



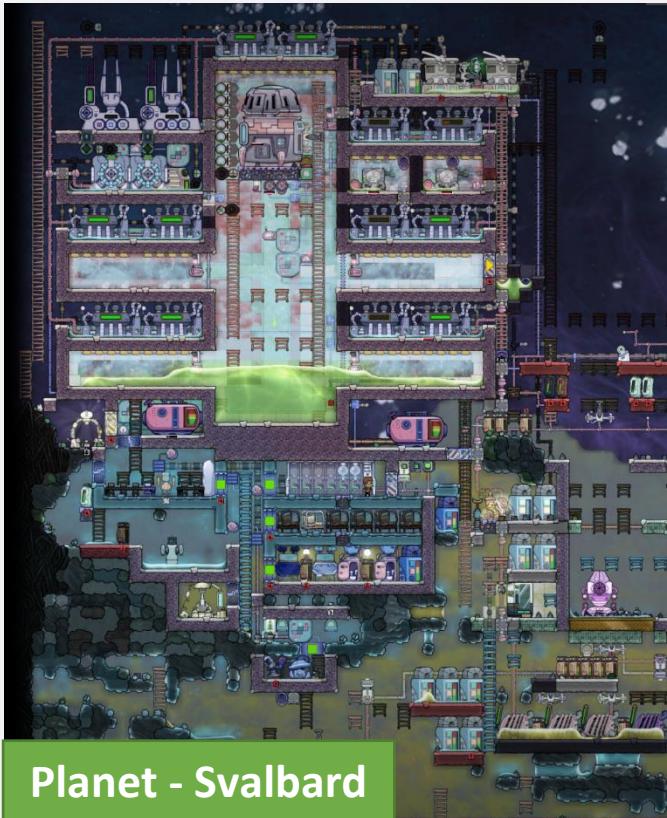
PROJECT SHATTERSTAR

VOLUME 1 OF GUIDE TO THE ONI-VERSE

OXYGEN
NOT INCLUDED
SPACED OUT!

By-
the stormfather

CHAPTER 12 : Steel, Slicksters and Mini-Volcanos



When life gives you iron, build a nuclear reactor to transport it home.

We've been wanted iron forever. Now that we have it, what do we do?

Highlights :

- We build a nuclear reactor + launcher on chernobyl
- We build slickster farms on Petra
- We start mass steal production
- We build our first drillcone rocket
- We tame volcanos and steam vents



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Disclaimer-

Oxygen Not Included is a sandbox game limited only by the player's imagination. I can assure you that no player (including me) has figured out the 'right' way to play the game.... No matter how many hours they may have put into the game.

That's because there is no right way. What you do depends on what you want to achieve. Some love building ridiculous and elaborate builds, while others are more efficient and practical. Both are perfectly acceptable ways to play. What matters is that you enjoy what you do.

The following document is a guide and not a gospel. Like every other player, I have my unique style of play. What I intend to do is to share my playstyle and start a conversation with the community. This document will take you through a real and typical game, showcasing my approach to things. The playthrough will not be perfect. But it will be enlightening and entertaining. I hope my readers will use this series to modify their own unique style rather than copy mine.

Feel free to skip, ignore or modify any of the recommendations given in the series.

All Game art has been taken from the game files and is the property of Klei (if that wasn't obvious enough). I've used them only to make the document more engaging.

While this guide is quite simple, It's not meant to spoon-feed you. You may have to do a bit of additional research if you are a new player, and I'm happy to answer any specific questions.

The easiest way to find me is on Reddit. My handle u/Storm-Father. Please feel free to drop me a message or tag me in a post.

The series will use the following mods. These are quality-of-life mods and do not affect core gameplay

- Wounded go to Med bed
- Blueprints fixed
- Bigger Building Menu
- No 'Long Commutes'
- Suppress Notifications

- Geyser Calculated Average Output tooltip
- Critter Inventory
- Queue for Sinks
- FreeCamera
- MaterialColor
- Show industrial Machinery Tag

Game Coordinates – ‘SNDST-C-360860549-0’



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The Starmap



The layout of the introduction has been changed to accommodate the increase in information that comes from having multiple planets. If you have any suggestions on alternate layouts or additional information, feel free to let me know on Reddit.



