1 QCD Background

QCD backgrounds refer to events where the lepton does not come from the decay of a W or Z boson. These include lepton and missing energy fakes as well as semileptonic B decays etc. We continue to use the standard technique of "MET vs. ISO".

We define the 4 regions A, B, C, D

1. Region A: isolation > 0.2 and missing $E_T < 15$ GeV
2. Region B: isolation < 0.1 and missing $E_T < 15$ GeV
3. Region C: isolation > 0.2 and missing $E_T > 20$ GeV
4. Region D: isolation < 0.1 and missing $E_T > 20$ GeV,

Then:

$$QCD_D = \frac{N_B \times N_C}{N_A}. \tag{1}$$

For the tagged sample, we move the isolation boundary to 0.1 for regions A and C in order to increase the number of events in the sample.

1.1 Summary

- We estimate the systematic error due to this method to be 25% by applying the method to predict the number of events with isolation between 0.1 and 0.2.
- We compared the two methods of jet counting for events with non-isolated leptons. We find that not counting jets close to the lepton does a much better job in predicting the number of events with isolation between 0.1 and 0.2.
- We correct for the contribution of W and $t\bar{t}$ events in the sideband regions by using the MC to obtain the ratio of events in the signal and sideband regions. We obtain a ratio for RegionB/RegionD of about 7% for W and $t\bar{t}$ MC and pretagged and tagged events. For RegionC/RegionD we obtain 2-3% for pretag events W (isolation cut for Region C at 0.2) and 6% for the tagged W sample (isolation cut for Region C at 0.1). For $t\bar{t}$ these numbers are 7.5% and 12% respectively. We assign a 20% uncertainty to the correction due to the MC based estimate of these ratios.
- The correction of W and $t\bar{t}$ events contributing to the sidebands changes the pretag Non-W fraction by 1-2% absolute, for both electrons and muons. For electrons, this amounts to a 5-10% change to the uncorrected estimate and for muons is a 25% change.
- We apply the same method to the tagged sample, including correcting the sideband regions for tagged $t\bar{t}$ and W+jet events.
- We also estimate the tagged qcd background by looking at the tagging rate in region B and applying that to the pretag qcd background estimate.
- We use a weighted average of the two tagged background estimates to obtain the final tagged qcd background estimate.

- Table 2 gives the final qcd background estimates.

Table 1: Final QCD background estimate.

			$H_T > 0$		$H_T > 200$ GeV	
Jet multiplicity	1 jet	2 jets	3 jets	≥ 4 jets	3 jets	≥ 4 jets
Electrons						
NonW Frac.	0.139 ± 0.035	0.173 ± 0.043	0.195 ± 0.053			
Tag Rate Region B (%)	2.3 ± 0.6	2.5 ± 0.7				
Taggable Jets Region D	5112	1709	454	200	232	181
Tag Rate Method	16.3 ± 5.8	7.4 ± 2.6	2.2 ± 0.9	1.0 ± 0.4		
Tag Sample Method	21.8± 6.1	10.0± 3.1	3.7± 1.3	1.2± 0.4		
Combined Tag Estimate	19.0 ± 4.2	8.6 ± 2.1	2.7 ± 0.7	1.1 ± 0.3	1.3 ± 0.3	1.0 ± 0.3
Muons						
NonW Frac.	0.034 ± 0.01	0.043 ± 0.011	0.075 ± 0.023			
Tag Rate Region B (%)	3.2 ± 0.8	2.4 ± 0.8				
Taggable Jets Region D	3698	1172	273	110	118	84
Tag Rate Method	4.0 ± 1.6	1.2 ± 0.6	0.5 ± 0.3	0.2 ± 0.1		
Tag Sample Method	4.8± 1.5	1.8± 0.7	1.0± 0.4	0.3± 0.1		
Combined Tag Estimate	4.4 ± 1.1	1.5 ± 0.5	0.7 ± 0.2	0.3 ± 0.1	0.3 ± 0.1	0.3 ± 0.1

1.2 Pretag Estimate

The pretag numbers for each region and the qcd background estimates are given in Table 3. The statistical error for the estimates are quite small. To make an estimate of the systematic error, we use the method to predict the number of events in the Region F: 0.1 $<$ Isolation $<$ 0.2 and missing $E_T > 20$ GeV. To do this we redefine region B to also have lepton isolation between 0.1 and 0.2. Since these regions are (mostly) just qcd background events, we can test our method to see if it gives consistent results. The predicted fractions are given in Table 4, and in principle should be equal to one. We find variations of around 20% or less and we assign a systematic error of 25% to the pretag background fraction.

