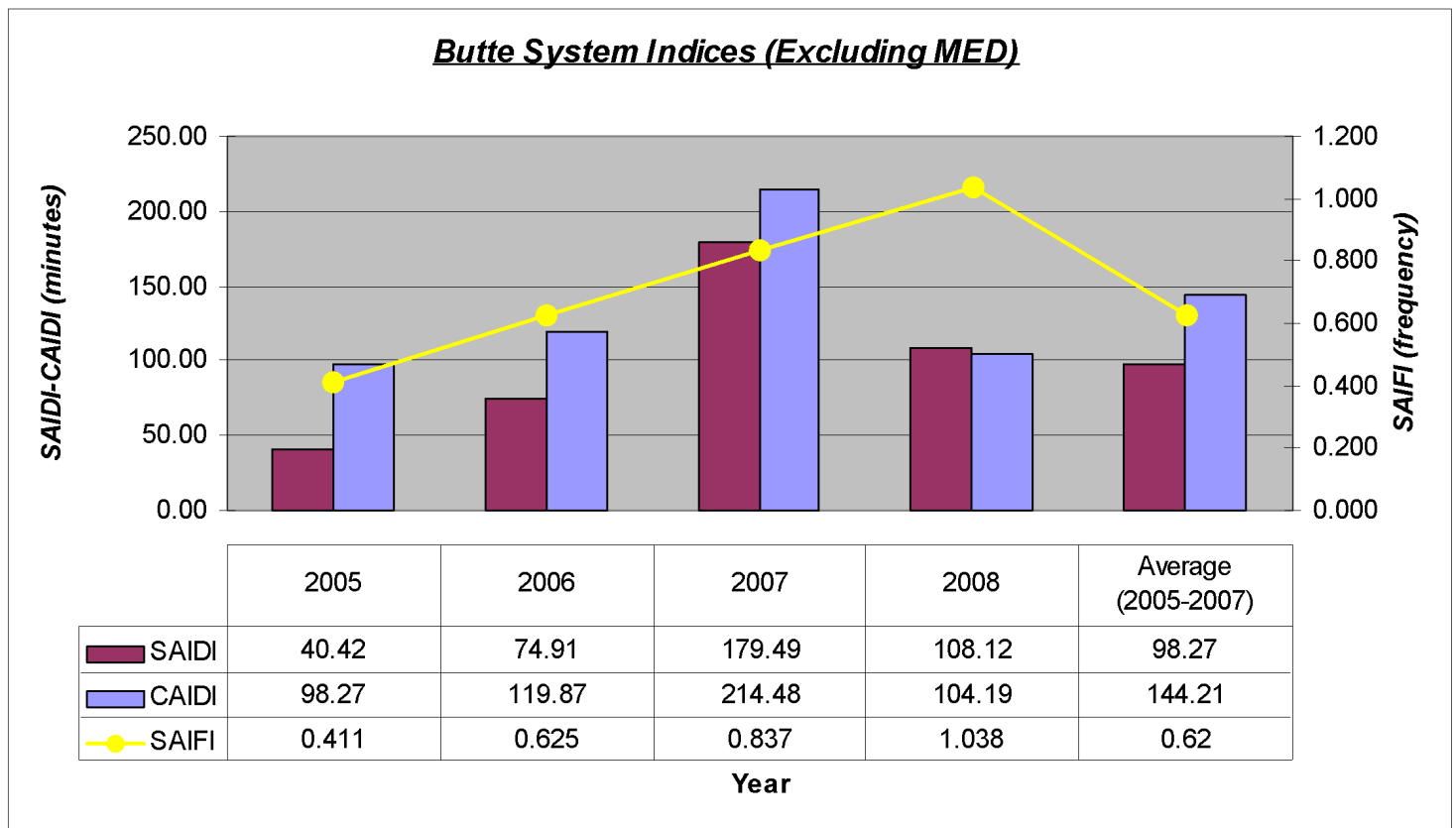


Figure 6.0a – Butte – System Indices (Excluding MED)

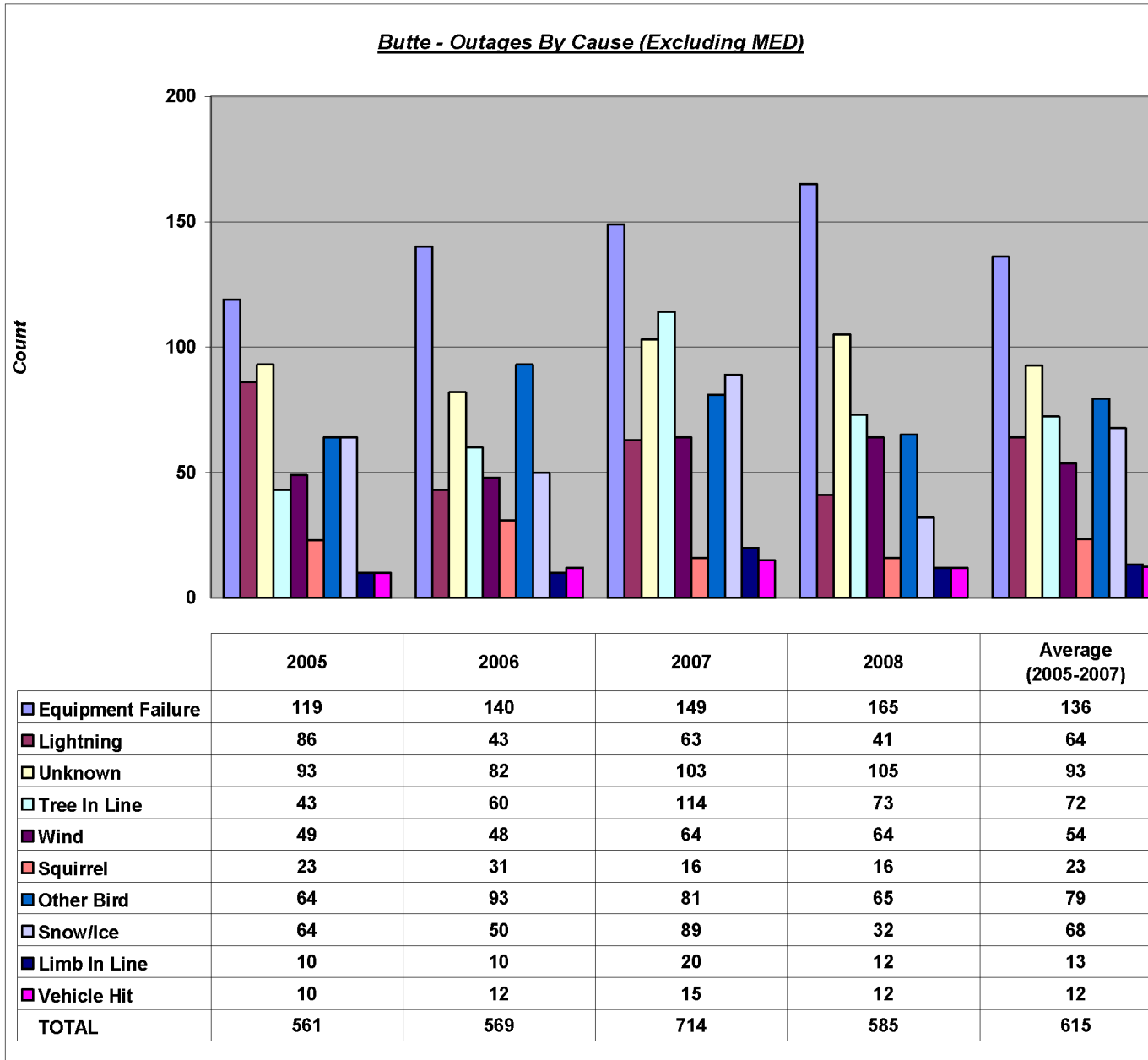
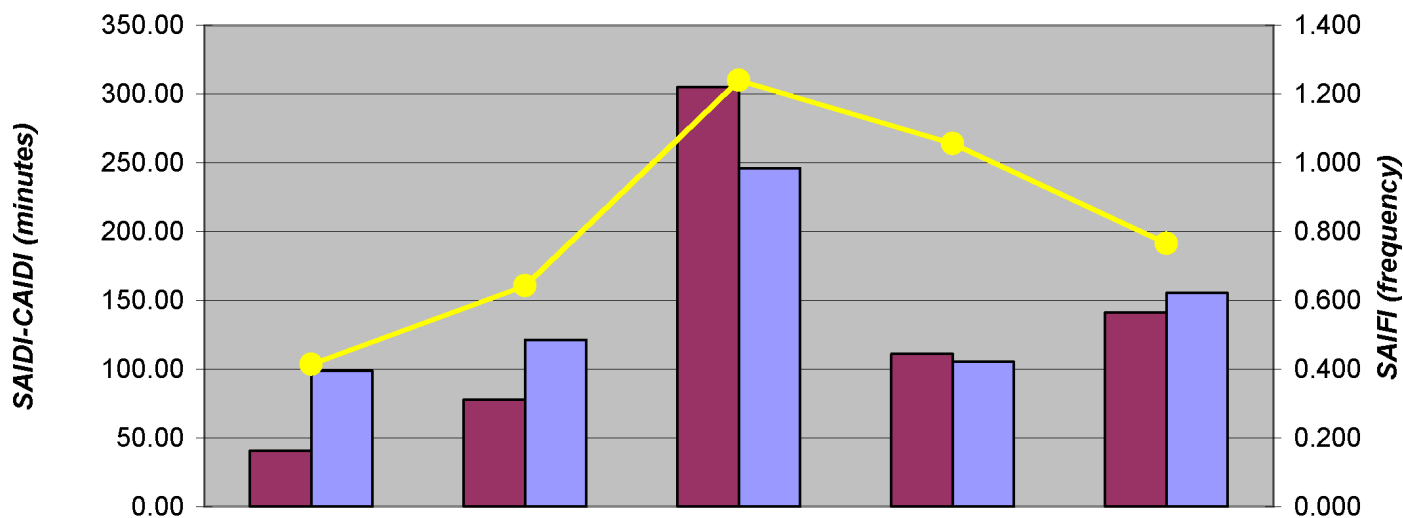


Figure 6.0b – Butte – Outages By Cause (Excluding MED)

Butte System Indices (Including MED)



	2005	2006	2007	2008	Average (2005-2007)
SAIDI	40.76	77.81	305.10	111.11	141.22
CAIDI	98.60	121.20	246.14	105.26	155.31
SAIFI	0.413	0.642	1.240	1.056	0.76

Year

Figure 6.0c – Butte – System Indices (Including MED)

Butte - Outages By Cause (Including MED)