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Neo Terra



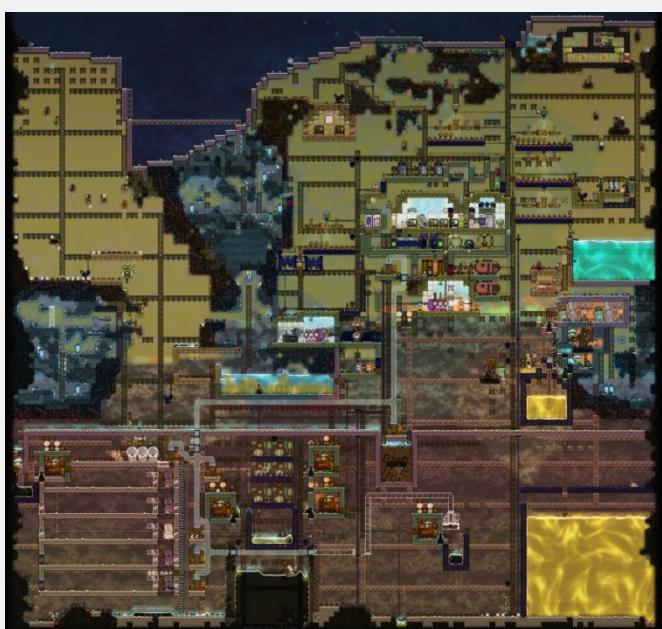
Cycle 750



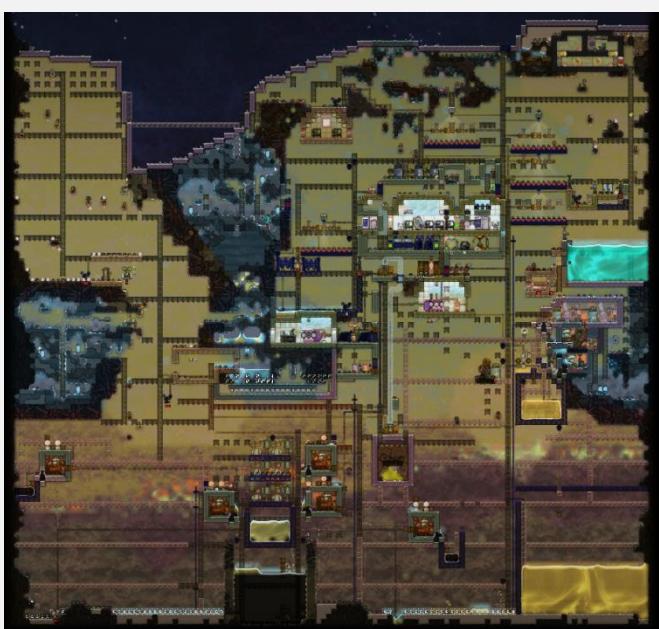
Cycle 570

StormFather

Petra



Cycle 750



Cycle 570



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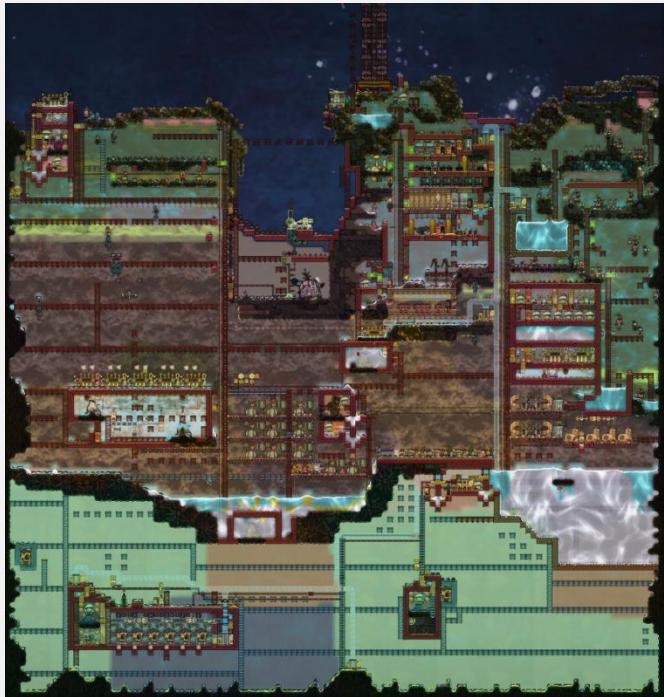


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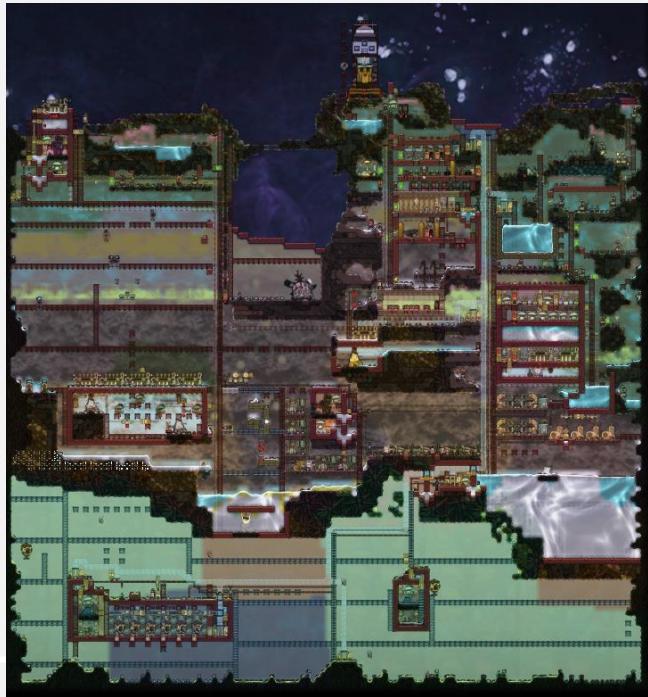
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Chernobyl