1.3 Jet Counting

Binning the MET vs ISO analysis into jet multiplicities has a complication in the non-isolated lepton region: should a jet containing the lepton be counted as a jet? In the isolated region, the towers containing the electron can not be used as part of the jet clustering and so effectively the jet faking the electron would not be counted as a jet. This is not done for non-isolated electrons. To correct for this in the non-isolated sample, we can either remove the electron's energy from the jet energy, and then determine whether the jet E_T passes the 15 GeV cut; or we can simply not count any jets within $\Delta R < 0.4$ of any kind of lepton. We compare our estimate of the Pretag QCD background fraction using both methods and find a 30% difference for electrons and a 100% difference for muons in the 3 and 4 jet bins. For the estimate of the tagged QCD background, we do not want to count tags where the tagged jet includes the lepton. Thus for our default value we use the method where jets near leptons are not counted. Table 3 compares the results using the two methods of jet counting.

Jet multiplicity	1 jet	2 jets	3 jets	≥ 4 jets	3.5 jets
Pretag Electrons					
Region A	46071	6553	948	124	423
Region B	34042	3158	370	64	151
Region C	1771	550	123	40	52
Region D	8829	1447	239	69	90
QCD Pred.	1308.6$\pm$ 32.5	265.1$\pm$ 12.7	48.0$\pm$ 5.2	20.6$\pm$ 4.6	18.6$\pm$ 3.1
Fraction in D	0.148 $\pm$ 0.004	0.183 $\pm$ 0.010	0.201 $\pm$ 0.025	0.299 $\pm$ 0.075	0.206 $\pm$ 0.041
			0.214 $\pm$ 0.024		
Frac. No removal	0.141 $\pm$ 0.004	0.154 $\pm$ 0.006	0.167 $\pm$ 0.015		
Pretag Muons					
Region A	16858	2537	310	51	205
Region B	6065	558	71	10	27
Region C	723	236	63	21	36
Region D	6483	998	145	36	65
QCD Pred.	260.1$\pm$ 10.4	51.9$\pm$ 4.2	14.4$\pm$ 2.6	4.1$\pm$ 1.7	4.7$\pm$ 1.3
Fraction in D	0.040 $\pm$ 0.002	0.052 $\pm$ 0.004	0.100 $\pm$ 0.020	0.114 $\pm$ 0.051	0.073 $\pm$ 0.021
			0.104 $\pm$ 0.019		
Frac. No removal	0.046 $\pm$ 0.002	0.039 $\pm$ 0.003	0.055 $\pm$ 0.008		

Table 2: Pretag event counts in the $\not\!\!E_T$ and isolation sidebands and the estimated QCD background in signal region. The "No removal" fraction is when we count jets near leptons, after removing the electron E_T from the jet E_T. We only quote statistical errors.

Jet multiplicity	1 jet	2 jets	3 jets	≥ 4 jets
Pretag Electrons				
Fraction in F	1.141 $\pm$ 0.045	0.918 $\pm$ 0.069	0.707 $\pm$ 0.112	1.789 $\pm$ 0.670
			0.830 $\pm$ 0.120	
Pretag Muons				
Fraction in F	0.861 $\pm$ 0.058	0.972 $\pm$ 0.141	0.948 $\pm$ 0.300	1.132 $\pm$ 0.723
			0.992 $\pm$ 0.280	

Table 3: The predicted background fraction for events in the isolation region between 0.1 and 0.2. The background fraction should be equal to one.

To compare the methods of either subtracting the electron energy from the jet (the muon pt is implicitly subtracted), or not counting any jets within $\Delta R < 0.4$ of the lepton, we again look at the Nonw prediction for the isolation region of 0.1 to 0.2. Table 5 shows the predicted fraction when we include jets that contain the lepton if they still pass the 15 GeV cut after the electron energy subtraction. We find that the prediction with this method of jet counting is much worse, especially for higher jet multiplicities.

Jet multiplicity	1 jet	2 jets	3 jets	≥ 4 jets
Pretag Electrons				
Fraction in F	1.239 ± 0.055	0.625 ± 0.035	0.469 ± 0.048	0.509 ± 0.114
			0.479 ± 0.045	
Pretag Muons				
Fraction in F	0.917 ± 0.064	0.720 ± 0.092	0.478 ± 0.127	$0.822 \pm 0.4\ 89$
			0.543 ± 0.131	

Table 4: The predicted background fraction for events in the isolation region between 0.1 and 0.2. We count jets above 15 GeV which contain the non-isolated lepton.

1.4 Correcting Sideband Regions

The isolation and $\not\!\!E_T$ sideband regions contain some amount of events from $t\bar{t}$ and W+jet events where the lepton is non-isolated due to overlap with hadronic activity in the event or where the neutrino is produced with low transverse momentum.

We use the MC to find the ratio for $t\bar{t}$ and W events in the signal versus sideband regions. For the tagged QCD background estimate we use the boundary of 0.1 for lepton isolation to separate signal and sideband regions. Thus we expect this correction to be more important for the tagged sample.

Table 6 has the ratio of W+jets in the sideband regions to the number of events in the signal region. events. We use the alpgen MC W+1p samples for the 1 and 2 jet bin and the W+3p samples for the 3 and 4 jet bins. Table 9 contains the ratio for tagged $t\bar{t}$ events where the isolation cut is at 0.1.

