

# Redstone Isotope based nuclear power



# Part I

## The Idea itself

Any regular industry mod like IC2 uses Uranium as fuel for nuclear reactors to create massive amounts of energy. But if we look to the other side of the spectrum: the Vanilla game, we can see some (and i mean some) similarities between redstone and uranium.

Both materials act like metals, uranium and redstone has the potential to transmit power like a metal, though both materials show that they cannot transmit power over long distances without loss (redstone losing over short distance like 15 meters or so, shows that it is not capable of great conductivity, just like uranium). Uranium 235 under great pressure starts emitting particles or in other words ENERGY. While the power amounts aren't insane, an over exaggerated example that is Redstone can show that in higher concentrations like blocks, torches or other components that produce power in smushed (not powdered form) it can produce power. Thus instead of using uranium, Minecraft mods could in theory use redstone as a fission component for nuclear reactors by using enriched redstone rods, or some other way of using them (that will be detailed later in the doc)

P.S.

Another material that is similar to redstone could be lithium, a material that has the ability to store energy, while still being extremely reactive (not radioactive). Redstone seems to more work like a fission material outputting electrons instead of neutrons from fission reactions, thus those could be used for batteries, WITHOUT giving them self recharging capabilities unless they use extremely well refined Redstone isotopes.

# Part II

## Refining the material

The first and simplest Redstone isotopes can be created using simple machinery like compressors, presses or anything that will... Presses.

Those low concentration Redstone isotopes can be used in low output Radioisotope thermoelectric generators or an RTG's for short or low heat reactors

The second class isotopes are the angrier kind of isotopes, the ones that can finally be used for high heat reactors, that will both be way more dangerous and more prone to explosions (due to overheating and pressures inside of the reactor). This class of isotopes has to be created by using a depleted class 1 isotope with redstone dust in a centrifuge. Centrifuges would create the class 2 isotope base, that can then be used in a compressor to create a brand spanking new class 2 isotope, for use in nuclear reactors.

The most powerful and dangerous isotope is a class 3 Redstone isotope. These extreme isotopes can be used for extreme heat reactors, that have to be cooled with unconventional ways to stay stable (it is said that an explosion from a class 3 isotope reactor can match the power of a 6kt fission bomb). Just note that the creation of this isotope is not recommended for non pulse based reactors, due to cooling requirements being too high. The class 3 isotope itself can be created using 8 depleted class 2 isotopes in a centrifuge, then in a three step process using machines that infuse coal, redstone and diamond dust, in order like this:

1. 8 class 2 isotopes are centrifuged to a single pile of class 2 depleted dust
2. the class 2 depleted dust is then put into an infuser with coal -> class 3 carbon base
3. the class 3 carbon base is then put into an infuser with redstone -> class 3 activated carbon base
4. finally the class 3 activated carbon dust can be put into the infuser with diamond dust to finish the class 3 base

(You can completely avoid this step by using an infuser that can infuse several materials at once or making less steps, if you want a simpler design or a rebalance).

the class 3 base can then be put into a compressor to create the class 3 isotope.

### NOTE

all of the isotope types will have to be canned in a crafting table or a machine into a canister, cell, rod or some containment device.

# Part III

## Reactor working principles

### **RTG reactor (Redstone thermoelectric generator)**

Uses class 1 isotopes to generate low amounts of power for a really long time for example an RTG generator could provide the same amount of power as a two first tier solar panels, but working 24/7 for over 60 days or so without (not a great machine for depleted class 1 isotope production). These generators do not have any control or cooling surfaces, they can contain only a single class 1 cell. P.S these machines can be boosted by steam generators or turbines, but they can also work without these, but then they generate a comparably miniscule amount of power.

### **Low pressure Reactor**

These reactors use class 1 isotopes (or low quality isotopes for research) and internal pressure generators to produce more power at the price of heat that you will have to manage using cooling components around the main reactor core. From this point onward every reactor will need a kickstart to start producing power and self sustaining itself, due to the requirement of a pressure generator. These devices make the redstone isotopes inside the reactor even more active than they were before, to start producing electrons at a greatly increased rate with the cost of a massive heat output. When the reactor pressure reaches the required mark, the reactor starts producing power.

#### **NOTE**

The pressure management is on the player itself, the class 1 reactors are not extremely explosive, more like a charged creeper, but the radiation after a meltdown is already bad enough to make the place not livable. The player has to manually kickstart the class 1 reactors with managing the pressure in the reactor to match their liking, they can “overclock” the reactor with more heat and energy output, but with increased risk of an explosion (an item proposal like an emergency pressure valve would be a great suggestion for stopping the reactor)

### **High pressure Reactor**

These reactors start using graphite rods for simple on/off control due to class 2 isotopes naturally being active, they cannot be simply turned off with a pressure release, but to start the reactor now both graphite rods have to be released and the pressure in the reactor has to be increased. These reactors now are way more dangerous in a meltdown situation, now radiation won't be a problem, because your house will be an irradiated crater. To control the reactors, the pressure valves can only slow down the reactor meltdown, graphite rod insertions and/or liquid coolants will have to be used to stop the reactor completely (when the temperatures are high, the fuel should not be removable from the reactor due to heat).