Cycle 750

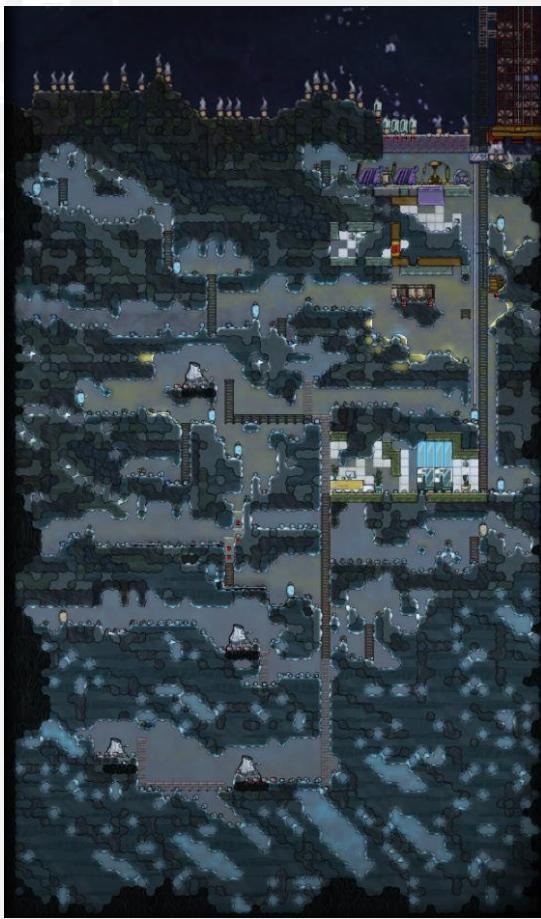


Cycle 570

Svalbard



Cycle 750



Cycle 570



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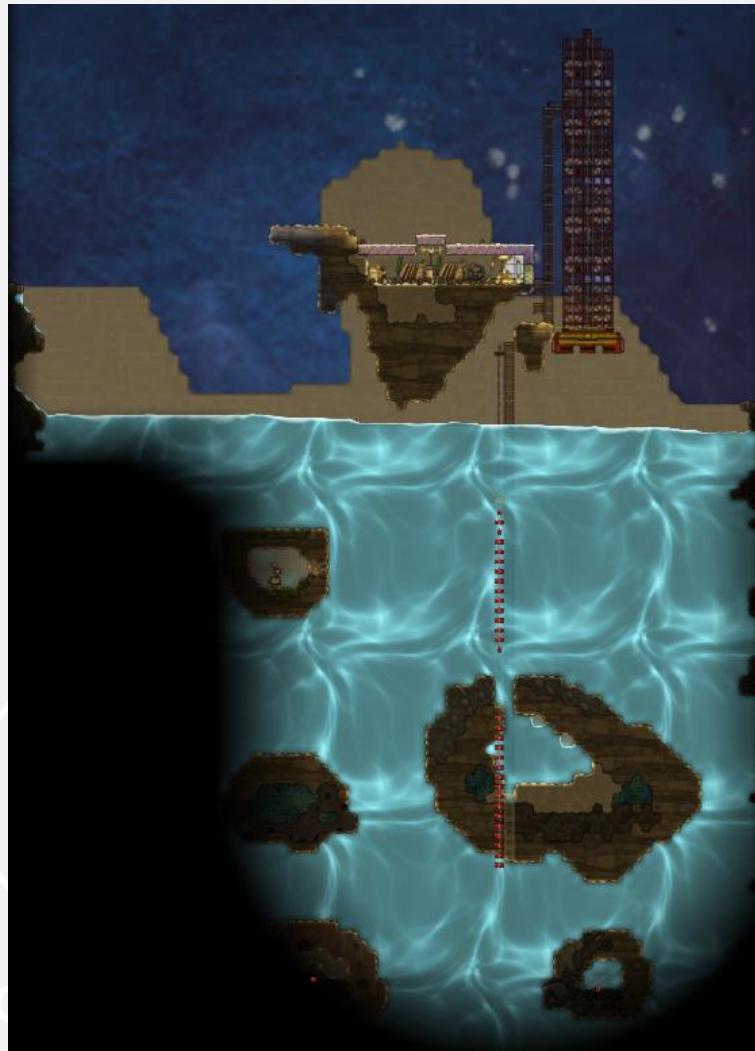
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Numenor

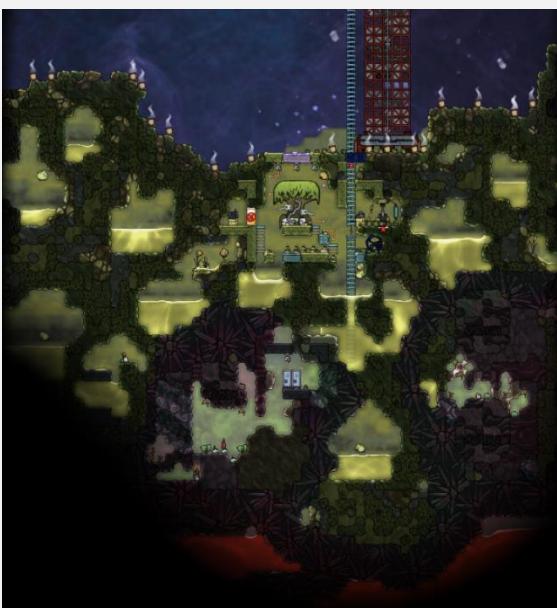


Cycle 750



Cycle 570

Florida



Cycle 750



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1) Let's talk logistics



The biggest challenge in Spaced Out is, well, space. With resources spread across various planets, it can be difficult to gather everything in one place. As the number of planets and complexity increase, managing your bases becomes even more challenging.

For instance, Svalbard is the only source of iron available, Petra is the only source of crude oil, and Chernobyl is the only planet with Uranium. Although interplanetary launchers and teleporters can help, nothing happens automatically. Currently, I'm manually filling storage bins and sending materials across planets as needed. I have added some automation to send oxygen to Svalbard, but I don't want to get into it just yet. Let's discuss this in the next chapter.

However, this will have to change, at least for some materials. While it's still manageable manually, I've begun the journey towards automated logistics by creating a single storage area for all excess materials. These automatic dispensers are set to "sweep only," meaning any sweep jobs on the planet will be dropped off at this central location. Note that if you don't select "sweep only," your dupes may get stuck in an infinite loop, as they pick up materials from the pit and put them back.

Even if you're not a logistics expert, I recommend setting up a material pit like this. It reduces debris and clutter, improving game performance.

Please ignore the mess of rails and receptors in the corner of the map - that's a discussion for another time.

2) Taming volcanos and vents

Mini-volcanoes are a good source of igneous rock, and steam vents are a good source of water. But to really harness them both, you have to tame them.



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'Taming' is the general term used to describe a setup that confines the vent or volcano into an insulated box where the end product can be automatically cooled to a convenient or usable temperature.