Since we use the MC to estimate the ratio of isolated to non-isolated leptons, we need to verify that the MC properly models this distribution. We look at the lepton isolation for events with 3 or more jets and with $H_T > 200 GeV$. This gives a sample with a much higher $t\bar{t}$ fraction and a reduced non-W contribution. Figures 1 and 2 shows the lepton isolation distribution for large H_T events for data and MC. We find good agreement in the region of low isolation. We assign a systematic error of 20% to cover the uncertainty of the MC estimate of the ratio of events in the signal and sideband regions.

We now correct the pretag QCD background estimate for the contribution of W+jets events to the sideband regions. We find a small correction to non-W fraction for electron events, but a signficant correction for muon events. These results are given in Table 7.

1.5 Tagged QCD Background Estimate

1.5.1 Tagged Sample Estimate

One method for estimating the tagged QCD background is to simply apply Equation 1 to the tagged event sample. We redefine regions A and C by counting leptons with isolation > 0.1, which is the edge of the signal region, in order to increase the number of events. However, the limitation for using the tagged sample is the small number of tagged events in the 3 and 4 jet bin for regions B and C. The Iso vs. $\not\!\!E_T$ method uses the low $\not\!\!E_T$ region to measure how the QCD background changes with lepton isolation - this is the ratio of events in B/A. For calculating the ratio of events in regions B and A, we combine the 2, 3 and 4 jet

Jet multiplicity	1 jet	2 jets	$\geq$ 3jets	$\geq$ 3jets $H_T > 200$
Pretag Electrons - W+jets MC				
A/D Ratio (%)	0.0± 0.0	0.0± 0.0	0.2± 0.1	0.2± 0.1
B/D Ratio (%)	7.7± 0.2	6.8± 0.6	6.9± 0.4	4.1± 0.4
C/D Ratio (%)	0.9± 0.1	0.9± 0.2	2.2± 0.2	2.9± 0.4
Pretag Electrons - $t\bar{t}$ MC				
A/D Ratio (%)	0.7± 0.3	0.7± 0.1	1.3± 0.1	1.0 ± 0.1
B/D Ratio (%)	4.6± 0.7	5.5± 0.4	6.7± 0.2	5.7 ± 0.2
C/D Ratio (%)	15.7± 1.4	11.4± 0.5	7.5± 0.2	7.0 ± 0.2
Pretag Muons - W+jets MC				
A/D Ratio (%)	0.0± 0.0	0.0± 0.0	0.2 ± 0.1	0.1 ± 0.1
B/D Ratio (%)	9.4± 0.3	7.4± 0.8	9.3 ± 0.5	6.6 ± 0.6
C/D Ratio (%)	0.8± 0.1	1.0± 0.3	3.1 ± 0.3	2.9 ± 0.4
Pretag Muons - $t\bar{t}$ MC				
A/D Ratio (%)	0.5± 0.3	0.7± 0.1	1.6± 0.1	1.3± 0.1
B/D Ratio (%)	7.7± 1.1	5.6± 0.4	6.9± 0.2	5.9± 0.2
C/D Ratio (%)	19.8± 1.8	12.8± 0.6	8.9± 0.2	8.2± 0.2

Table 5: Contribution of W+ jet and $t\bar{t}$ events to the Iso and $\not{E}_T$ sideband regions. Errors are due to MC statistics. Note that $t\bar{t}$ has very few pretag events in the 1 and 2 jet bins.

Jet multiplicity	1 jet	2 jets	3 jets	$\geq$ 4 jets
Pretag Electrons				
Fraction in D	0.148 ± 0.004	0.183 ± 0.010	0.201 ± 0.025	0.299 ± 0.075
Corrected Fraction	0.139 ± 0.004	0.173 ± 0.009	0.184 ± 0.023	0.269 ± 0.068
			0.195 ± 0.022	
Pretag Muons				
Fraction in D	0.040 ± 0.002	0.052 ± 0.004	0.100 ± 0.020	0.114 ± 0.051
Corrected Fraction	0.034 ± 0.001	0.043 ± 0.004	0.076 ± 0.015	0.067 ± 0.030
			0.075 ± 0.014	

Table 6: Non-W background fraction in the signal region, both before and after correcting for W contributions in the sideband regions. Errors are due to data statistics. We also apply an overall 25% systematic error on this estimate.

bins to compensate for the lack of statistics in the higher jet multiplicity bins. We use the pretag sample to test the assumption that the ratio B/A is independent of jet multiplicity, and find that the ratio is consistent across jet bins. Table 8 shows the numbers relevant to this discussion.

