Details of MC distributions and cuts.

The estimation of the number of ν_μ and ν_e events producing charm within the ν_τ acceptance interval (passing cuts to be considered a ν_τ event) was calculated from a large sample of MC generated events.

All of the charm events were generated in the bulk sections of each module during period 4. using Lepto and propagated with Geant. Measurements of the tracks were taken as true MC positions and angles at the interface between the plastic backing and the emulsion, one upon entry to the plastic and one upon exit.

Charged Charm Production:

36K, 130K and 170K Lepto events were generated, resulting in 982, 1197 and 4988 events with a D_s, D or Λ_c, respectively. The ratio of the (weighted) number of events producing charged charm VS. the total number of events (as a function of energy) was found to be consistent with previous measurements. The fraction given is the ratio of the sum of weights for events producing charged charm to the sum of weights for all events generated. The neutrinos were generated with the standard E872 neutrino generators.

This is the largest source of error since charm production ratio is not known to better than 20% at low energies.

S ingle Segment Parents:

The number given is calculated from the decay length distribution of the charm produced and the geometry of ECC200, ECC800 and Bulk plates which were weighted by mass and exposure during Period 4. This is the fraction of produced charm which does not decay before passing at least one emulsion/plastic interface.

SingleCharge Decay:

This was an input. Branching fractions of the charm particles were taken out of the PDG (1994)

Lepton Lost:

For ν_μ events "lost" is defined as failure of the primary muon to produce a prop tube hit in the third muon ID wall. This has a weak dependence on module number, but a much stronger one on neutrino energy.

No consideration for prop tube inefficiency is included.

For ν_e events a global identification efficiency of .75 is used.

Trigger:

Both trigger types 1 & 2 are included.

Primary Angle < 200 mr:

The angle between the first segment recorded and the neutrino direction is used.

Decay length < 5mm:

The decay length is the distance between the intersection of the last segment of the charm particle and the first segment of the charm's daughter and the true MC interaction vertex.

P_t > 250 MeV:

The true MC momentum is used in calculating the P_t . Pt = momentum x sin(kink angle)

Fraction MC n_t:

This is the result of finding the event's position in parameter space and finding the fraction of generated ν_τ interactions that have a set of parameters which are less likely. " Parameter analysis: tau evaluation "

Below is a table of fraction of MC events satisfying individual cuts. The fractions listed in the bottom half of the table are the fractions of the sample satisfying the stated cut and all the cuts listed before it.

EVENT TYPE	ν_μ	ν_μ	ν_e
w/ charged charm	.033	.019	.035
≥ 1 seg. parent	.843	.767	.843
Single charge decay	.298	.298	.298
Lepton lost	.227	.334	.25
Trigger	.864	.908	.896
Pri. Angle < 200 mr	.996	.995	.993
Length < 5mm	.982	.953	.984
Pt > 250 MeV	.732	.736	.730
Fraction MC ν_τ Less likely > .05	.948	.933	.891
P (10^{-3})	1.1	.87	1.2

The estimation of the number of ν_μ and ν_e events producing scatters within the ν_τ acceptance interval (passing cuts to be considered a ν_τ event) is calculated from a large sample of MC generated events . A scatter was recorded if two adjacent segments have an angular difference of 5 mr or more.

All of the scatter events were generated in the ECC sections of the first three modules of the period 4 configuration.

Lepton Lost:

Same comments as charm samp le.

Average number of scatters with in 5 mm.:

This number is the average of the distribution of:

.5 *(ns) *(np)/(l)

ns = number of scatters found in event
np = number of charged primaries in event
l = total length of event in cm

This number results in an over estimate since it includes tracks of greater than 200 mr which are eventually cut out. These tend to be lower energy and produce more scatters.

For CC interactions the average number of scatters per cm of track are ~ .98, 1.2 and 1.0 for ν_μ prompt, ? ? non-promt and ν_e respectively. These interactions have an average multiplicity of ~ 6.1, 4.8 and 6.1.

For NC interactions the average number of scatters per cm of track are ~. 98, 1.2 and 1.0 for ν_μ prompt, ν_μ non-promt and ν_e respectively. These have interactions have an average multiplicity of ~ 5.4, 4.4 and 5.2.

This is a revised from the number given in the previous presentation. That number was calculated assuming every track had data recorded for 2cm. (Two cm was a downstream distance cut, however the simulation also included a cut of 15 segments which is ~. 95 cm in the ECC200 and ~1.4 cm in the ECC800)

Trigger, Primary Angle < 200 mr, Decay length < 5mm, P_t > 250 MeV, Fraction MC n_t **:**

Same comments as charm sample.

Individual cuts on MC scatter sample:

	cc			nc		
EVENT TYPE	ν_μ	ν_μ	ν_e	ν_μ	ν_μ	ν_e
Lepton lost	.229	.478	.25	1.0	1.0	1.0
Average # scatters per event (5mm of track)	2.85	2.93	2.97	3.18	3.23	2.49
Trigger	.983	.890	.956	.776	.628	.783
Pri. angle < 200 mr	.158	.121	.158	.151	.138	.151
Length < 5mm	1.0	1.0	1.0	1.0	1.0	1.0
Pt > 250 MeV	.0047	.0026	.0040	.0045	.0027	.0041
Fraction MC ν_τ Less likely > .05	.70	.65	.70	.64	.61	.60
P (10^{-4})	5.1	2.5	3.1	11	4.6	7.2