This is a broad definition, and the implementation depends on the stage of the game, materials available, end goal, and how particular one is as a player. Some build simple and crude setups, while others build complex and sophisticated ones, but both are equally valid approaches.



I tend to go for builds that are a bit on the complex side, but not so complex that they are difficult to replicate.

Here we have the vent neatly enclosed in a box, with the following features:

- Vacuum joint – I think I have discussed this before, but let me do it again just in case. Heat can only be transferred when there is a medium to do it. And in ONI, power wires, pipes, etc., don't count as a medium. So heat can only be transferred via tiles, air, or water. If there is no air or water between two conducting tiles, there will be no heat transfer. That is the function of the vacuum joint.



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- Steam chamber – This contains the aquatuner that runs the cooling loop to cool the entire room. The room is completely insulated and has a turbine over it for heat deletion. Make sure the room has no gases in it before sealing it. The best way to do that is to drop two layers of different liquids into it using a bottle emptier. This will cause both levels to be occupied by liquid, hence removing all gas from it. Just make sure that at least one liquid is water-based (i.e., water, saltwater, or brine – though avoid polluted water as it sometimes off-gasses, especially when on top). Also, make sure to add the heavier liquid first (such as petroleum first and then water on top).





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- Vent chamber – The vent chamber has the vent on top and a liquid pump on the bottom, with the whole area being cooled by radiant pipes. Since we aren't concerned about gas here, there is no need to remove any existing gas from this chamber. The automation for the pump and the temperature setting of the aquatuner is up to you. Here the aquatuner is set to 85 degrees, and I have multiple hydro sensors for the pump, just to make sure that air pockets or misc blobs of a foreign liquid do not lock up the system.



Here we also built a tamer for the mini volcano. Just keep in mind that this cooler works for all mini volcanos and metal volcanos (except niobium, haven't tried it on that one), but the cooling isn't enough for a full volcano.

The goal of this tamer is to cool the igneous rock down to a target temperature before taking it out of the system. There are simpler and cruder ways to do it (which we will explore when we look at the gold and aluminum volcanos). This cooler has the following components –



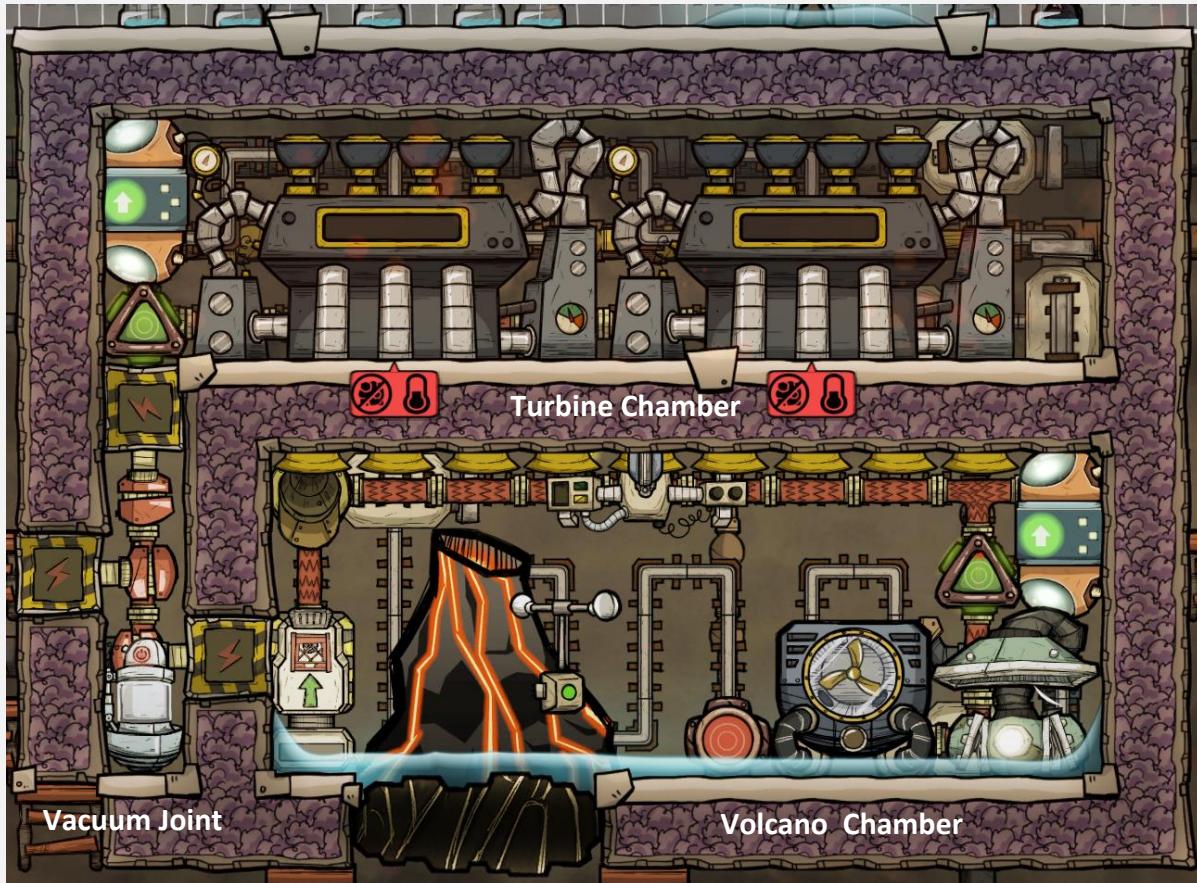
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- The volcano chamber- This is the chamber where both the mini volcano and the aquatuner are kept. Since this chamber has the heat sources and the turbine above it for cooling, it must not have any gas in it except steam. The layering technique we discussed just now is only valid up to 3 layers, so it won't do us any good here as the chamber is 4 tiles high. Here I just use a gas pump to evacuate the room. If you're really particular, you could put in a liquid lock here so that you can go in later and deconstruct the pump after vacuum is achieved, but I think that's too much work and takes up too much space (since you'll need to make 2 liquid locks to seal in the temperature). In any case, I tend to always have some issue or another when I build these things, so the gas pump will be useful.
- The Vacuum joint- Same concept as last time, just in a different shape.
- The turbine chamber- This chamber has the turbines and the cooling loop that cools it down.