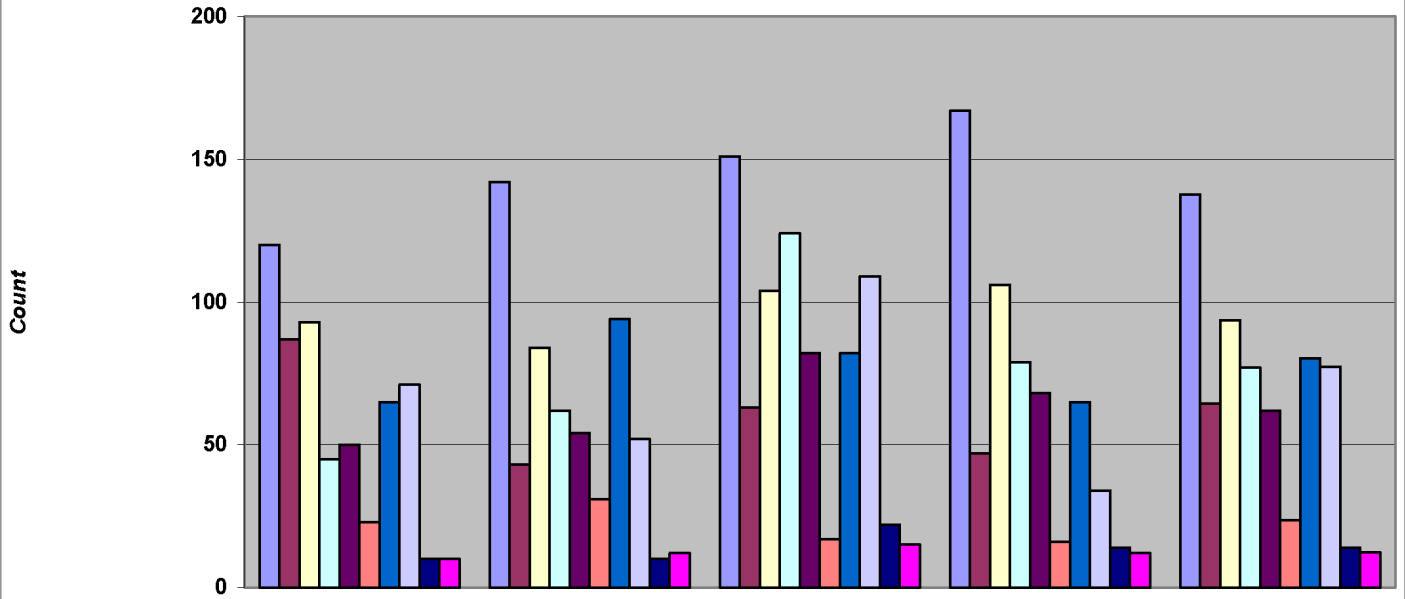


Figure 6.0d – Butte – Outages By Cause (Including MED)

7.0 Great Falls – System Reliability

7.1 Great Falls Division had heavy wet snow on June 11th that resulted in long outages and a major event day. SAIDI was almost 160 minutes higher for Great Falls with MEDs included. Without MEDs, almost all outage cause categories decreased and overall outages are down 121 from 2007. The largest SAIDI outage was a tree through a feeder in Great Falls in April.

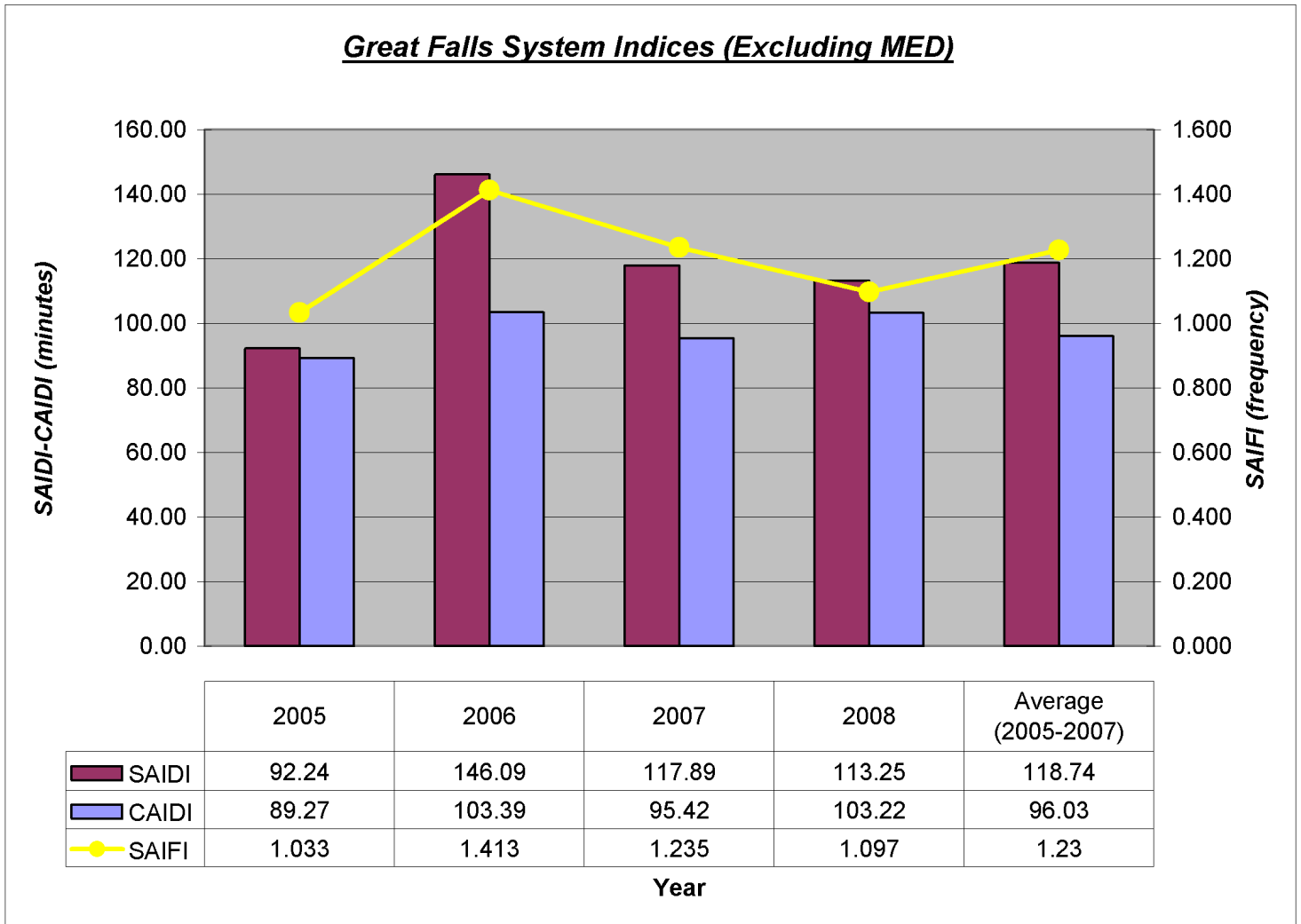


Figure 7.0a – Great Falls – System Indices (Excluding MED)

Great Falls - Outages By Cause (Excluding MED)

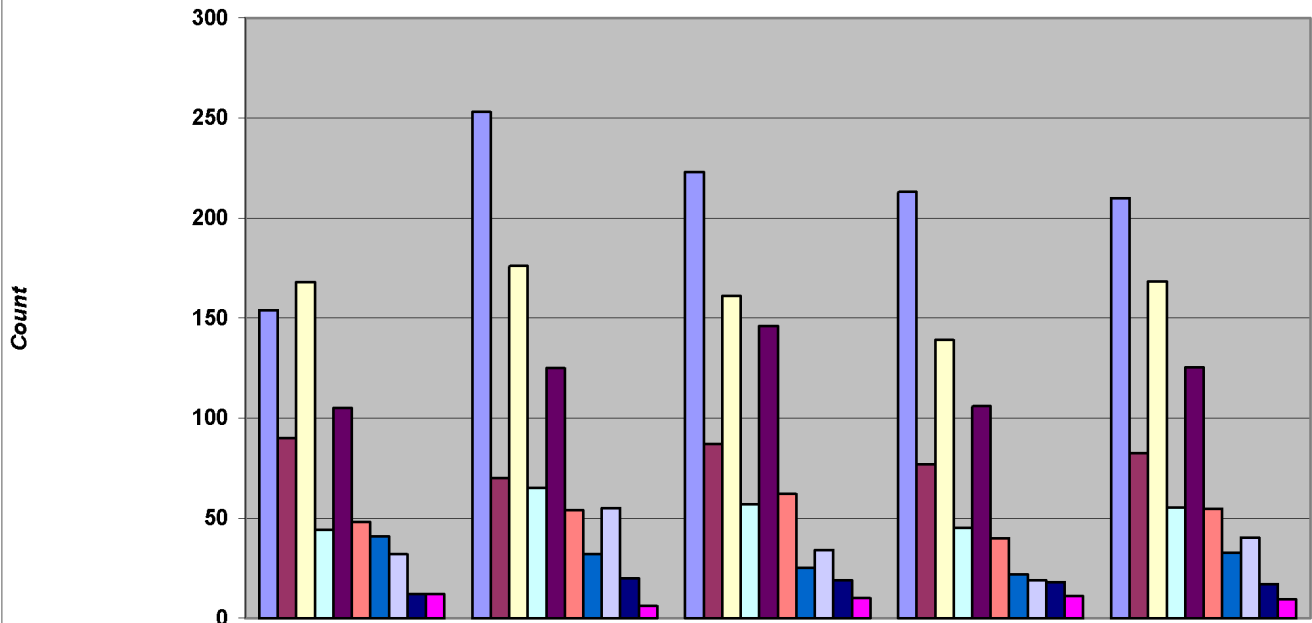


Figure 7.0b – Great Falls – Outages By Cause (Excluding MED)

Great Falls System Indices (Including MED)

