I. ADDENDUM TO D0 NOTE 5030 SEARCH FOR THE HIGGS MASS POINT 200 GEV

The data sample used in this analysis has been collected between April 2002 and November 2005, as described in D0 Note 5030.

For the e^+e^- final state, the normalization used in this analysis is a factor that scales the NNLO $Z/\gamma^* \to ee$ cross section to the data in the mass region 60 GeV< M_{ee} <130 GeV. For the $e^\pm\mu^\mp$ final state, the data sample size is determined by normalizing the electron-muon invariant mass distribution to the NNLO $Z/\gamma^* \to \tau\tau$ cross section. The estimated data sample size both for the di-electron and electron-muon final states was found to be of the order of ~ 950 pb^{-1}. More details can be found in D0 Note 5030.

The following mass cuts are applied in the event selection:

Selection criterion	Value
Cut 1 Preselection	Trigger, ID, leptons with opposite charge and $p_T^l > 15$ GeV and $p_T^{l'} > 10$ GeV, $m_{ll} > 15$ GeV ($H \to WW^* \to e\mu$: remove events with 2e or 2μ, if 75 GeV $< M_{ll} <$ 105 GeV)
Cut 2 Missing transverse energy $\not\!\!E_{\rm T}$	$\not\!\!E_{\rm T} > 20$ GeV
Cut 3 $\not\!\!E_T^{\rm Scaled}$	$\not\!\!E_T^{\rm Scaled} > 7$ (for $N_{Jet} > 0$)
Cut 4 Invariant mass $M_{ll'}$	$M_{ee} <$ min $(M_H/2,\ 80)$ GeV $M_{e\mu} < M_H/2$ GeV
Cut 5 Sum of $p_T^l + p_T^{l'} + \not\!\!E_{\rm T}$	$M_H/2 + 20\,\text{GeV} < p_T^l + p_T^{l'} + \not\!\!E_{\rm T} < M_H$
Cut 6 $M_{min}^T\ (l, \not\!\!E_{\rm T})$	$M_{min}^T\ (l, \not\!\!E_{\rm T}) > 70\ GeV (M_H = 200\ GeV)$
Cut 7 H_T (scalar sum of p_T^{Jet})	$H_T < 100$ GeV
Cut 8 Lepton opening angle $\Delta\phi_{ll'}$	$\Delta\phi_{ll'} < 2.0$

TABLE I: Summary of the selection criteria for a Higgs mass point $M_H = 200 GeV$.

CUT	e^+e^-	$e^\pm\mu^\mp$
1	31.0±0.26	36.1±0.28
2	29.1±0.25	33.9±0.28
3	27.5±0.24	31.9±0.27
4	18.8±0.23	27.2±0.26
5	14.0±0.21	20.0±0.23
6	11.0±0.17	14.1±0.21
7	10.7±0.17	13.8±0.20
8	10.6±0.17	13.1±0.20
Exp. Events	0.102±0.002	0.253±0.005

TABLE II: Efficiencies (%) with statistical errors for $H \to WW^* \to e^+e^-$ and $H \to WW^* \to e^\pm\mu^\mp$ for Higgs mass 200 GeV and number of events expected for a standard model Higgs boson at the end of the selection (Cut 8) for the data sample of the order of $\sim 950\ pb^{-1}$.

CUT	$t\bar{t}$	WZ/ZZ	WW	$Z \to \tau\tau$
1	25.96±0.35	52.92±0.24	45.30±0.37	540±11.7
2	24.21±0.35	39.91±0.21	36.64±0.34	92.4±7.5
3	16.02±0.29	36.71±0.20	35.02±0.33	59.4±6.5
4	8.57±0.21	4.76±0.07	21.13±0.36	57.6±6.5
5	6.06±0.17	1.57±0.05	7.38±0.17	0.71±0.71
6	2.50±0.12	0.56±0.03	4.22±0.14	0.0±0.0
7	1.29±0.09	0.54±0.03	4.17±0.14	0.0±0.0
8	1.2±0.08	0.53±0.03	4.09±0.14	0.0±0.0

CUT	$Z \to ee$	$W + jet/\gamma$	QCD	Sum	Data
1	63389±132	47.8±3.8	1120±33.5	65522±137	65587
2	904±17.1	37.5±3.3	104.4±10.2	1239±21.5	1278
3	452±11.9	36.1±3.3	20.9±4.6	657±14.7	658
4	88.3±5.5	31.2±3.1	13.5±3.7	225.1±9.9	253
5	2.26±1.2	0.57±0.57	0.38±0.8	19.0±3.3	23
6	0.0±0.0	0.0±0.57	0.07±0.37	7.3±0.5	6
7	0.0±0.0	0.0±0.57	0.03±0.24	6.0±0.6	4
8	0.0±0.0	0.0±0.57	0.03±0.24	5.8±0.6	4

TABLE III: Number of background events expected, and number of events observed, after successive selections in the e^+e^- channel for the $M_H = 200$ GeV selection. Only statistical error is given for all backgrounds.

CUT	$t\bar{t}$	WZ/ZZ	WW	$Z \to \tau\tau$
1	63.0±0.31	7.7±0.16	111.2±0.31	1066.6±13.4
2	58.8±0.3	5.6±0.13	91.1±0.29	256.5±5.7
3	39.3±0.25	4.8±0.12	86.9±0.28	190.0±5.2
4	23.4±0.19	3.1±0.09	56.5±0.22	187.3±5.1
5	18.3±0.16	0.91±0.06	24.2±0.16	5.32±0.51
6	6.5±0.11	0.35±0.05	11.5±0.13	0.0±0.0
7	3.0±0.07	0.33±0.05	11.4±0.13	0.0±0.0
8	2.6±0.06	0.31±0.05	10.7±0.12	0.0±0.0

CUT	$Z \to \mu\mu$	$W + jet/\gamma$	QCD	Sum	Data
1	35.9±2.6	85.6±5.7	306.3±3.0	1676.6±15.1	1678
2	8.91±1.1	68.3±5.1	69.6±1.4	558.9±7.9	553
3	7.46±1.18	64.4±4.9	19.3±0.7	412.1±6.9	443
4	7.3±0.95	52.8±4.4	14.7±0.6	345.3±6.8	363
5	0.48±0.24	4.2±2.0	1.5±0.2	54.9±2.1	61
6	0.01±0.01	1.9±1.4	0.13±0.06	20.3±1.4	14
7	0.01±0.01	1.9±1.4	0.05±0.05	16.7±1.4	11
8	0.01±0.01	1.9±1.3	0.05±0.05	15.5±1.3	11

TABLE IV: Number of background events expected, and number of events observed, after successive selections in the $e^\pm\mu^\mp$ channel for the $M_H = 200$ GeV selection. Only statistical error is given for all backgrounds.