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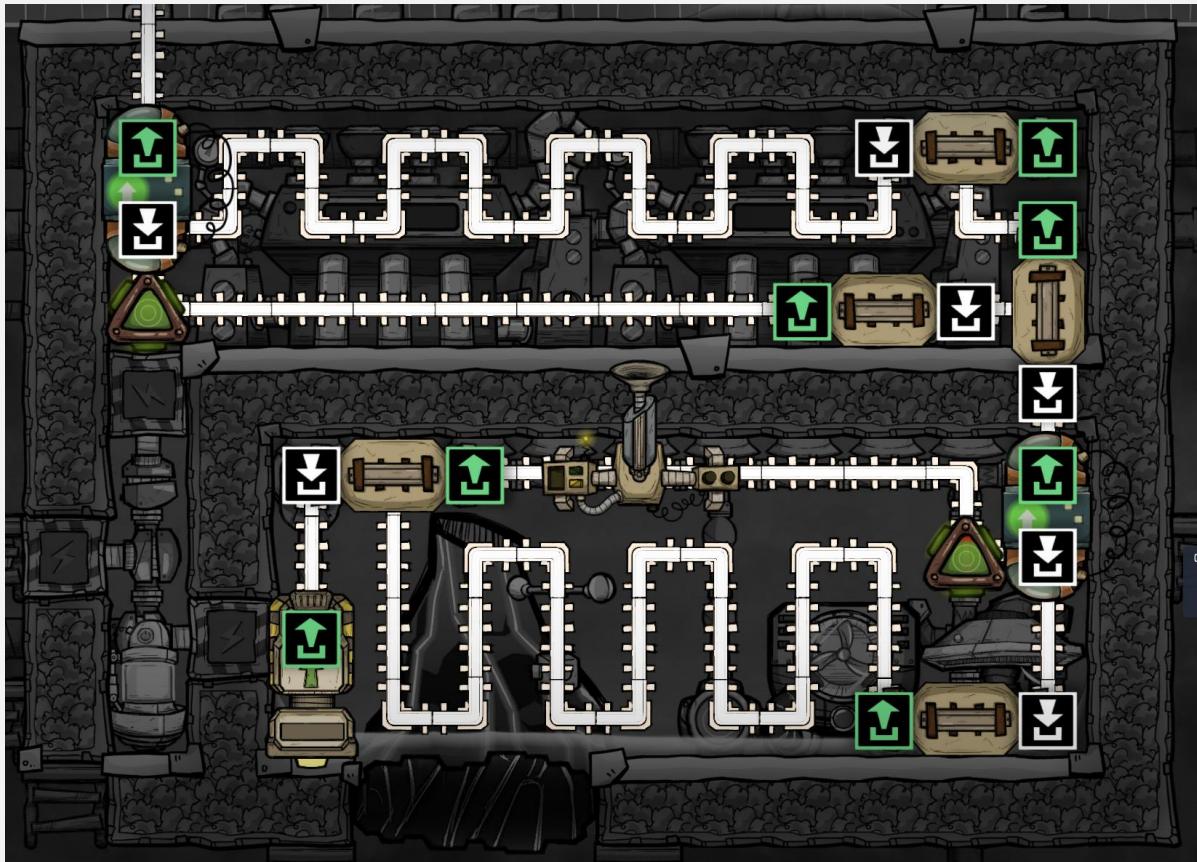
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- The conveyor rail system- This system allows us to automatically pick up the contents of the volcano, cool it down, and remove it from the system. It consists of 2 loops, one in the volcano chamber and another in the turbine chamber. Material enters the volcano loop via the conveyer loader, where it continues to be circulated as it cools. Once the material goes below a certain temperature (I set it to 130 degrees), the conveyer shutoff activates and the material moves to the turbine loop.

It's the same story here but with a different temperature target (mine is usually 60 degrees) at which it leaves the system and goes to the outside world. The speed of how soon the material leaves the system can be changed by changing the temperature targets for the aquatuner and the shutoffs.

One thing to keep in mind about volcanos – steam pressure is important. Too little steam and your system will overheat and break. Too much steam and your mini volcanos will go into ‘Overpressure’ and not emit any materials. Overpressure is around 125 kg per time (though I’ve seen this vary). Ideally, I would recommend a pressure of 100kg per tile. I invariably either put too much or too little water, which takes a lot of time to get



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the balance right. I'm sure I can sort the startup with some sort of automation, but that seems like even more work.

Also, make sure there are no materials like polluted water or bleach stone that can off-gas inside the chamber, as that will ruin the build. Gases like oxygen that are lighter than steam will float to the top and block the steam's access to the turbines and break the build.

While I may not mention it explicitly every single time, every mini volcano tamer I have made in this game has broken for some reason or another at least once. But they are fairly easy to fix so don't worry about it. If you want to prevent or stop a volcano from erupting, just make a temperature shift plate of coal and place it right in the middle of the mini volcano. This will flash to refined carbon and create a tile that will block further eruptions.

3) Life on Neo Terra –

There have been many more changes made to Neo Terra, apart from the logistics pit and the tamers that we've discussed. Here are some of them:



The water pit – Liquid management is a bit of a mess right now, as tends to happen in the mid-game. While we do have renewable sources of water in the form of geysers, they go through periods of dormancy giving us an inconsistent output.