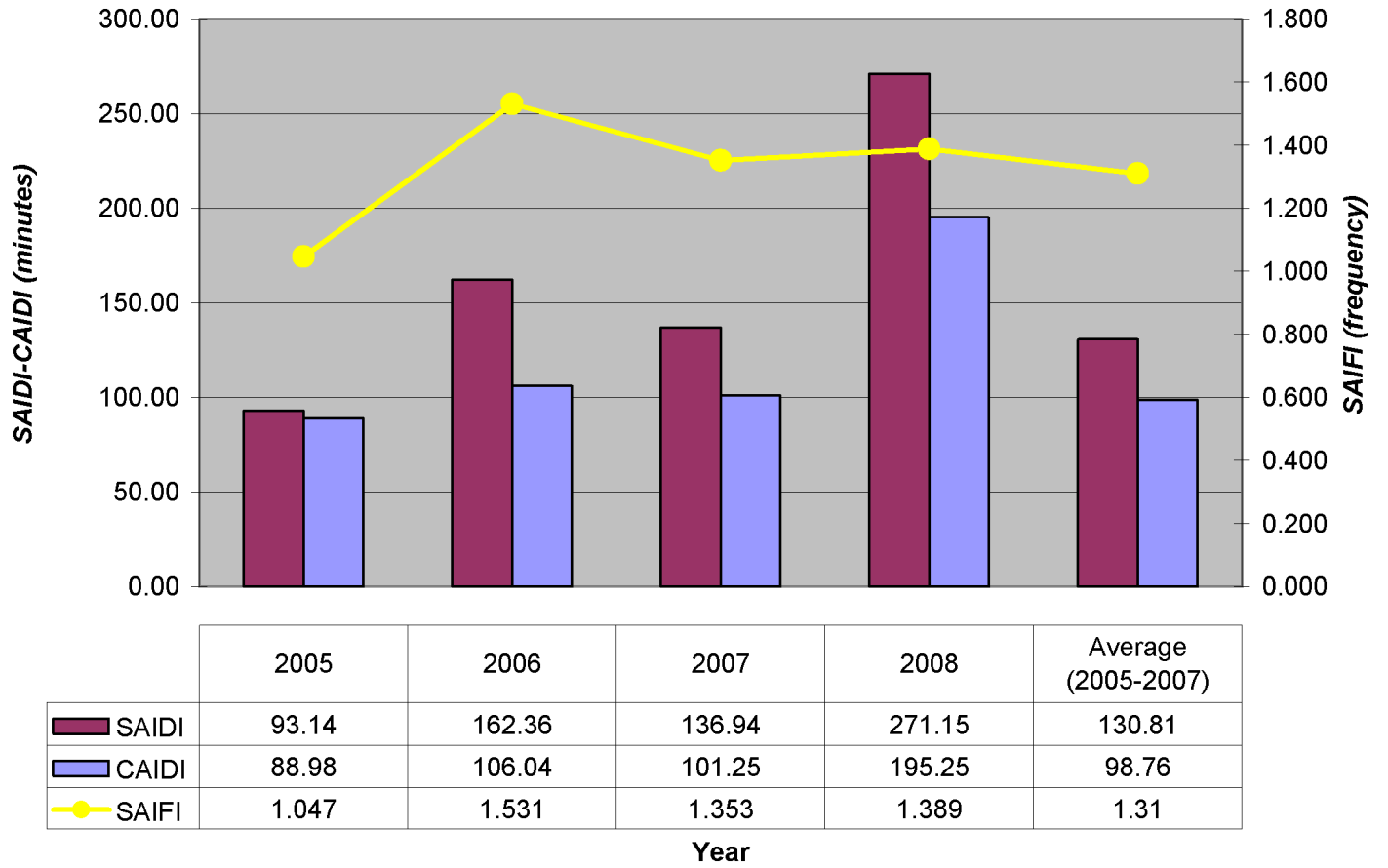
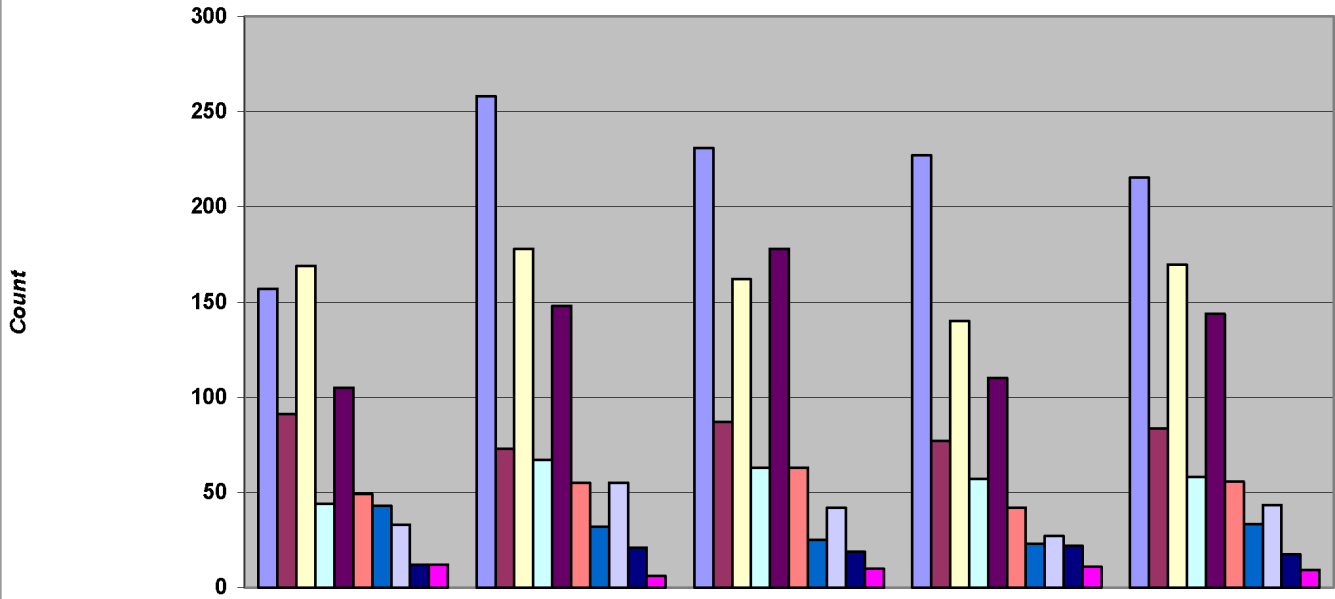


Figure 7.0c – Great Falls – System Indices (Including MED)

Great Falls - Outages By Cause (Including MED)



	2005	2006	2007	2008	Average (2005-2007)
Equipment Failure	157	258	231	227	215
Lightning	91	73	87	77	84
Unknown	169	178	162	140	170
Tree In Line	44	67	63	57	58
Wind	105	148	178	110	144
Squirrel	49	55	63	42	56
Other Bird	43	32	25	23	33
Snow/Ice	33	55	42	27	43
Limb In Line	12	21	19	22	17
Vehicle Hit	12	6	10	11	9
TOTAL	715	893	880	736	829

Figure 7.0d – Great Falls – Outages By Cause (Including MED)

8.0 Havre – System Reliability

8.1 Discussion: Havre did not have major problems on any of the regional major event days. Two indices (SAIDI and SAIFI) rose in 2007, while CAIDI decreased. A broken distribution pole and a connection problem in a substation resulted in the largest SAIDI outages. Transmission outages drove SAIFI higher. No outage causes were appreciably higher in 2008 than in 2007.

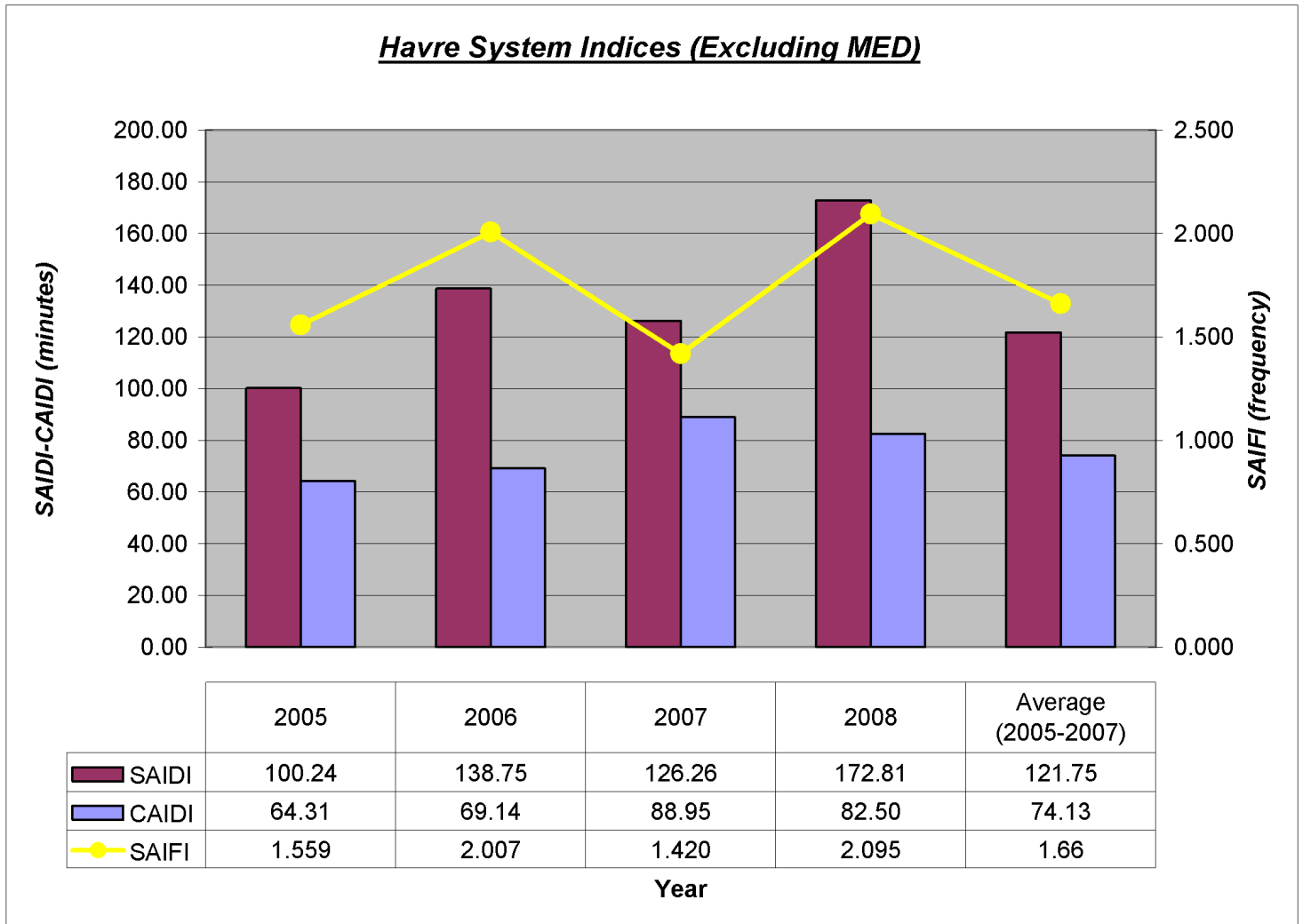
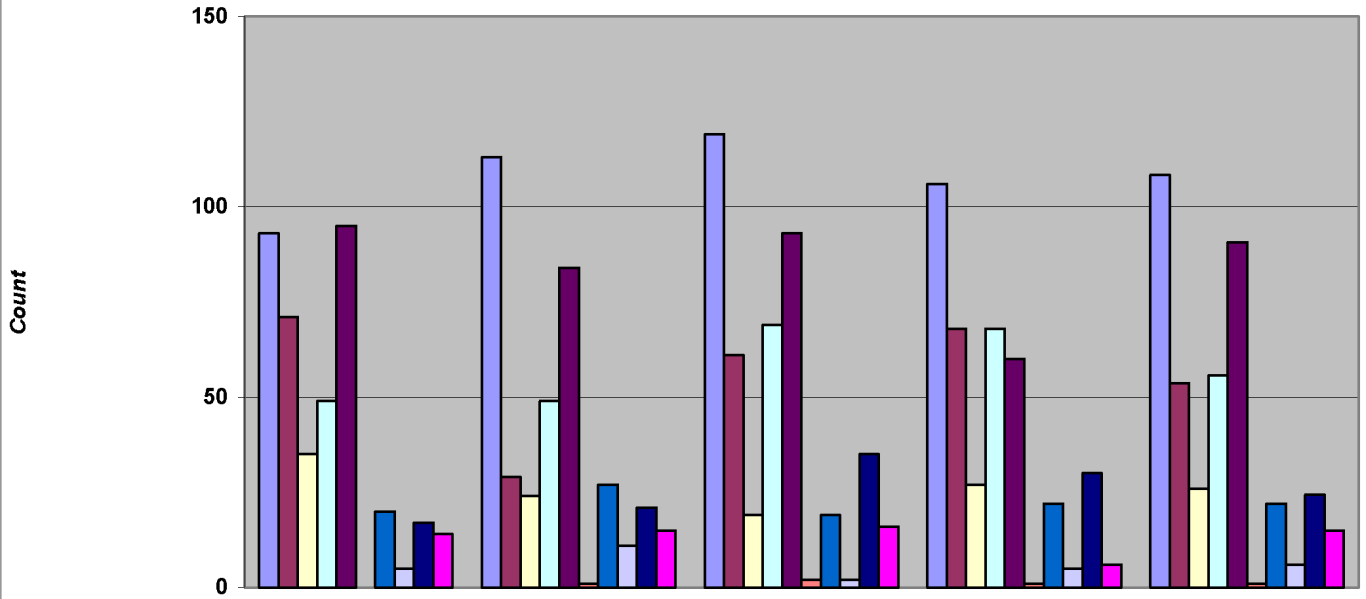