In the 3 and 4 jet bins, regions B and C contain $t\bar{t}$ events. Table 9 shows the ratio of $t\bar{t}$ events in the sideband regions to the signal region. We obtain an estimate of the number of $t\bar{t}$ events in these sideband regions by multiplying these fractions by our estimate of the $t\bar{t}$ yield in the signal region assuming a cross section of 6.7pb. We use a 20% systematic error for the $t\bar{t}$ estimate to cover reconstruction and cross section uncertainties. In the 4 jet bin in

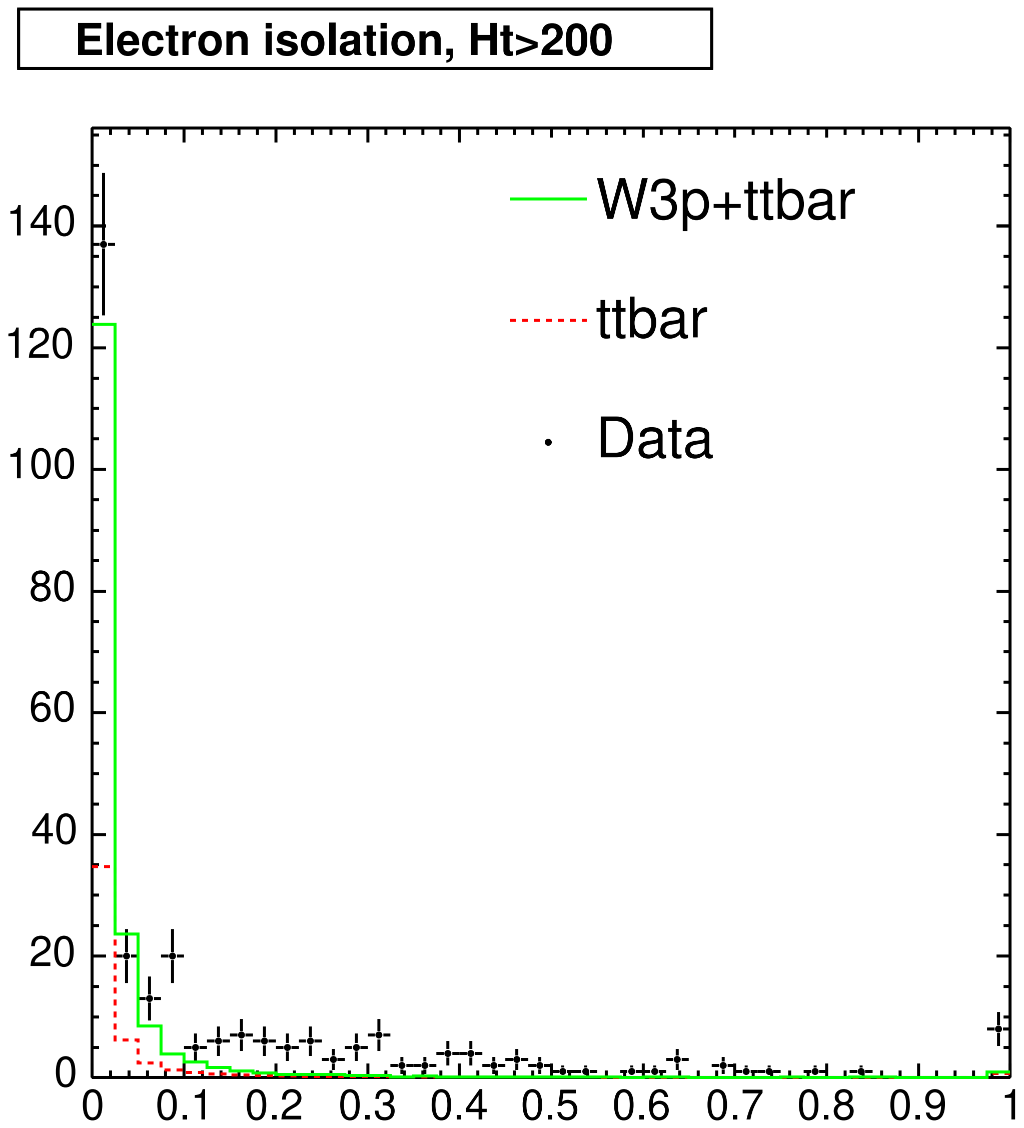

Figure 1: Electron isolation for $W+\geq 3$ jet events with $H_T > 200$. $t\bar{t}$ is normalized to a cross section of 6.7 pb. Wev3p MC is normalized to the number of pretag events (with no H_T cut) after subtracting nonw and $t\bar{t}$ contributions.

particular, this can be a 15-30% correction for Regions B and C. Since the numbers of tags in these two regions multiply each other, this correction is not negligible. We also correct for the contribution of tagged W+jet events in the sideband regions. We use the pretag MC to get the ratio of W events in the sideband to signal region. This ratio is multiplied by the tagged Method 2 W estimate which includes mistags, Wbb, Wcc, and Wc. The correction for W events is given in Table 10

For the tagged qcd background estimate, we correct the numbers in Table 8 for the $t\bar{t}$