To combat this, I've made this pit of water that will serve as a buffer. The input water sources are from the various vents and geysers across the map. The saltwater/brine and polluted water is processed into fresh water and dumped in.



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At this moment, I have no way to monitor and regulate the water level, so I'll have to keep an eye to make sure the water level is not too high or too low. The input to the filters comes from another pit of water that has a mix of all the liquids from the map, except petroleum. This is filtered into water, salt water, polluted water and diverted accordingly. Note that this is not a perfect system, as the inclusion of any other liquid will break the system.



💡 Too much petroleum – Too much of a good thing is a bad thing. I produce petroleum at 10kg/s, but I don't consume it at the same rate. I did not have enough steel to make a proper steam room for plastic production. Even my petroleum generators weren't made of steel, meaning I couldn't use them at full tilt. I had to cut crude oil supply into the petroleum boiler a bunch of times, but even so, I have banked up a lot of petroleum that I do not need.



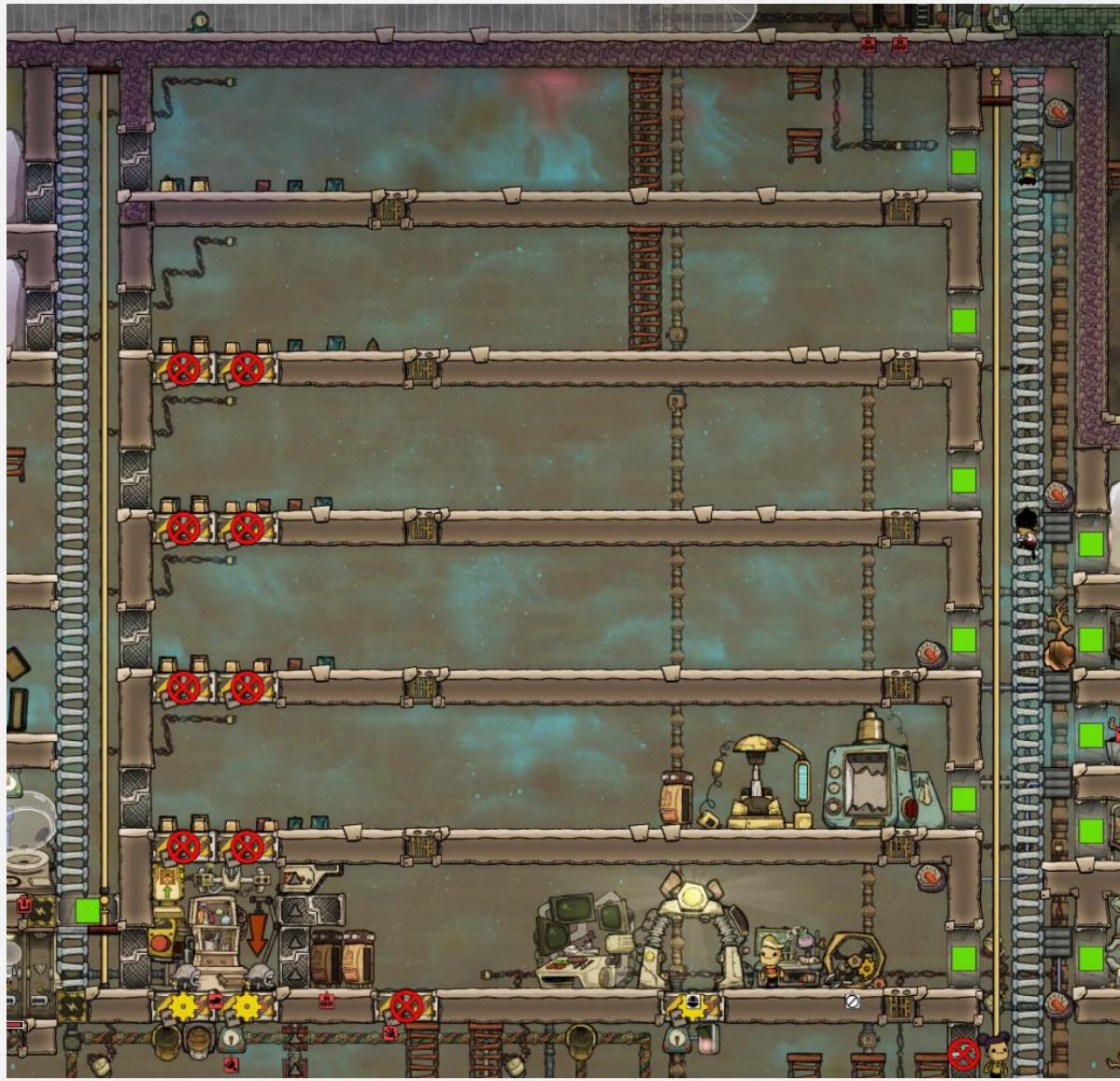
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Fortunately, we got a lot of lime and iron in this chapter (I'll get into the how in a bit) so I made tonnes of steel and overhauled the entire setup. While it's not up and running yet, it will be in the next chapter, where we will discuss our petroleum situation further.



- Ranches demolished – The hatch ranches have fed us for about 600 cycles but they were getting expensive to run. Believe it or not, the hatches are eating through all the raw minerals we have on Neo Terra, and I will literally run out in a few hundred cycles. I had a good amount of barbecue banked up (About 3.8 million kilo-Calories), enough to keep my 17 dupllicants fed for about 220 cycles, so I shut down my ranches and... liquidated my hatches. I also began to deconstruct the ranches as I no longer needed them.