Figure 8.0a – Havre – System Indices (Excluding MED)

Havre - Outages By Cause (Excluding MED)



	2005	2006	2007	2008	Average (2005-2007)
Equipment Failure	93	113	119	106	108
Lightning	71	29	61	68	54
Unknown	35	24	19	27	26
Tree In Line	49	49	69	68	56
Wind	95	84	93	60	91
Squirrel	0	1	2	1	1
Other Bird	20	27	19	22	22
Snow/Ice	5	11	2	5	6
Limb In Line	17	21	35	30	24
Vehicle Hit	14	15	16	6	15
TOTAL	399	374	435	393	403

Figure 8.0b – Havre – Outages By Cause (Excluding MED)

Havre System Indices (Including MED)

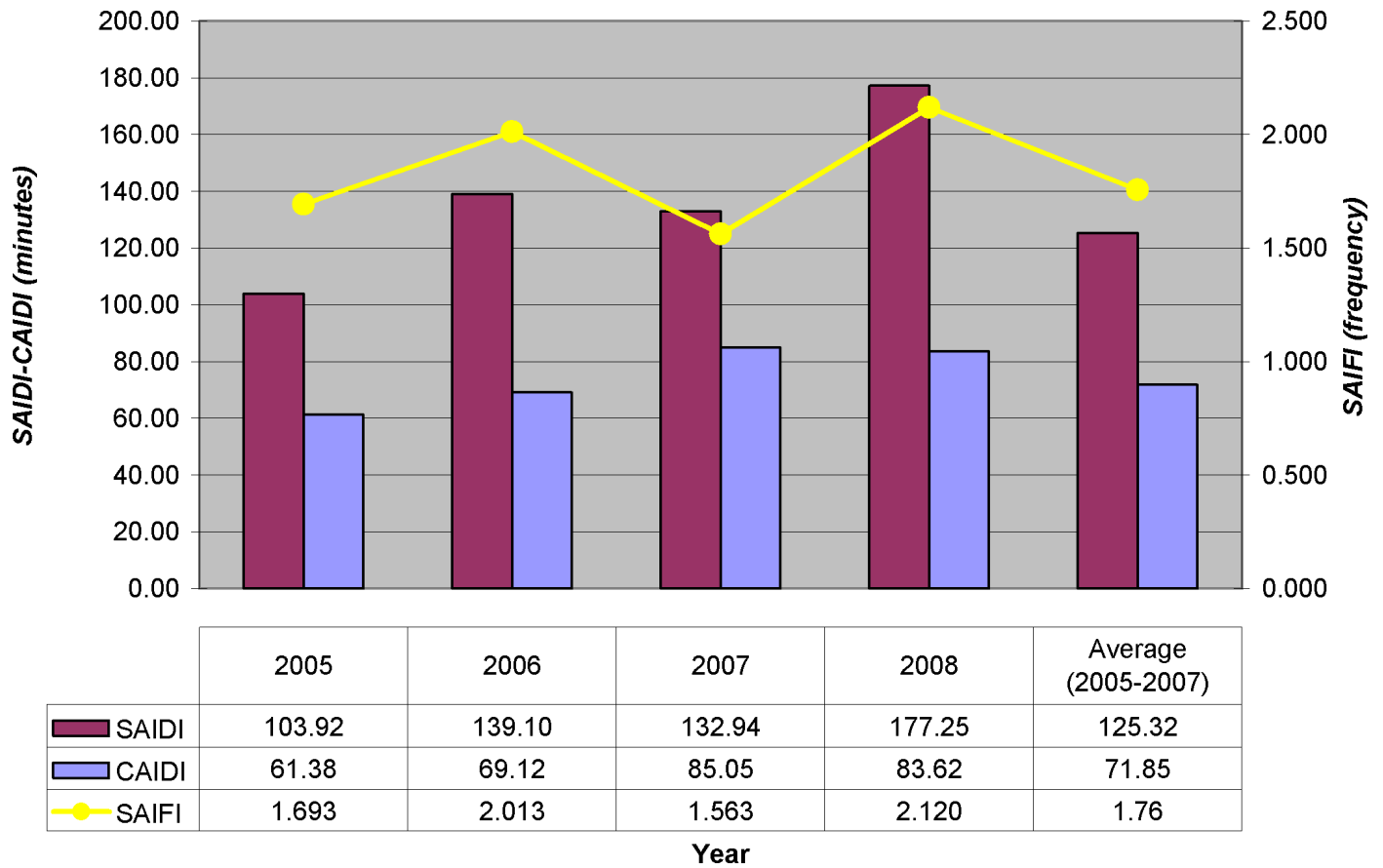
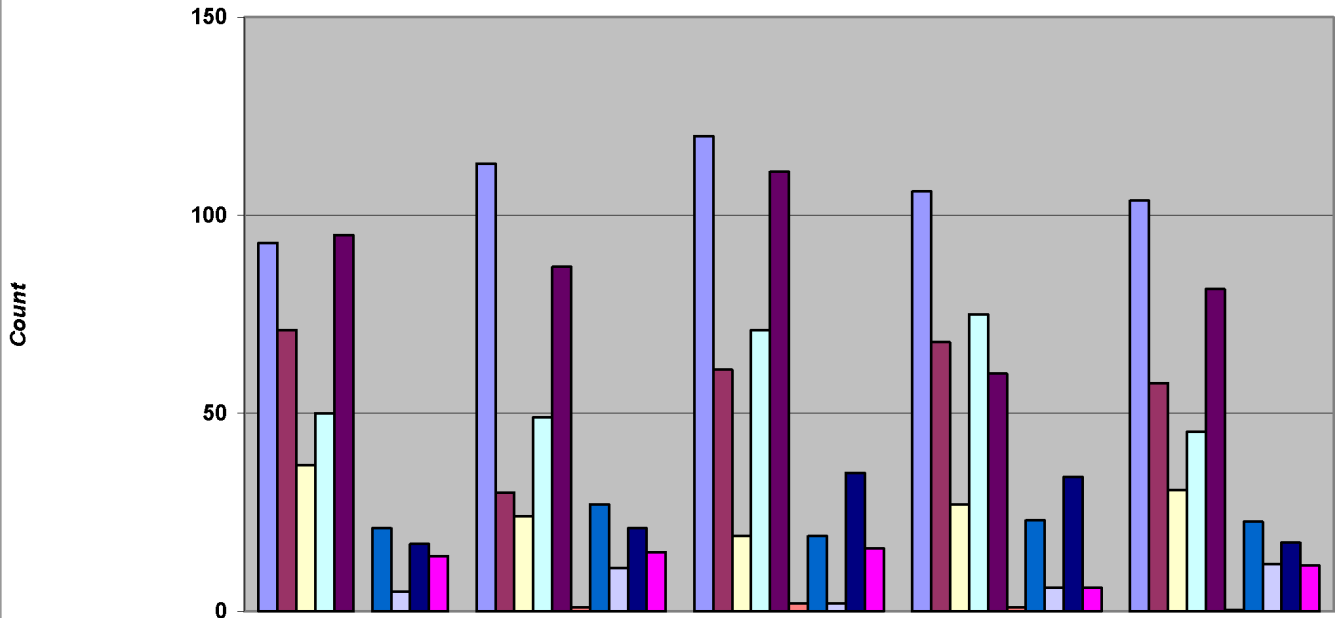


Figure 8.0c – Havre – System Indices (Including MED)

Havre - Outages By Cause (Including MED)



	2005	2006	2007	2008	Average (2005-2007)
Equipment Failure	93	113	120	106	104
Lightning	71	30	61	68	58
Unknown	37	24	19	27	31
Tree In Line	50	49	71	75	45
Wind	95	87	111	60	81
Squirrel	0	1	2	1	0
Other Bird	21	27	19	23	23
Snow/Ice	5	11	2	6	12
Limb In Line	17	21	35	34	17
Vehicle Hit	14	15	16	6	12
TOTAL	403	378	456	406	383

Figure 8.0d – Havre – Outages By Cause (Including MED)

9.0 Helena – System Reliability

9.1 Discussion: Helena Division had some outages due to the June 11th MED snow storm but overall fared better in 2008 than in 2007 as reflected by improving indices. The largest outages were the loss of Townsend in October due to an insulator failure on the 100kv line while a temporary substation transformer was in service and an April storm related outage. Increased outage causers were wind and vehicle hits, with most other causes down in 2008. Most indices were improved over 2007.

