Three event files are available that give the event weights for nuebar-IBD events (IBD = Inverse Beta-Decay) and nuebar-e elastic scattering events for a 4yr IsoDAR run (5yrs with 80% duty_factor). The event files are generated using the 8Li beta-decay spectrum from IsoDAR combined with the details of the KamLAND detector and give weighted events as a function of nuebar energy, distance from 8Li decay point to the interaction in KamLAND, and, in the case of nuebar-e scattering the energy of the outgoing electron.

These event files are related to what was used to calculate the IsoDAR oscillation sensitivity (described in arXiv:1205.4419) and the electroweak nuebar-e scattering measurements (described in arXiv:1307.5081).

File 1: current_istope_event_calc_run.txt
https://drive.google.com/open?id=16hG6pADAxzxThJbhUn1brUIa15RdGkXt

This file gives a summary of the run: the input parameters and two tables.

- The first table gives the number of nuebar-e event (binned in enu or in evis, the electron energy) plus the number of nuebar IBD events (binned in enu).
- The second table gives the number of nuebar IBD events in length bins where the length is the distance the neutrino travels from creation in the IsoDAR target to interaction in the KamLAND detector.

File 2: IBD_event_array.dat
https://drive.google.com/open?id=1j-9hRUcUKVH778Lfp5x1LHjY1Yjp9jRn

This is the file of weighted nuebar IBD events for this 5yr run.

- The first line gives total number of subsequent lines in the file and variable names for the columns.
- Each subsequent line gives: the neutrino energy (MeV), the neutrino travel distance (as described above), the IBD xsec associated with this neutrino energy (in cm^2), and the event weight.

If you add up the event weights in the last column for the 10,000 events in the file, you should get the total IBD events as given in File 1 => 818,338 events.

The IBD xsec used to calculate the event weights is given below in case you want to reweight the events to a different xsec model. The program uses a parameterization for the IBD xsec given by:

```
# IBD cross section in cm^2 with energy (eee) in MeV):
def IBD_xsec(eee):
    xsec = (1.08497e-06 - 0.00971813*eee + 0.00484432*eee**2 + 0.000521442*eee**3
            - 2.81264e-05*eee**4 + 5.62992e-07*eee**5 - 3.90173e-09*eee**6)
    return max(0.0,xsec)*1.e-41
```

Here is a printout of the first few lines of this "IBD_event_array.dat file":

10000 enu,levt,xsecIBD,n_nuebar_IBD

1.725	9.5656462	1.7636627e-45	0.00067089558
1.725	9.6956331	1.7636627e-45	0.0019657463
1.725	9.8256201	1.7636627e-45	0.0032000799
1.725	9.955607	1.7636627e-45	0.0043762666
1.725	10.085594	1.7636627e-45	0.0054965549
1.725	10.215581	1.7636627e-45	0.0065630784
1.725	10.345568	1.7636627e-45	0.0075778638
1.725	10.475555	1.7636627e-45	0.0085428371
1.725	10.605542	1.7636627e-45	0.0094598298

File 3: nuebar_e_event_array.dat
https://drive.google.com/open?id=1YFIZ1yNfiebmoUrwgy5h01Y0C28m5qhw

This is the file of weighted nuebar-e events for this 5yr run.

- The first line gives total number of subsequent lines in the file, the weak mixing angle used for this run and the variable names for the columns.
- Each subsequent line gives: the neutrino energy (MeV), the neutrino travel distance (as described above), the outgoing electron energy (in MeV), the nuebar-e xsec associated with this neutrino energy (in cm^2), and the event weight.

If you add up all the event weights in the last column for the 1,000,000, you should get the total nuebar-e events as given in File 1 => 29,757 events.

The nuebar-e xsec is given in case you want to reweight the events to a different xsec model. The program uses the following code to calculate the nuebar-e xsec:

```
# nu-e scattering xsecs
sinsqthw = 0.238
eminus = -0.5-sinsqthw
eplus = -sinsqthw
# sig0 = 2Gmu^2*me*enu/(pi) in cm^2
sig0 = 1.72328e-44*enu # enu in MeV
xsec_nuebar_e = sig0*(eplus**2+eminus**2/3.0)*8.0 # 8 electrons per CH2
```

Here is a printout of the first few lines of this "nuebar_e_event_array.dat":

1000000 0.238 enu,levt,e_elect,xsec_nuebar_e,wtnuebar

0.075	9.5656462	0.000375	2.4628291e-45	1.2140744e-07
0.075	9.5656462	0.001125	2.4628291e-45	1.1921018e-07
0.075	9.5656462	0.001875	2.4628291e-45	1.1703511e-07
0.075	9.5656462	0.002625	2.4628291e-45	1.1488223e-07
0.075	9.5656462	0.003375	2.4628291e-45	1.1275155e-07
0.075	9.5656462	0.004125	2.4628291e-45	1.1064306e-07
0.075	9.5656462	0.004875	2.4628291e-45	1.0855677e-07
0.075	9.5656462	0.005625	2.4628291e-45	1.0649267e-07

0.075	9.5656462	0.006375	2.4628291e-45	1.0445077e-07
0.075	9.5656462	0.007125	2.4628291e-45	1.0243106e-07
0.075	9.5656462	0.007875	2.4628291e-45	1.0043355e-07
0.075	9.5656462	0.008625	2.4628291e-45	9.8458226e-08
0.075	9.5656462	0.009375	2.4628291e-45	9.6505101e-08
0.075	9.5656462	0.010125	2.4628291e-45	9.4574171e-08
0.075	9.5656462	0.010875	2.4628291e-45	9.2665435e-08
0.075	9.5656462	0.011625	2.4628291e-45	9.0778894e-08