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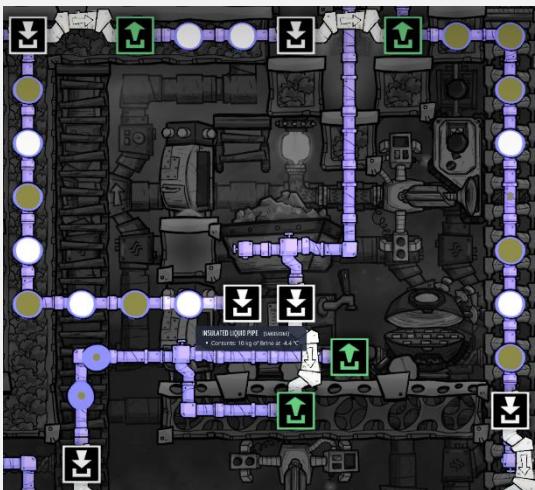
But my duplicants will still need to eat in 200 cycles, so what can we do? Let's discuss this when we talk about Petra.



Steel (At last) – I got a lot of lime from Numenor and a lot of Iron from Svalbard.



Putting them together with refined carbon, I have literal tons of Steel to work with. Finally! I decided not to make a ‘proper’ steel refining setup, opting to use cold water as the coolant. The advantage is that this is quick and easy to make. The disadvantage is that this system is not a permanent fix. It can only work as long as cold water is available, and even with cold water, pipes do overheat and explode every now and then. I would suggest you do not mix two different types of liquids for cooling, as I have here, and use only



We also made changes to the nuclear reactor, but I collectively covered all changes to that in the previous chapter so let's skip that bit. Just note that we start using our reactor to make diamonds around cycle 615. We also use the refined metal we are importing from Chernobyl to upgrade our electrical grid to heavy-watt conductive wiring.

4) Life on Petra –

Petra also has the problem of too much Petroleum, but I think I'll need it soon enough. The biggest change here is the ranches. With Hatches hard to maintain, I had to look for alternative sources of food, and slicksters seemed like the obvious choice. They thrive in hot temperatures, only take in CO₂ as food, and provide meat for barbecue. Thus we are literally able to turn a useless gas into food, which is excellent for us. Since we don't need a spot for the critter feeder, we can also reduce the floor space for the critters by 1 tile. Just make sure to make a system to collect the crude oil they produce.



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I've separated the bottom of the map with insulation tiles and vacuum locks to keep the temperature in. For now, I will be bringing in CO₂ from Neo Terra via teleporter, but I think we can produce enough CO₂ locally in a few hundred cycles. We're also beginning to work on a basic tube network.

We've also consumed all the extra water we had, so the bristle blossoms are no longer growing. We have lots of ice though, so I might melt it, increase the temp, and then use it for the blossoms. Let's see.



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5) Life on Chernobyl -

Going forward, I want natural gas to be the backbone of the power system on Chernobyl, with hydrogen being a backup. So I currently have both natural gas and hydrogen generators on the map. Nothing fancy, just functional.



Also, Chernobyl is also our source of refined metal, with 2 gold and 2 aluminium volcanos. I have not built proper tamers for them, but what we have is enough to delete the heat and give us workable metal. The only issue is that I have to transport the material in the interior of rockets, which has caused the rocket to overheat, meaning that duplicates are no longer safe inside them without atmosuits.





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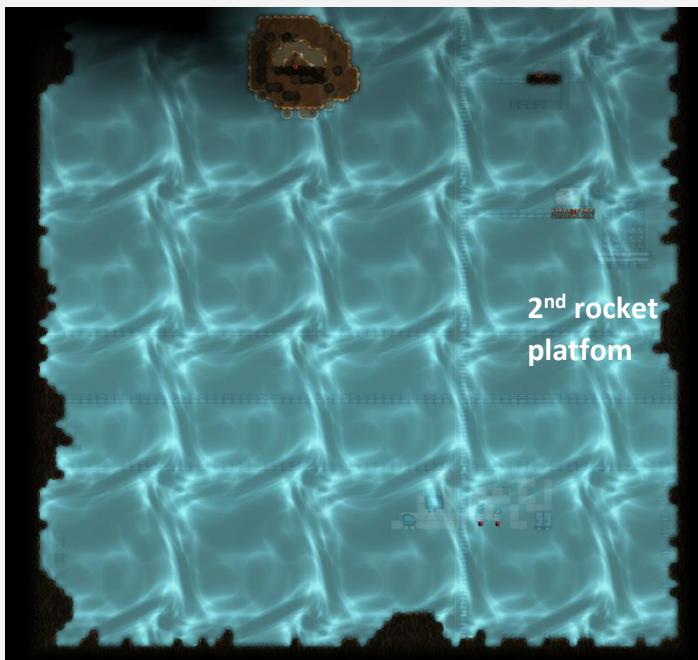
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With some refined metal taken and the uranium making beetas hard at work, I actually had no need for duplicants on the planet anymore. I got them back to Neo Terra and will send them if and when required. We also have a payload launcher here, But'll I'll discuss this along with the rest of the logistics network in later chapters.

We're also using the polluted water vent to grow some thimble reed since it's at the right temperature.