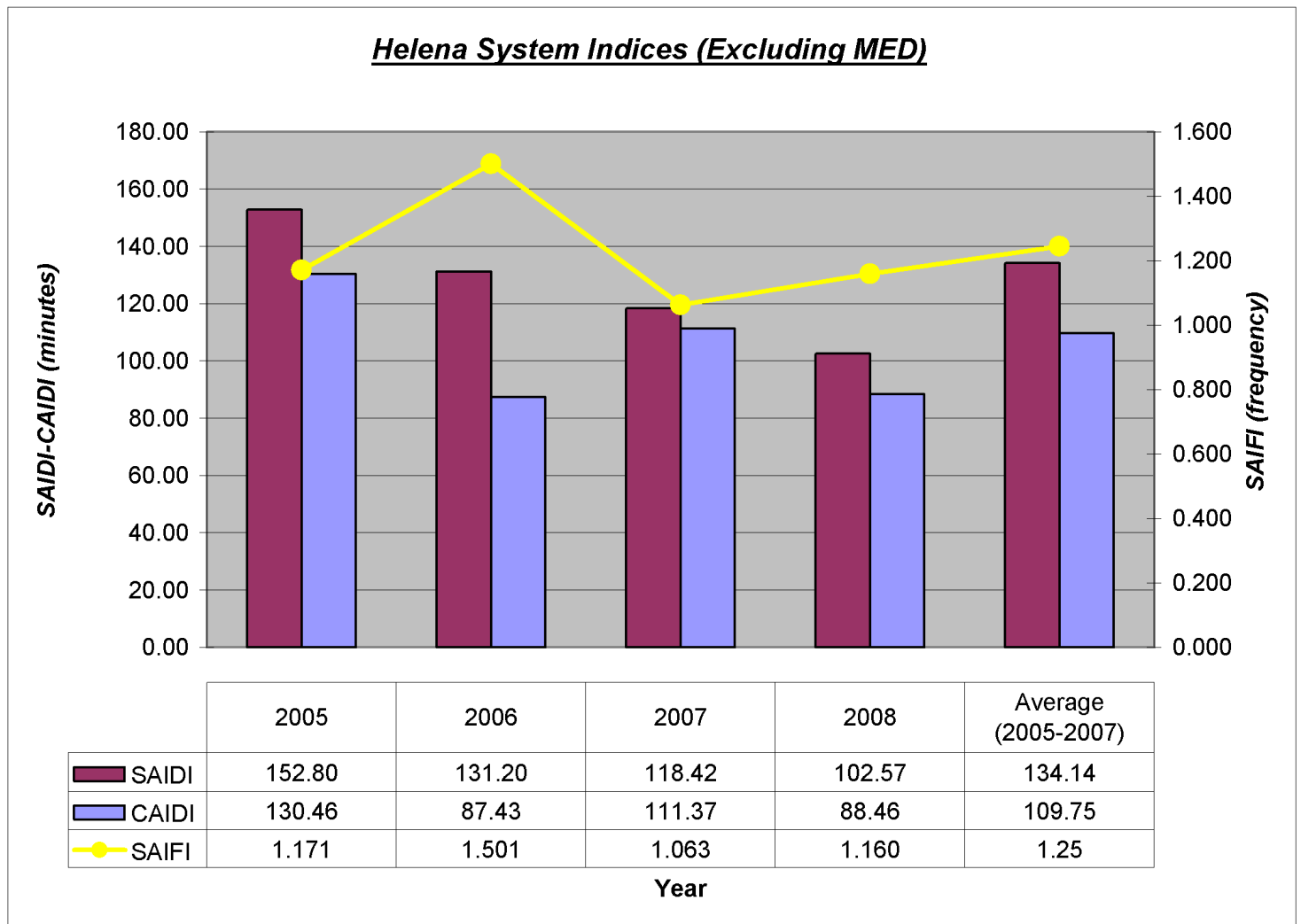
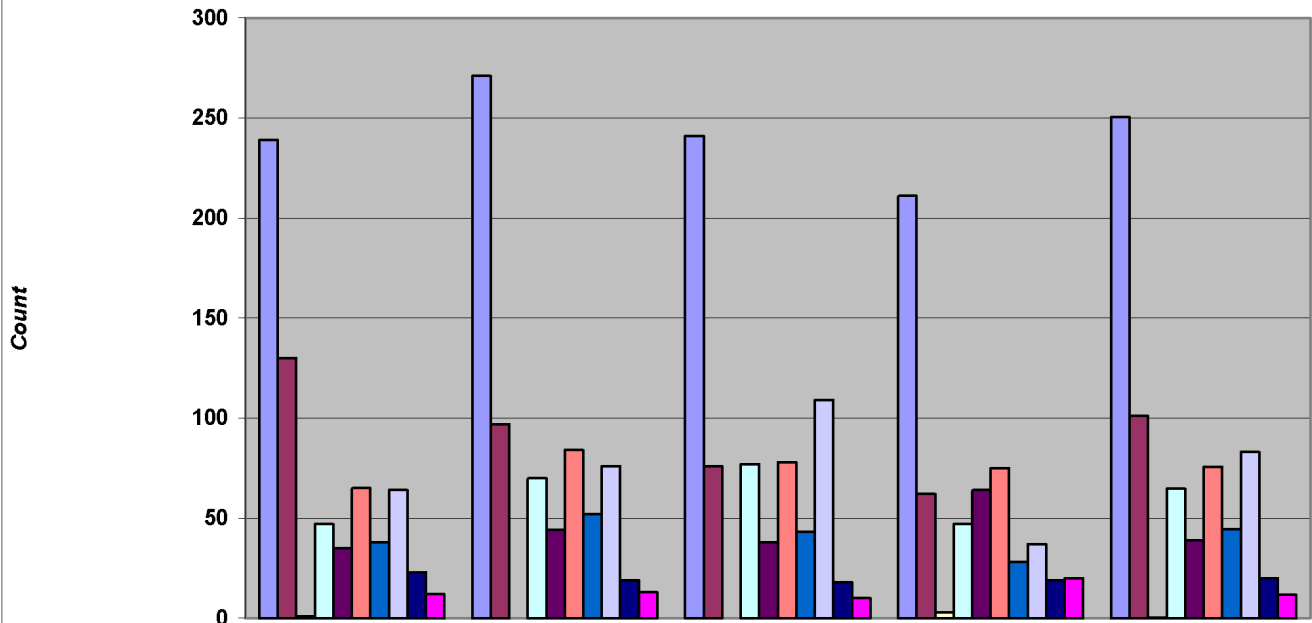


Figure 9.0a – Helena – System Indices (Excluding MED)

Helena - Outages By Cause (Excluding MED)



	2005	2006	2007	2008	Average (2005-2007)
Equipment Failure	239	271	241	211	250
Lightning	130	97	76	62	101
Unknown	1	0	0	3	0
Tree In Line	47	70	77	47	65
Wind	35	44	38	64	39
Squirrel	65	84	78	75	76
Other Bird	38	52	43	28	44
Snow/Ice	64	76	109	37	83
Limb In Line	23	19	18	19	20
Vehicle Hit	12	13	10	20	12
TOTAL	654	726	690	566	690

Figure 9.0b – Helena – Outages By Cause (Excluding MED)

Helena System Indices (Including MED)

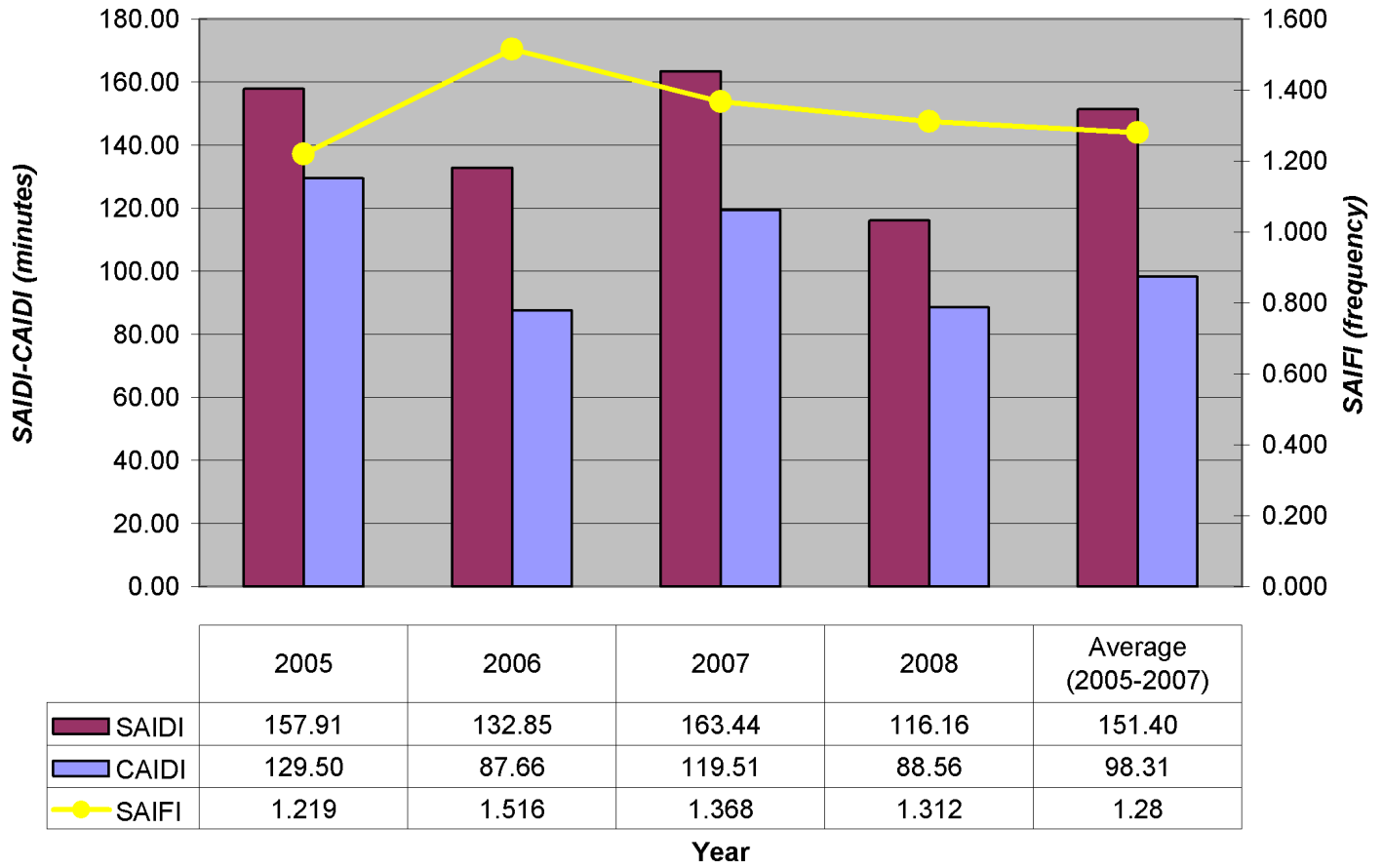
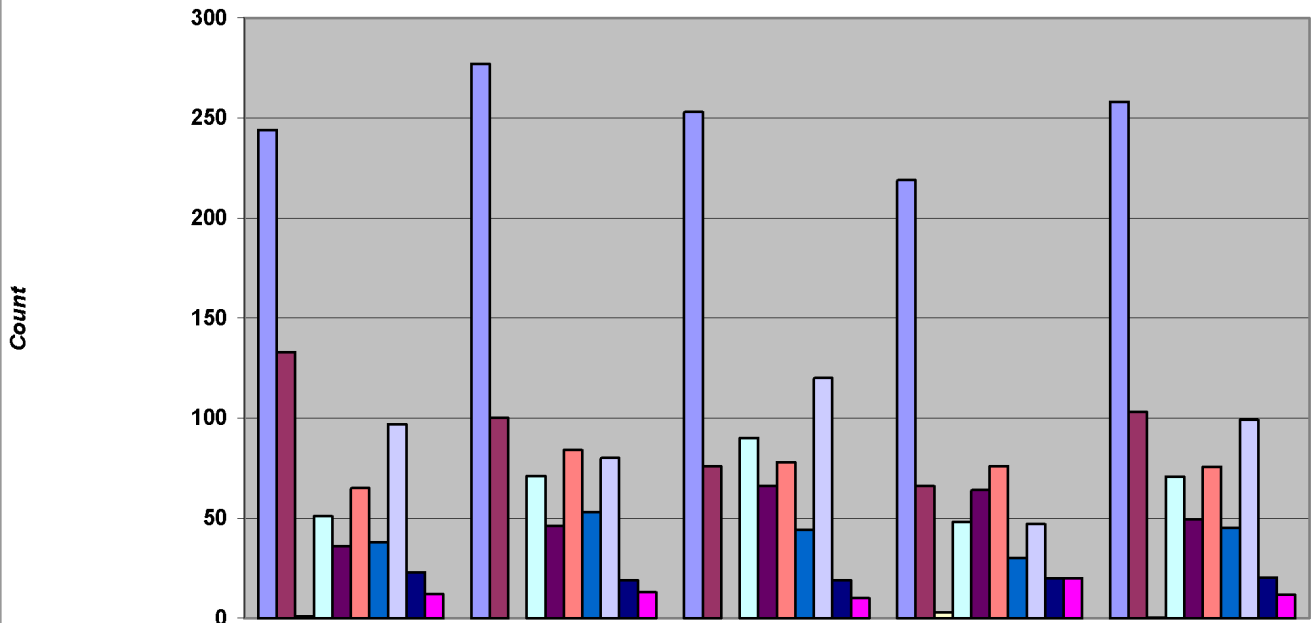