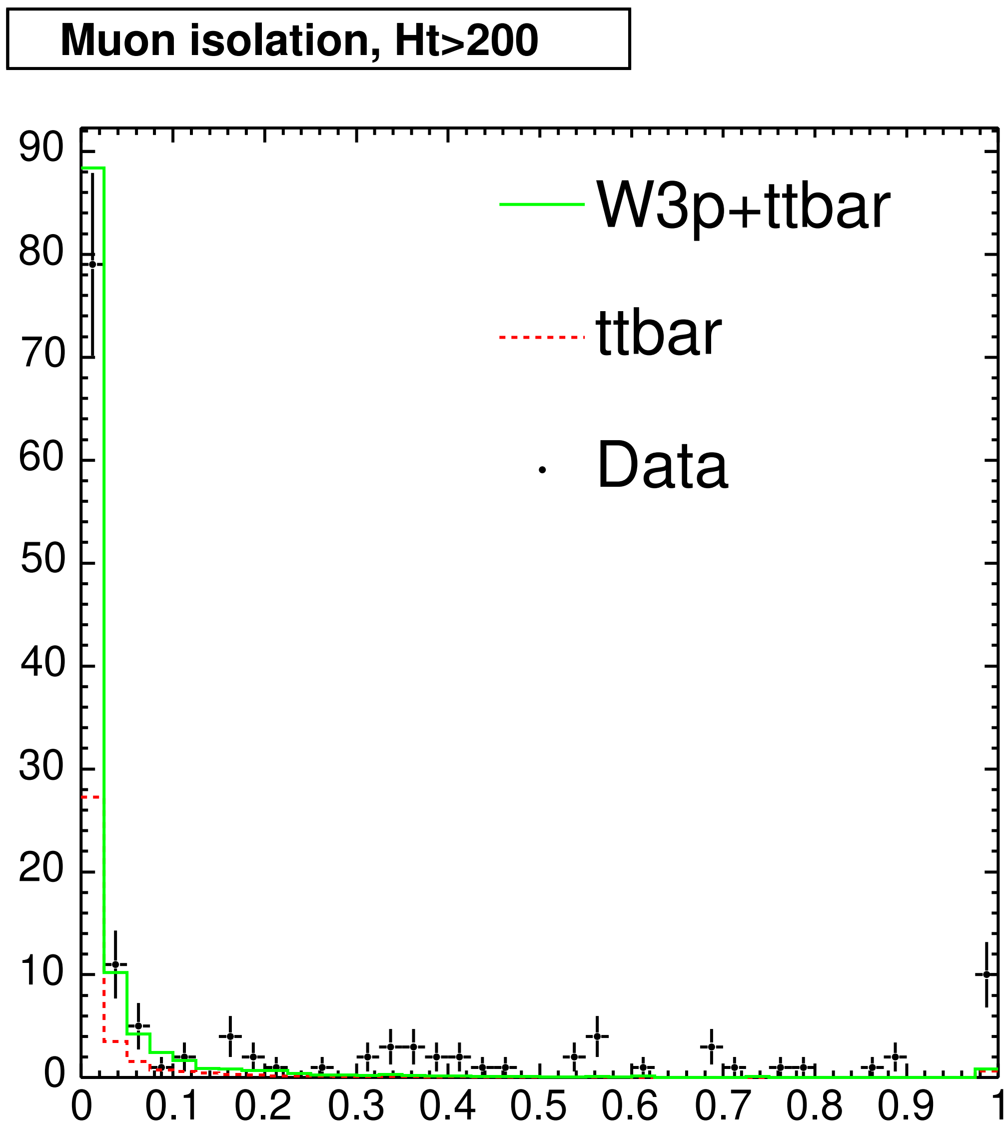

Figure 2: Muon isolation for $W+\geq 3$ jet events with $H_T > 200$. $t\bar{t}$ is normalized to a cross section of 6.7 pb. Wmv3p MC is normalized to the number of pretag events (with no H_T cut) after subtracting nonw and $t\bar{t}$ contributions.

and W contributions from Tables 9 and 10. We combine the 2, 3 and 4 jet bins to obtain the ratio of events for regions A and B. For Region C we combine the 3 and 4 jet bins to obtain a combined estimate. We then separate the combined estimate by the ratio of 3 and 4 jet events in the Pretag sample for Region C. This background estimate is given in Table 11. The errors quoted are due to data statistics and the error due to the $t\bar{t}$ and W corrections.

There are not enough tagged events to determine the systematic uncertainty of using Iso versus $\not{E}_T$ for the tagged sample as was done for the pretag sample. We will assume the same systematic error of 25% as used for the pretag sample.