#### **NOTE**

The High pressure Reactors can also operate using class 3 isotopes, either in small

concentrations with extreme cooling, or using pulse based reactors (a possible upgrade, or leave that to the player itself to design a clock system).

# Part IV

## Centrifuge working principles

### Centrifuge

a rather simple machine that takes a depleted isotope and smushes it into a more purified and dusty form, that lets the player create more powerful and unstable Redstone isotopes. The centrifuge has to be steadily powered for 4 in game days to produce a single unit of an isotope base, the centrifuges require a spin up before they start operating, a multi block machine that is made of the centrifuge motor, a centrifuge silo, and an input hatch on the top so materials can be dropped into it for processing. The centrifuge rpms function like this:

0-40000 rpm - the spin up period, if an already spun up centrifuge loses power and spins down to these rpm values, the process will have to be restarted

40001-100000 rpm - the operational speed that the centrifuges can operate

The centrifuges have a failure rate that begins at 0% and starts slowly increasing at every spinning cycle (every item produced). After every cycle the motor gets an increase to fail by +5%, and every time the motor is spun up, a dice is rolled where if the roll is bad, the motor burns down, that will have to be replaced (a texture of the bottom part that being the motor could show cracks or some damage to the motor to visually indicate the damage).

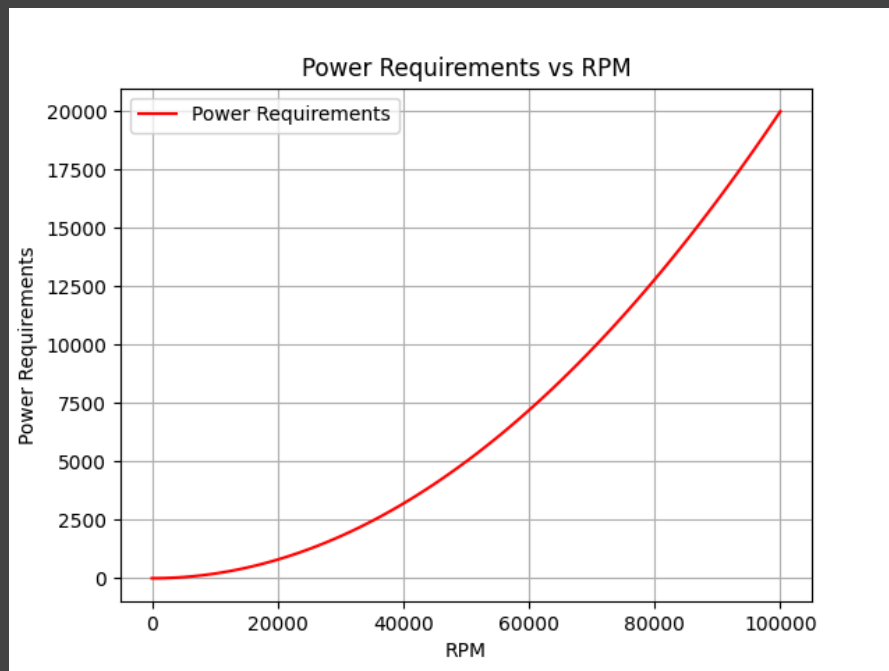
The chances of failure increase in these events:

spinning above 60000 rpm's -> failure rate increase from +5% to +7% per cycle

sudden power loss above 40001 rpm's -> +18% increase, and resets the rpm's, (AND due to electricity spiking, burns down all the cables that it is connected to OPTIONAL)

The player has the clear ability to increase and decrease the rotational speed as they need, giving them the control to control the centrifuge.

To balance the centrifuge as a production element, the power usage becomes exponential as the rpm's increase, every 10000rpm's the power increases exponentially  $x^2$ .



When the centrifuge is spinning at the operational rpm's, If the silo or any other component of a centrifuge is broken, or just removed by any means. The machine will combust, and if it had any radioactive materials, it would also irradiate the area.

# Part NOLLA

## Additions

The class 3 isotopes can be used in self recharging armor, tool or battery production.

The centrifuges need to have a lifespan of only 10-14 cycles before needing repair, due to extreme condition requirements, one cycle is a single use or 4 in game days to refine a single unit.

Depleted isotopes can be used for ammo or slightly radioactive armour.

While operating a reactor that is pressurized, removing a cell or interacting with the reactor core, would start releasing the pressure in high levels.

Depleted cells sitting in exposed air, inventories, chests or anything related unless stored in a safe environment will start oxidizing and start releasing more and more radiation

Cables that are used in a mod, if a electricity spike from a centrifuge or other machinery occurs, the spike not only burns down the cables, but also lights fire in the surrounding area.