CLAIMS

1. A method of processing materials, such as a biomass material, the method comprising;

conveying a biomass material through a first ~~enclosure~~ radiation opaque treatment vault and exposing the biomass material to a first dose of ionizing radiation to produce a first treated biomass material;

conveying the biomass material out of the first treatment vault and into a second radiation opaque treatment vault that shares one or more common walls with the first treatment vault; and

conveying the first treated biomass material through the~~a~~ second radiation opaque treatment vault ~~enclosure~~ and exposing the first treated biomass material to a second dose of ionizing radiation to produce a second treated biomass material.

~~2. The method of claim 1, wherein the first enclosure shares one or more common walls with the second enclosure.~~

~~3~~2. The method of claim 1 ~~or 2~~, wherein the first and second dose of the ionizing radiation are applied using accelerated electrons from one or more electron accelerators.

~~4~~3. The method of claim ~~3~~2, wherein the electrons are accelerated to an energy of between about 0.3 MeV and about 5 MeV.

~~5~~4. The method of claim ~~3~~2, wherein the electrons are accelerated to an energy of between about 0.5 MeV and about 3.5 MeV.

~~6~~5. The method of claim ~~3~~2, wherein the electrons are accelerated to an energy of between about 0.8 MeV and about 2 MeV.

~~7~~6. The method of any one of the above claims, wherein the first dose is between about 0.5 Mrad and about 20 Mrad.

~~8~~7. The method of any one of the above claims, wherein the first dose is between about 1 Mrad and about 15 Mrad.

~~9~~8. The method of any one of the above claims, wherein the first dose is between about 5 Mrad and about 15 Mrad.

~~10~~9. The method of any one of the above claims, wherein the sum of the first and second dose is between about 10 Mrad and about 40 Mrad.

~~11~~10. The method of any one of the above claims, wherein the sum of the first and second dose is between about 20 Mrad and about 40 Mrad.

~~12~~11. The method of any one of the above claims, wherein the sum of the first and second dose is between about 15 Mrad and about 35 Mrad.

~~13~~12. The method of any one of the above claims, wherein the sum of the first and second dose is between about 15 Mrad and about 30 Mrad.

~~14~~13. The method of any one of the above claims, wherein walls of both the first and second ~~enclosures~~ vaults are fabricated from discrete interconnecting blocks to provide photon-tight structures.

~~15~~14. The method of any one of the above claims, further comprising conveying the biomass material into the first ~~enclosure~~vault ~~and then conveying the first treated biomass out of the first enclosure and into the second enclosure~~.

~~16~~15. The method of any one of the above claims, further comprising conveying the second treated biomass material out of the second ~~enclosure~~vault.

~~17~~16. The method of claim ~~16~~15, further comprising conveying the biomass into a third ~~enclosure~~radiation opaque treatment vault, conveying the biomass within the third ~~enclosure~~ vault and exposing the second treated biomass material to a third dose of ionizing radiation to produce a third treated biomass material.

~~18~~17. The method of any one of claim ~~15~~ 14 -~~17~~16, wherein the conveying utilizes a pneumatic conveyor system and/or a screw conveyer system.

~~19~~18. The method of any one of claims ~~15~~14- ~~18~~17, wherein the conveying into and/or out of ~~enclosures~~ the vaults occurs continuously.

~~20~~19. The method of any one of the above claims, wherein the biomass material and/or the first treated biomass material is/are conveyed by a vibratory conveyor within the ~~enclosure~~vault(s).

~~21~~20. The method of claim ~~20~~19, wherein conveying with the vibratory conveyor occurs continuously.

~~22~~21. The method of any one of the above claims, wherein processing of the material occurs at an average rate of between about 5,000 lb per hour and about 25,000 lb per hour *e.g.*, the material is conveyed through the ~~enclosures~~ vaults at a rate of between about 5,000 lb per hour and about 25,000 lb per hour.

~~23~~22. The method of any one of the above claims, wherein processing of the material occurs at an average rate of between about 2,000 lb per hour and about 6,000 lb per hour *e.g.*, the material is conveyed through the ~~enclosure~~vaults at a rate of between about 2,000 lb per hour and about 6,000 lb per hour.

~~24~~23. The method of any one of the above claims, wherein processing of the material occurs at an average rate of between about 2,000 lb per hour and about 5,000 lb per hour *e.g.*, the material is conveyed through the ~~enclosure~~vaults at a rate of between about 2,000 lb per hour and about 5,000 lb per hour.

~~25~~24. The method of claim ~~2~~1, wherein the first and second dose of ionizing radiation are applied using accelerated electrons produced by an accelerator, each accelerator operating at a power of between about 100 kW and about 400 kW.

~~26~~25. The method of claim ~~2~~1, wherein the first and second dose of ionizing radiation are applied using accelerated electrons produced by an accelerator, each accelerator operating at a power between about 100 kW and about 300 kW.

~~27~~26. The method of claim ~~2~~1, wherein the first and second dose of ionizing radiation are applied using accelerated electrons produced by an accelerator, each accelerator operating at a power between about 100 kW and about 200 kW.

~~28~~27. A biomass treatment facility, comprising:

a first conveying system configured to convey a biomass material through a first radiation opaque treatment ~~enclosure~~vault while exposing the biomass material to a first dose of ionizing radiation from a first electron accelerator to produce a first treated biomass material; and

a second conveying system configured to convey the first treated biomass material through a second radiation opaque treatment ~~enclosure~~vault sharing at least one common wall with the first vault while exposing the first treated biomass material to a second dose of ionizing radiation from a second electron accelerator to produce a second treated biomass material.

~~29. The facility of claim 28, wherein the first and second enclosure share a common wall.~~

~~30~~28. The facility of claim 27~~28 or 29~~, wherein each accelerator operates at a power of between about 100 kW and about 300 kW.

~~31~~29. The facility of claim 27~~28 or 29~~, wherein each accelerator operates at a power of between about 100 kW and 250 kW.

~~32~~30. The facility of claim 27~~28 or 29~~, wherein each accelerator operates at a power of between about 100 kW to about 200 kW.

~~33~~31. The facility of any one of claims ~~28~~27-~~32~~30, wherein walls of both the first and second ~~enclosure~~vaults are fabricated from discrete interconnecting blocks configured to provide a photo-tight structure.