Jet multiplicity	1 jet	2 jets	3 jets	≥ 4 jets	3.5 jets
Electrons					
Tag Reg. A	1545	393	76	13	31
Tag Reg. B	419	87	17	7	6
Tag Reg. C	83	47	21	5	13
Pretag Ratio B/A	0.739 ± 0.005	0.482 ± 0.010	0.390 ± 0.024	0.516 ± 0.079	0.357 ± 0.034
TagRatio B/A	0.271 ± 0.015	0.221 ± 0.026	0.224 ± 0.060	0.538 ± 0.252	0.194 ± 0.086
		0.230 ± 0.024			
Muons					
Tag Reg. A	949	214	54	9	34
Tag Reg. B	97	15	4	3	2
Tag Reg. C	51	28	13	10	9
Pretag Ratio B/A	0.360 ± 0.005	0.220 ± 0.010	0.229 ± 0.030	0.196 ± 0.068	0.132 ± 0.027
TagRatio B/A	0.102 ± 0.011	0.070 ± 0.019	0.074 ± 0.038	0.333 ± 0.222	0.059 ± 0.043
		0.079 ± 0.018			

Table 7: Tagged event counts in the $\not\!\!E_T$ and isolation sidebands, and the ratio of events in Regions B and A. Regions A and C are defined using lepton isolation > 0.1.

1.5.2 Tag Rate Method

An alternative to estimating the tagged qcd background is to apply a tagging rate to the pretag qcd background estimate. CDF6907 has a detailed discussion of how to estimate the tagging rate. To obtain a good estimate of the tagging rate, we use the tagging rate measured in region B (low isolation and low $\not\!\!E_T$). Because of the low number of tagged events in that region for 3 or more jets, we combine the 2, 3 and 4 jet events. CDF6907 shows that the per event tagging rate is not flat as a function of the number of jets. However, the per jet tagging rate is consistent between those 3 bins. That is comparable to the the per taggable jet tagging rate described in CDF6902. Here we use the method in 6902, with the additional step of correcting the tagged and pretag estimates in region B by the contribution of top and W events. Table 12 gives the numbers for this estimate. One question is whether the tagging rate depends on $\not\!\!E_T$. Figures 3 and 4 show the tagging rate per taggable jet as a function of $\not\!\!E_T$ for events with lepton isolation between 0.1 and 0.5. We do not observe a strong dependence of the tagging rate on $\not\!\!E_T$. For these isolation cuts we find a tag rate/taggable jet of 0.037 ± 0.001 for Region A and 0.051 ± 0.004 for Region C for electrons. For muons we find 0.067 ± 0.002 for Region A and 0.079 ± 0.01 for Region C. We assign a systematic uncertainty of 25% for covering the uncertainty due to the $\not\!\!E_T$ dependence.

Jet multiplicity	1 jet	2 jets	3 jets	$\geq$ 4 jets
Electrons				
Tag A/D Ratio (%)	0.9$\pm$ 0.5	0.5$\pm$ 0.1	1.0$\pm$ 0.1	1.5$\pm$ 0.2
A/D $H_T > 200$			0.8$\pm$ 0.1	1.3$\pm$ 0.1
Tag B/D Ratio (%)	5.1$\pm$ 1.3	5.7$\pm$ 0.5	6.3$\pm$ 0.4	7.6$\pm$ 0.4
B/D $H_T > 200$			4.7$\pm$ 0.3	7.0$\pm$ 0.3
Tag C/D Ratio (%)	23.1$\pm$ 2.9	15.3$\pm$ 0.9	13.0$\pm$ 0.5	11.3$\pm$ 0.4
C/D $H_T > 200$			12.6$\pm$ 0.6	11.2$\pm$ 0.4
Electrons in B	0.0$\pm$ 0.0	0.3$\pm$ 0.0	0.7$\pm$ 0.0	1.0$\pm$ 0.0
Electrons in C	0.1$\pm$ 0.0	0.8$\pm$ 0.0	1.5$\pm$ 0.0	1.6$\pm$ 0.0
Muons				
Tag A/D Ratio (%)	0.8$\pm$ 0.6	0.9$\pm$ 0.2	0.9$\pm$ 0.1	1.7$\pm$ 0.2
A/D $H_T > 200$			0.6$\pm$ 0.1	1.6$\pm$ 0.2
Tag B/D Ratio (%)	9.7$\pm$ 2.1	5.3$\pm$ 0.5	6.7$\pm$ 0.4	6.9$\pm$ 0.4
B/D $H_T > 200$			5.3$\pm$ 0.4	6.4$\pm$ 0.4
Tag C/D Ratio (%)	22.8$\pm$ 3.4	17.1$\pm$ 1.0	14.2$\pm$ 0.6	11.1$\pm$ 0.5
C/D $H_T > 200$			13.6$\pm$ 0.6	10.9$\pm$ 0.5
Muon in B	0.0$\pm$ 0.0	0.3$\pm$ 0.0	0.6$\pm$ 0.0	0.9$\pm$ 0.0
Muon in C	0.1$\pm$ 0.0	0.7$\pm$ 0.0	1.3$\pm$ 0.0	1.4$\pm$ 0.0

Table 8: Contribution of $t\bar{t}$ events to the Iso and $\not{E}_T$ sideband regions. Errors are due to MC statistics. These numbers are used to correct the number of tags in the sidebands. We assume a cross section of 6.7pb. For the tagged sample, the isolation cut is at 0.1. We apply a 20% systematic error for the $t\bar{t}$ cross section when applying the correction.

