

SYMBIOTIC NUCLEAR POWER

For 50 million years, the acacia ant (*Pseudomyrmex ferruginea*) has coexisted in a symbiotic relationship with the swollen thorn acacia (*Acacia collinsii*) in Costa Rica. This photograph shows the acacia ant sipping nectar from the petiolar nectary of the swollen thorn acacia. In return these ants defend the tree against browsing mammals and epiphytic vines in one of nature's most amazing symbiotic relationships. This symbiotic relationship has inspired this new idea for symbiotic nuclear power as a means of closing the nuclear fuel cycle.



SYMBIOTIC NUCLEAR POWER INSTALLATION

HALL OF
ELECTRICITY



HALL OF
MAINTENANCE



UNDERGROUND RADIOISOTOPE ELECTRICITY GENERATORS

SYMBIOTIC NUCLEAR POWER SYSTEM DESCRIPTION(Patent

Pending)

The principal embodiment of this invention is to configure the nuclear power fuel cycle as a system that develops a symbiotic relationship that can evolve over thousands of years, in which society continues to derive benefit from radioactive isotopes rather than danger. (Patent pending) The important first aspect of this system is to provide present society with electricity or hydrogen from radioisotope powered energy sources and then providing means of keeping the interest of evolving future human societies by converting High Level Waste (HLW) into radioisotope driven energy sources which could provide energy for thousands of years. This invention changes the paradigm of geological disposal of vitrified high level waste which needs to be sequestered for up to one million years, to a paradigm in which the high level waste is a useful component of evolving societies with inducements for the future society to obtain energy from the radioisotope battery sources. Another aspect of the system is means for future societies to interact with the system and maintain its usefulness.

The energy installations would have electrical power line connections or hydrogen outlets that could supply energy to future societies. There would a "Hall of Electricity" to explain what electricity and its uses are in 40 to 50 languages while providing examples of electricity utilizing technologies. A "Hall of Maintenance" would similarly explain maintenance and instructions for maintaining these "nuclear batteries". Spare parts for 10,000 years would be kept in the Hall of Maintenance. Simple analog meters would provide indication of the need for maintenance.

The radioisotope electricity producing devices would have two sections. Section one would be a polymer or glass inner container incorporating the radioisotopes. It could have a matrix material such as a radiation curable polymer, or glass. Vitrified glass is presently used for high level waste (HLW) sequestration in the U. S. Some European counties have utilized polymer materials. Polymer materials, in the form of amber have preserved biological materials for 100's of millions of years. This heat or charged particle producing section would be shaped so that a sleeve consisting of the electricity or hydrogen producing apparatus, could be easily slipped over it. This sleeve will be designed a long lifetime, of say 100 years. Electrical conversion process can be thermoelectric, a sterling engine or a piezoelectric process. Hydrogen could be generated by electrolytic cells.

RADIOISOTOPE GENERATORS

Radioisotope generators have been in use for many years, and have flown on many spacecraft. Three technologies are being developed. These are [radioisotope thermionic generators](#), [radioisotope Stirling generators](#) and [radioisotope piezoelectric generators](#).

SPECIES	WALLS	DVERTOR	LV1	LV2	LV3	LV4	LV5	TOTALS
STABLE (MI)								
Hydrogen	0	0	0	0	0	0	5.80E+04	5.80E+04
Oxygen	0	0	0	0	0	5.74E+05	0	5.74E+05
Nitrogen	0	0	0	0	2.73E+04	0	0	2.73E+04
Sodium	0	0	6.88E+04	0	0	0	0	6.88E+04
Carbon	1.15E+01	1.14E+03	0	0	0	0	0	1.15E+03
Calcium	1.4E+00	1.4E+02	0	0	0	0	0	1.4E+02
Aluminum	4.29E+01	4.2E+03	0	0	0	0	0	4.2E+03
Cesium133	0	0	0	2.09E+00	0	0	0	2.09E+00
TOTALS	5.59E+01	5.53E+03	6.88E+04	2.09E+00	2.73E+04	5.74E+05	5.80E+04	7.34E+05
RADIOACTIVE (MI)								
Am241	2.17E-05	2.86E-02	0	0	0	0	0	2.86E-02
C14	1.70E-05	1.68E-03	0	0	0	0	0	1.70E-03

Gs-137	0	0	0	3.92E-01	0	0	0	3.92E-01
Pu-239	4.00E-03	4.10E-01	0	0	0	0	0	4.14E-01
Sr-90	3.70E-03	3.76E-01	0	0	0	0	0	3.80E-01
Tc-99	1.80E-02	1.82E+00	0	0	0	0	0	1.84E+00
TOTALS	2.57E-02	2.64E+00	0	3.92E-01	0	0	0	3.03E+00

NEXT STEPS

This concept is under development. Interested parties are urged to contact us.

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