Figure 9.0c – Helena – System Indices (Including MED)

Helena - Outages By Cause (Including MED)



	2005	2006	2007	2008	Average (2005-2007)
Equipment Failure	244	277	253	219	258
Lightning	133	100	76	66	103
Unknown	1	0	0	3	0
Tree In Line	51	71	90	48	71
Wind	36	46	66	64	49
Squirrel	65	84	78	76	76
Other Bird	38	53	44	30	45
Snow/Ice	97	80	120	47	99
Limb In Line	23	19	19	20	20
Vehicle Hit	12	13	10	20	12
TOTAL	700	743	756	593	733

Figure 9.0d – Helena – Outages By Cause (Including MED)

10.0 Lewistown – System Reliability

10.1 Discussion: In 2008, Lewistown area was only slightly impacted by regional major event days, showing major improvement in the reliability indices over the two rough years experienced in 2006 and 2007. The largest SAIDI outage was losing the 50kv line feeding Geraldine on the fourth of July. Equipment failures and wind causes were up, while lightning, snow/ice, and vehicle-hits were down in 2008.

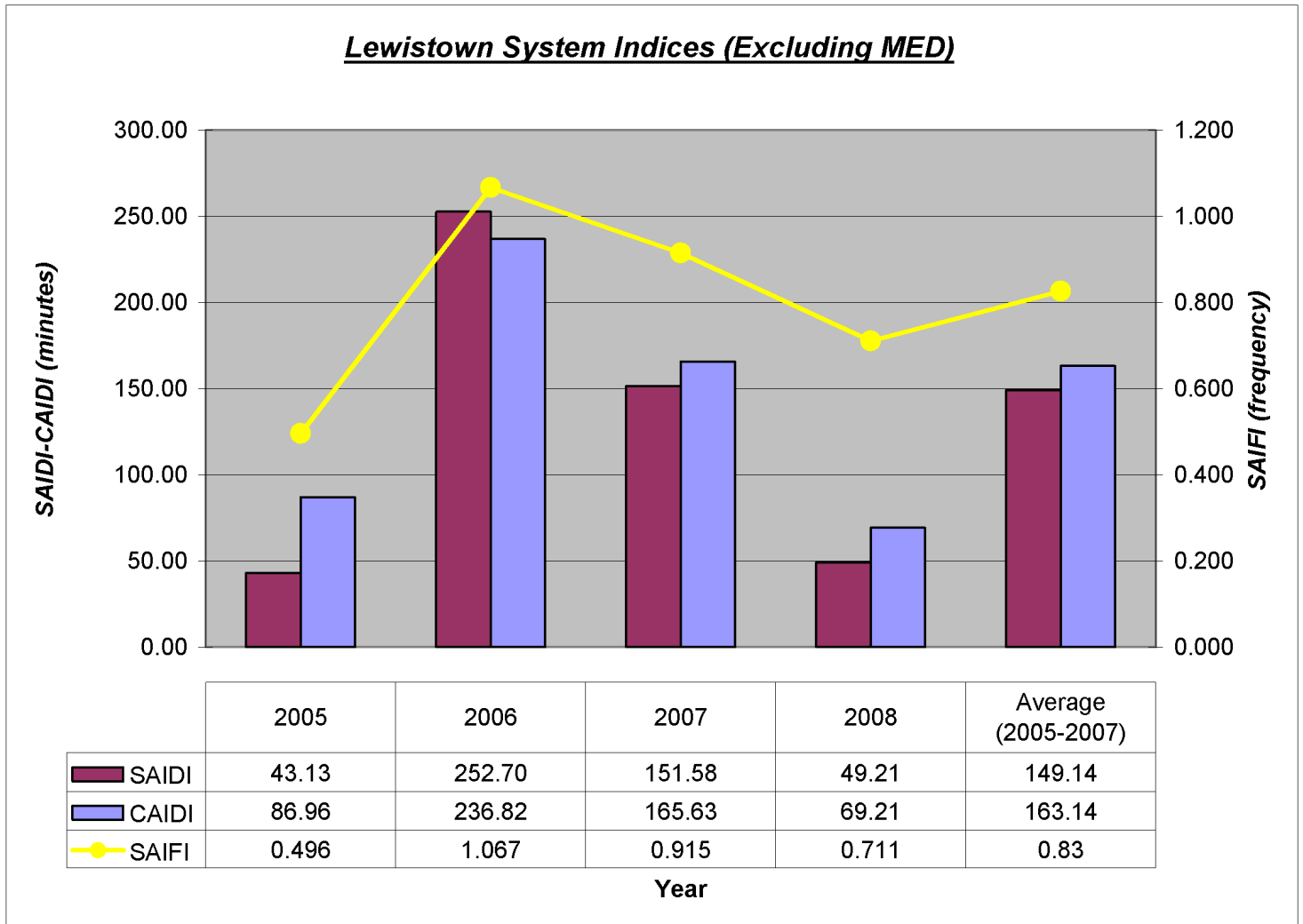
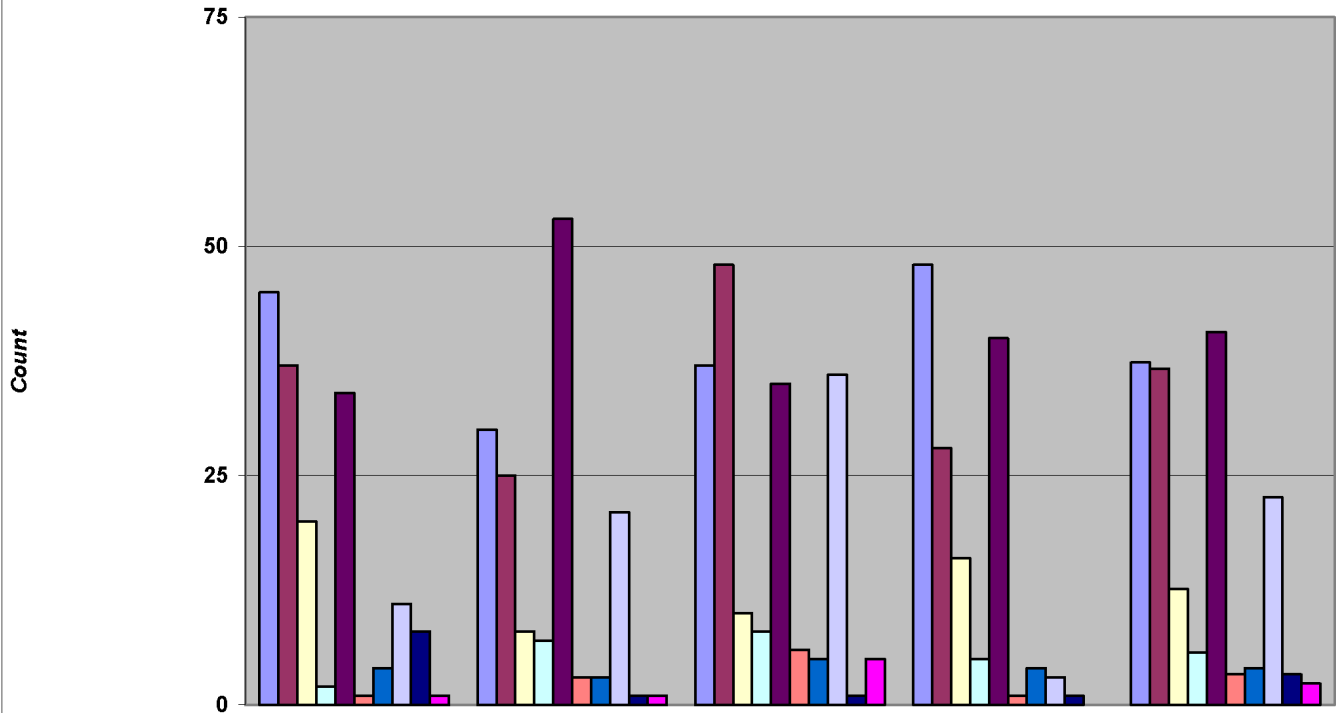


Figure 10.0a – Lewistown – System Indices (Excluding MED)

Lewistown - Outages By Cause (Excluding MED)



	2005	2006	2007	2008	Average (2005-2007)
Equipment Failure	45	30	37	48	37
Lightning	37	25	48	28	37
Unknown	20	8	10	16	13
Tree In Line	2	7	8	5	6
Wind	34	53	35	40	41
Squirrel	1	3	6	1	3
Other Bird	4	3	5	4	4
Snow/Ice	11	21	36	3	23
Limb In Line	8	1	1	1	3
Vehicle Hit	1	1	5	0	2
TOTAL	163	152	191	146	169

Figure 10.0b – Lewistown – Outages By Cause (Excluding MED)

Lewistown System Indices (Including MED)