Jet multiplicity	1 jet	2 jets	3 jets	$\geq$ 4 jets
Electrons				
B/D Ratio (%)	7.7$\pm$ 0.2	6.8$\pm$ 0.6	7.0$\pm$ 0.4	6.4$\pm$ 0.9
C/D Ratio (%)	2.6$\pm$ 0.1	3.5$\pm$ 0.4	5.8$\pm$ 0.4	6.7$\pm$ 0.9
Reg. B Tag Events	4.7$\pm$ 0.8	1.7$\pm$ 0.4	0.5$\pm$ 0.1	0.2$\pm$ 0.1
Reg. C Tag Events	1.6$\pm$ 0.3	0.9$\pm$ 0.2	0.4$\pm$ 0.1	0.2$\pm$ 0.1
B/D $H_T > 200$			3.8$\pm$ 0.5	4.9$\pm$ 0.9
C/D $H_T > 200$			4.8$\pm$ 0.5	5.6$\pm$ 1.0
Muons				
B/D Ratio (%)	9.4$\pm$ 0.3	7.4$\pm$ 0.8	9.1$\pm$ 0.5	10.1$\pm$ 1.2
C/D Ratio (%)	2.5$\pm$ 0.2	2.6$\pm$ 0.5	5.8$\pm$ 0.4	8.7$\pm$ 1.1
Reg. B Tag Events	4.7$\pm$ 0.8	1.5$\pm$ 0.3	0.4$\pm$ 0.1	0.2$\pm$ 0.1
Reg. C Tag Events	1.2$\pm$ 0.2	0.5$\pm$ 0.1	0.3$\pm$ 0.1	0.2$\pm$ 0.0
B/D $H_T > 200$			6.3$\pm$ 0.6	7.2$\pm$ 1.1
C/D $H_T > 200$			5.6$\pm$ 0.6	7.3$\pm$ 1.1

Table 9: Contribution of tagged W events to the Iso and $\not{E}_T$ sideband regions. Errors on the ratio are due to MC statistics. Errors on the number of tagged events are dominated by the Method 2 background errors. These numbers are used to correct the number of tags in the sidebands.

Jet multiplicity	1 jet	2 jets	3 jets	$\geq$ 4 jets
Electrons				
(B/A) Tagged (%)	26.8± 1.5	22.1± 2.4		
Reg. C Tagged	81.3	45.3	22.3	
Reg. C Pretag	1771.0	550.0	123.0	40.0
Tagged Estimate	21.8± 6.1	10.0± 3.1	3.7± 1.3	1.2± 0.4
Muons				
(B/A) Tagged (%)	9.7± 1.1	6.5± 1.6		
Reg. C Tagged	49.7	26.8	19.8	
Reg. C Pretag	723.0	236.0	63.0	21.0
Tagged Estimate	4.8± 1.5	1.8± 0.7	1.0± 0.4	0.3± 0.1

Table 10: Tagged QCD estimate using the Iso vs $\not\!\!E_T$ method with tagged events. The Region C pretag numbers are used to obtain separate 3 and 4 jet estimates.

Jet multiplicity	1 jet	2 jets	3 jets	$\geq$ 4 jets
Electrons				
NonW Frac.	0.139 ± 0.035	0.173 ± 0.043	0.195 ± 0.053	
Reg. B Tag Rate/Taggable (%)	2.3 ± 0.6	2.5 ± 0.7		
Reg. D # taggable	5112	1709	454	200
Tag Estimate	16.3 ± 5.8	7.4 ± 2.6	2.2 ± 0.9	1.0 ± 0.4
Muons				
NonW Frac.	0.034 ± 0.01	0.043 ± 0.017	0.077 ± 0.038	
Reg. B Tag Rate/Taggable (%)	3.2 ± 0.8	2.4 ± 0.8		
Reg. D # taggable	3698	1172	273	110
Tag Estimate	4.0 ± 1.6	1.2 ± 0.6	0.5 ± 0.3	0.2 ± 0.1

Table 11: Tagged QCD estimate using the tag rate per taggable jet applied to the pretag qcd estimate

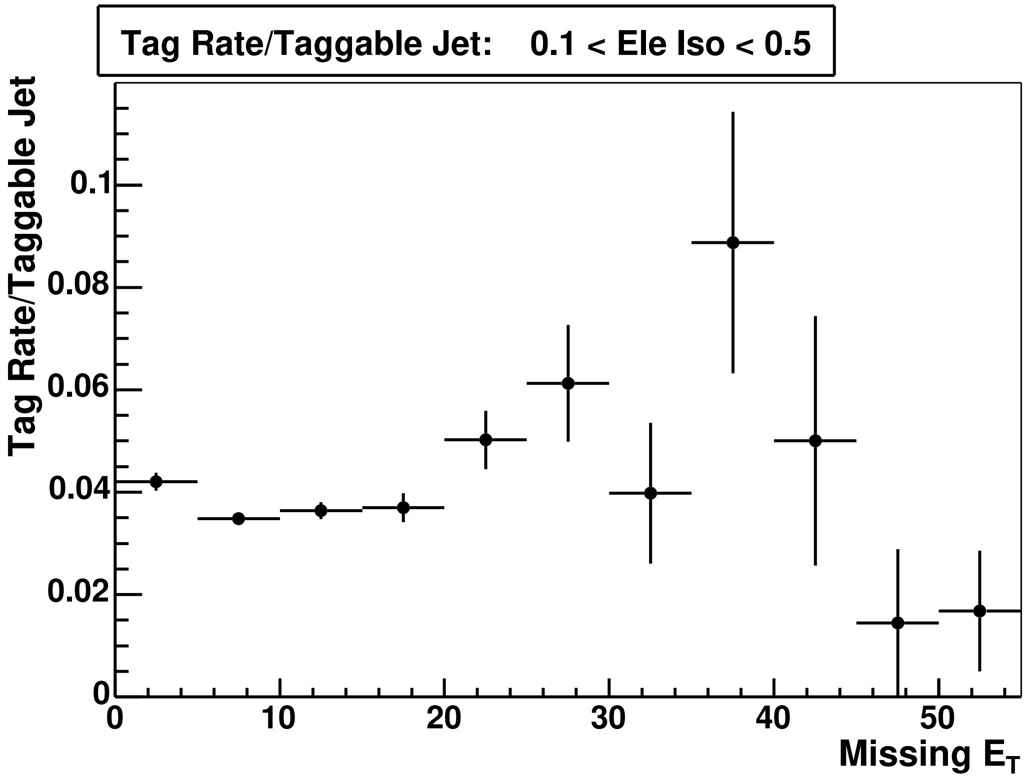

Figure 3: Tag rate per taggable jet as a function of $\not{E}_T$ for Electron events with electron isolation between 0.1 and 0.5

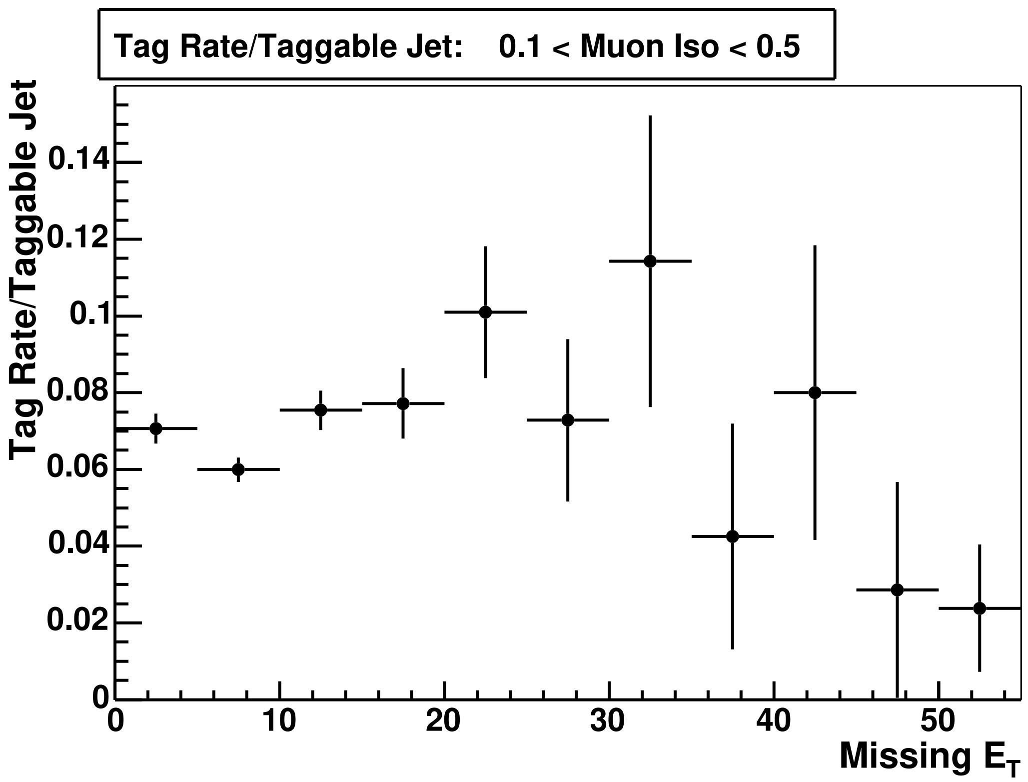

Figure 4: Tag rate per taggable jet as a function of $\not\!\!E_T$ for muon events with muon isolation between 0.1 and 0.5