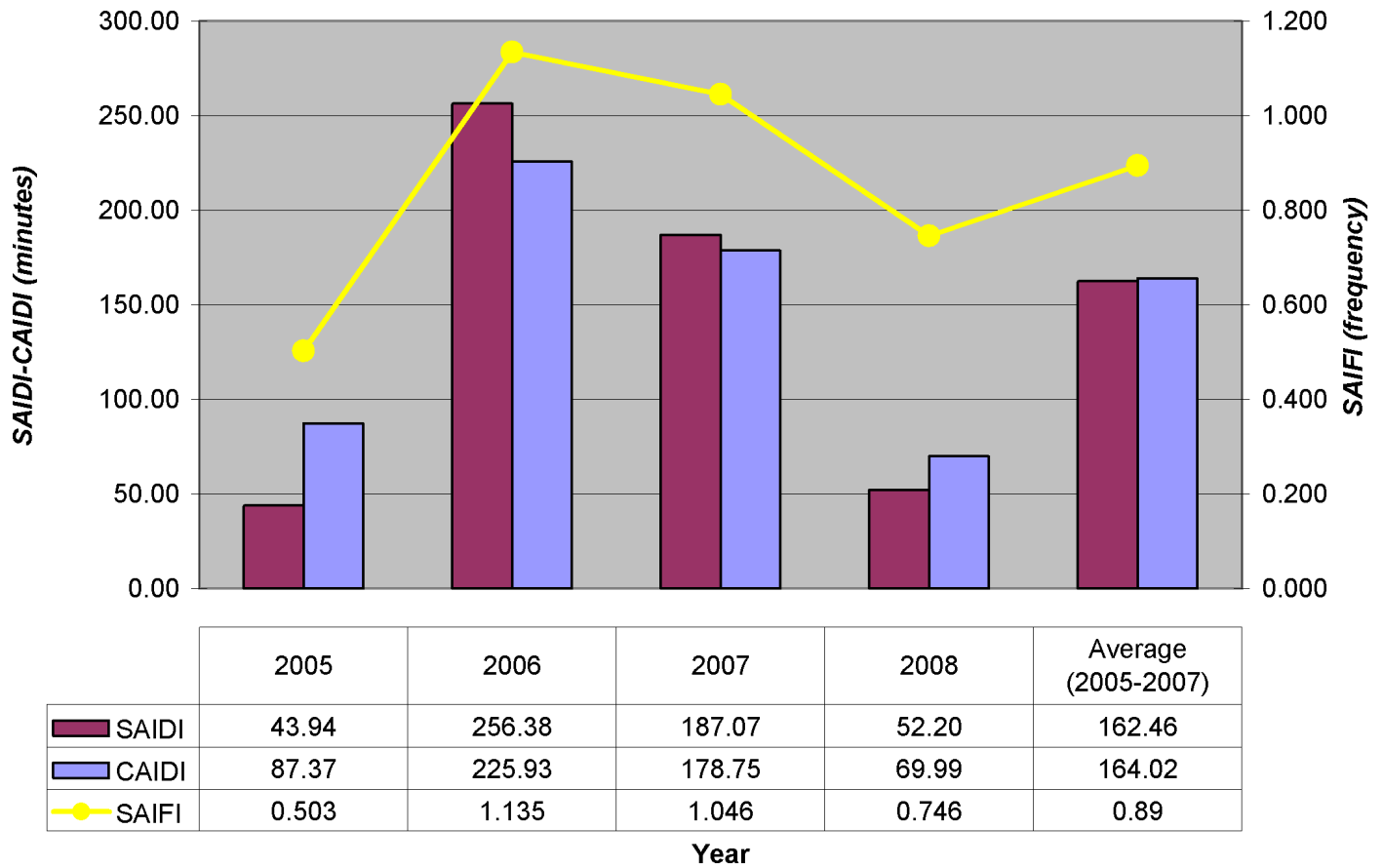
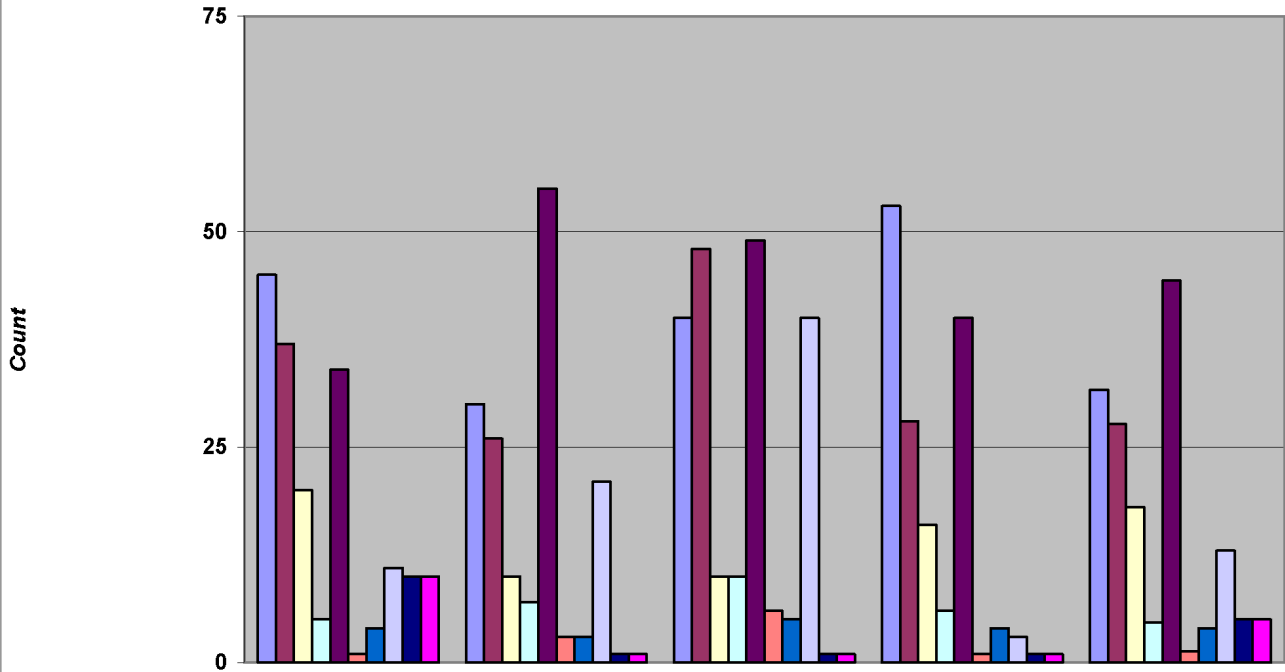


Figure 10.0c – Lewistown – System Indices (Including MED)

Lewistown - Outages By Cause (Including MED)



	2005	2006	2007	2008	Average (2005-2007)
Equipment Failure	45	30	40	53	32
Lightning	37	26	48	28	28
Unknown	20	10	10	16	18
Tree In Line	5	7	10	6	5
Wind	34	55	49	40	44
Squirrel	1	3	6	1	1
Other Bird	4	3	5	4	4
Snow/Ice	11	21	40	3	13
Limb In Line	10	1	1	1	5
Vehicle Hit	10	1	1	1	5
TOTAL	168	157	214	178	151

Figure 10.0d – Lewistown – Outages By Cause (Including MED)

11.0 Missoula – System Reliability

11.1 Discussion: Missoula Division was not impacted much from major event storms in 2008. All three indices showed major improvements in 2008 over 2007 and the three-year averages. Loss of the 161kv due to a tree in the line and the loss of a pole from a bad cutout and ensuing fire were the largest SAIDI outages. Most outage causes, including squirrels, were down. Only tree limbs and vehicle hits were up in the top ten causes.

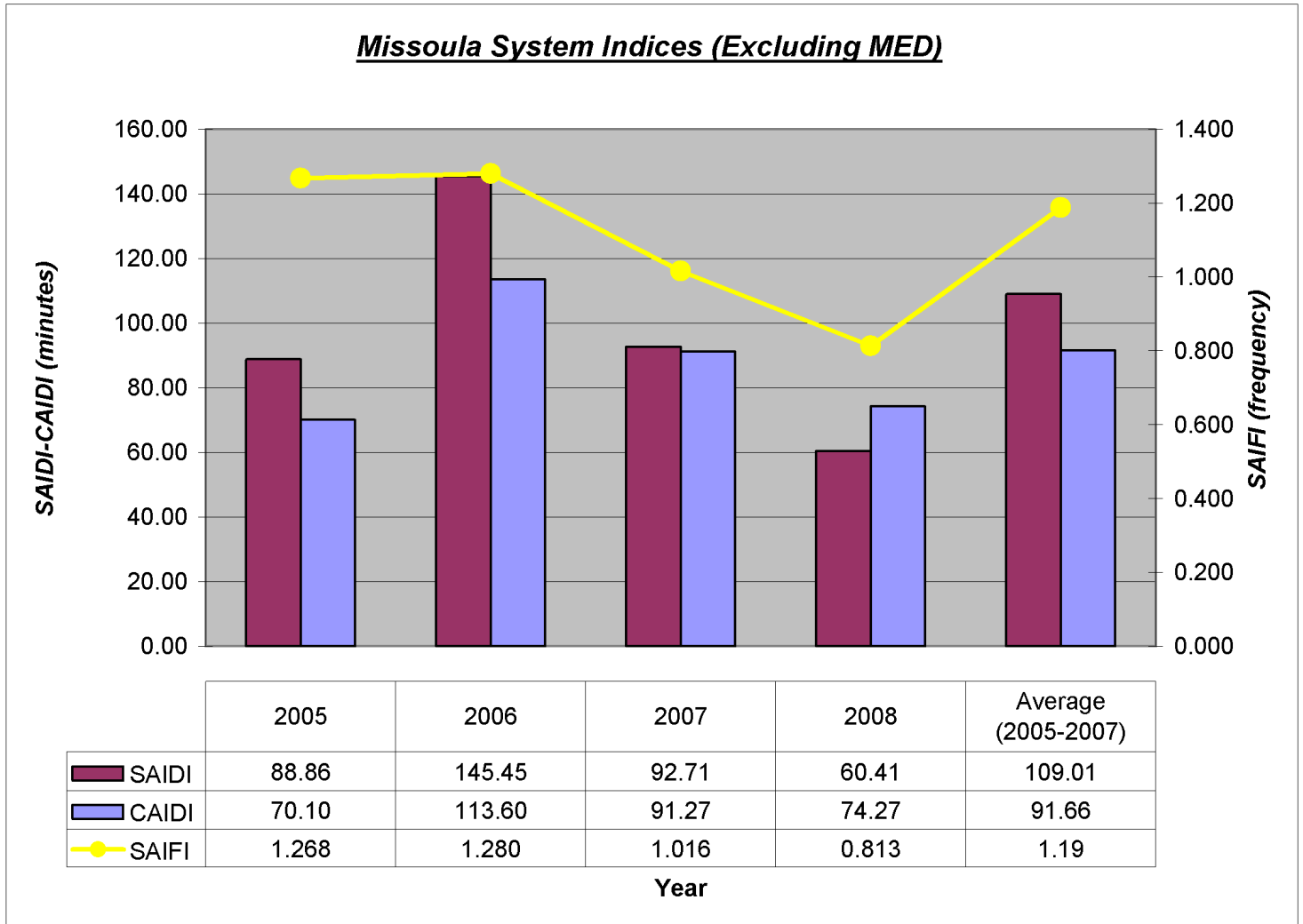


Figure 11.0a – Missoula – System Indices (Excluding MED)

Missoula - Outages By Cause (Excluding MED)

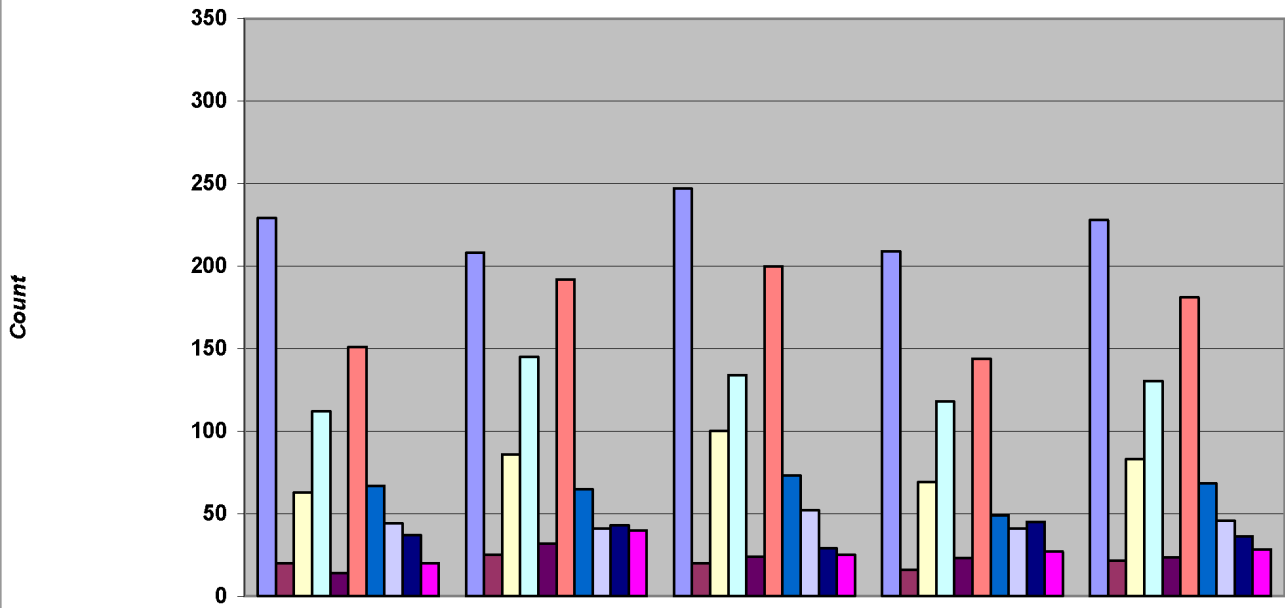


Figure 11.0b – Missoula – Outages By Cause (Excluding MED)

Missoula System Indices (Including MED)

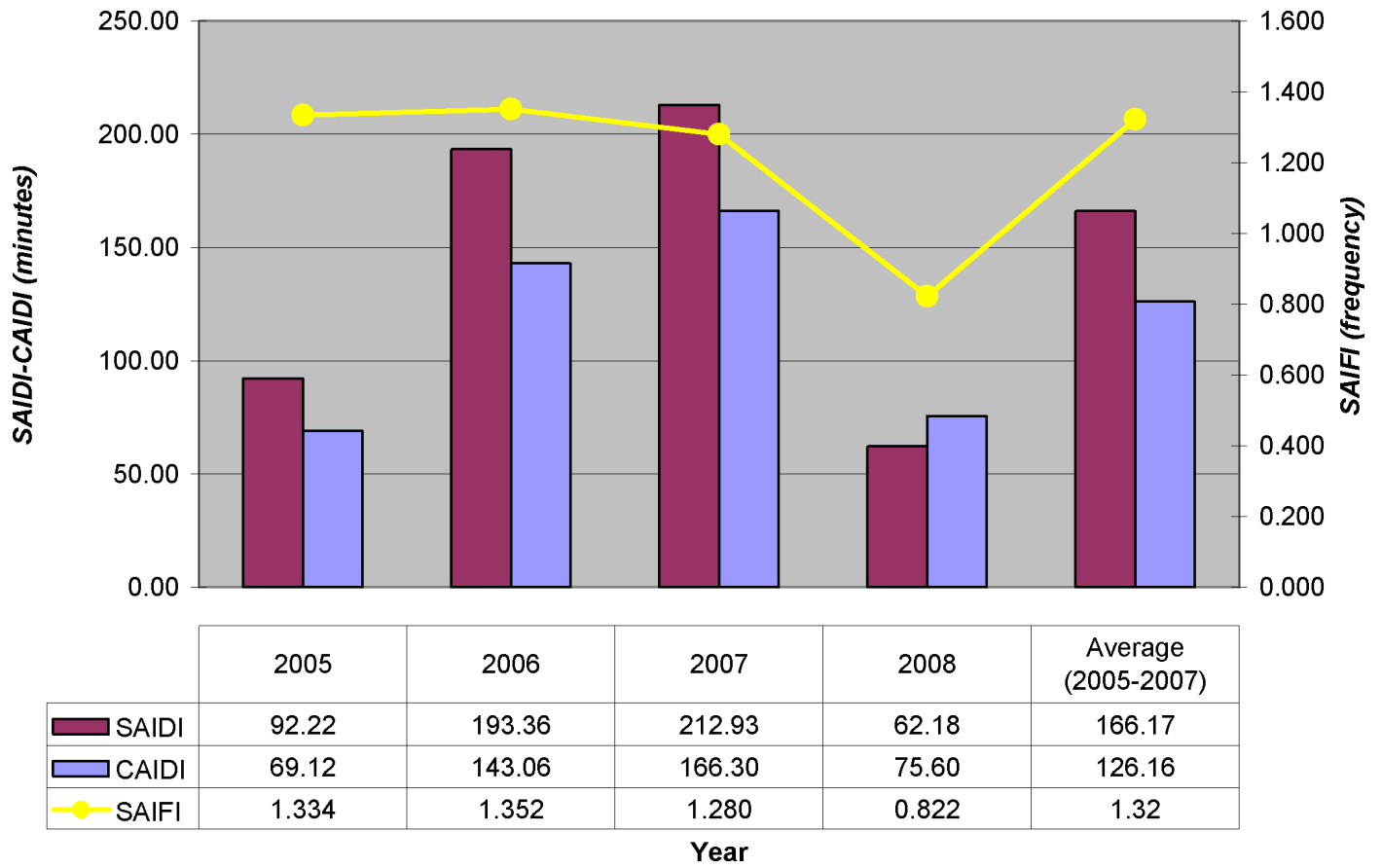
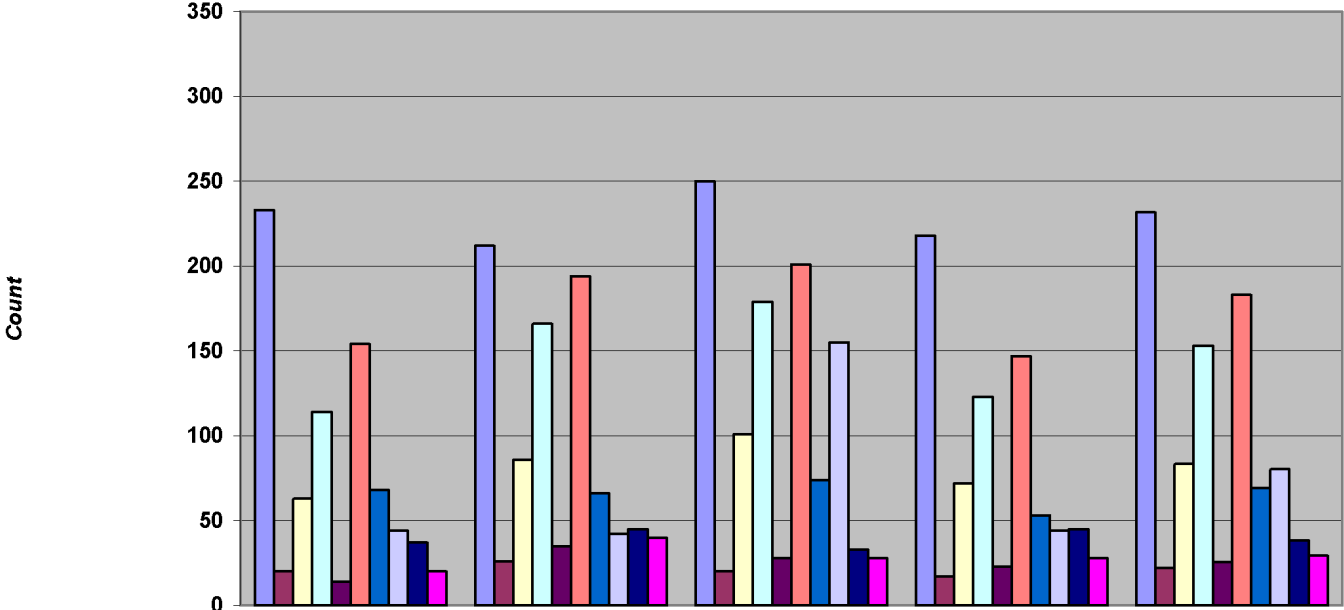


Figure 11.0c – Missoula – System Indices (Including MED)

Missoula - Outages By Cause (Including MED)



	2005	2006	2007	2008	Average (2005-2007)
Equipment Failure	233	212	250	218	232
Lightning	20	26	20	17	22
Unknown	63	86	101	72	83
Tree In Line	114	166	179	123	153
Wind	14	35	28	23	26
Squirrel	154	194	201	147	183
Other Bird	68	66	74	53	69
Snow/Ice	44	42	155	44	80
Limb In Line	37	45	33	45	38
Vehicle Hit	20	40	28	28	29
TOTAL	767	912	1,069	770	916

Figure 11.0d – Missoula – Outages By Cause (Including MED)

12.0 Conclusion

The five major event day (MED) snow and wind/hail storms contributed 58 minutes to the Montana Region SAIDI this year, causing some long outages and inconvenience to our customers, as well as long, hard working conditions for the line forces. The Billings storm had the largest SAIDI contribution of over 22 minutes, but the Great Falls and Helena storm was close behind with 21 minutes. The Livingston transformer failure was the largest substation outage, as most other substation and transmission occurrences were quickly restored, often due to the redundant system.

With major events excluded, all three indices were lower for 2008 than the 2007 values. The CAIDI value was down from the previous year, possibly due to a company effort to train field personnel to “restore before repair” whenever practical. Although 2008 was a very reliable year for the Company, Retail Operations continues look for areas that can be improved.

Areas where cycle tree trimming efforts were concentrated saw reductions in outage numbers from tree related causes. Equipment failures were down in 2008, possibly due to increased line inspection. Wind and snow/ice outages decreased, indicating a year with fewer storm related outages. Lightning outages were also down significantly, once again, probably related to fewer summer storms.