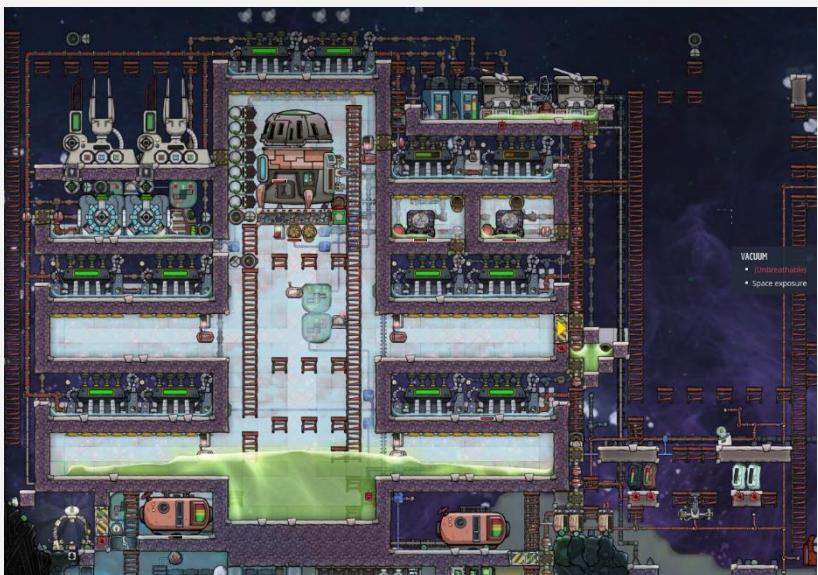
6) Life on Numenor



Most of Numenor is water, which is currently of no use to us. But the core of the map has lime and fossil, which can be converted to lime. This is where we got all the lime to make our steel. But we had to demolish most of the planet for it. Still worth it.

You'll notice that we have a 2nd rocket platform. That was just to land the rocket closer to the core so that we could demolish it all more efficiently. Once we took the lime, we went back to Neo Terra. Nothing else to do here.

7) Life on Svalbard



Of all the planets, Svalbard has changed the most. We've built a full-size nuclear reactor as well as a habitation station for the duplicants.

The reactor was built so that I could transport iron to Neo Terra via interplanetary launchers. I used these launchers to send both Iron and sleet wheat to Neo Terra.



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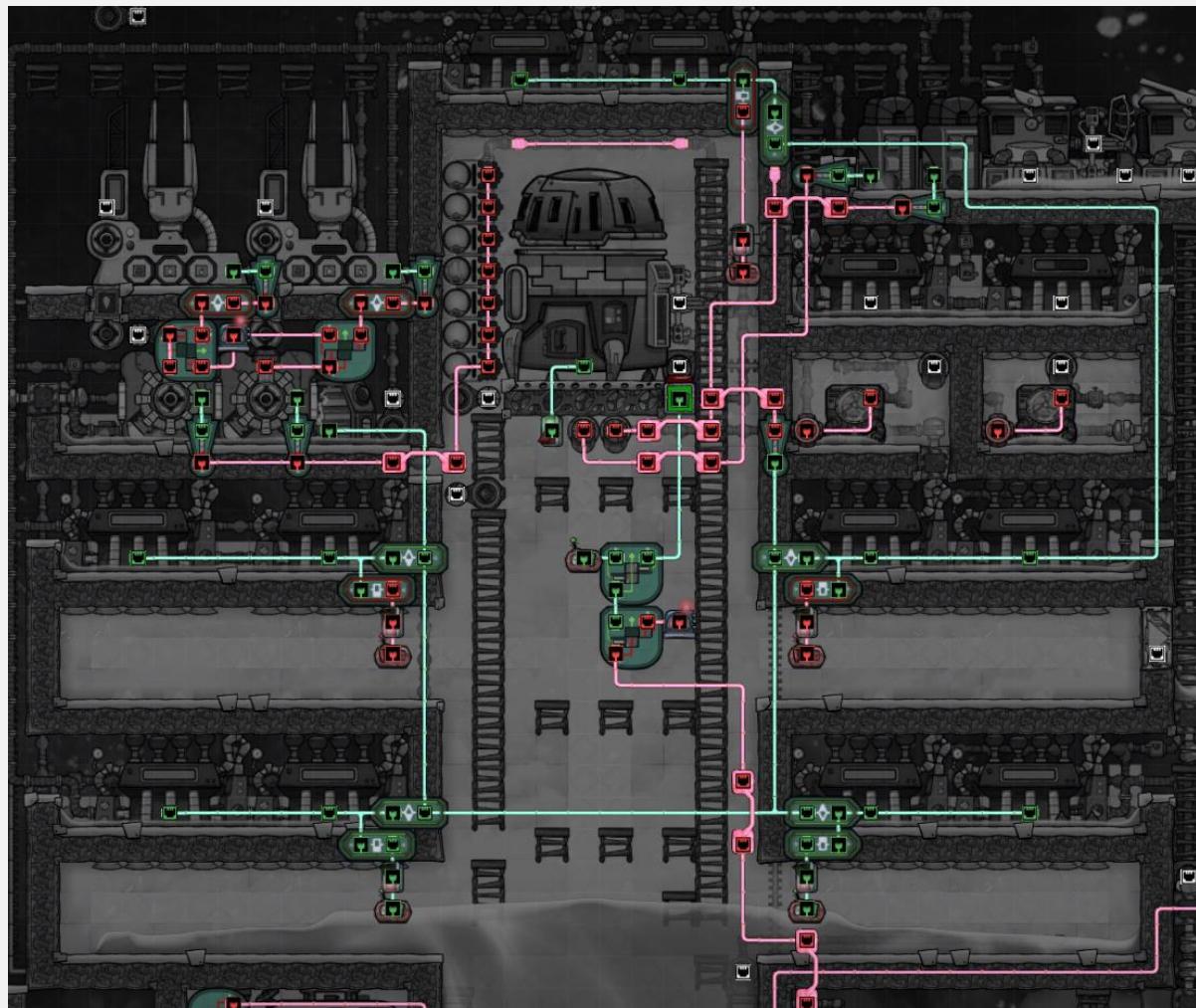


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In the long term, I also want to convert Svalbard into a rocketry hub.



Design-wise though, both the reactor and habitation station are not very good. I tried making a nuclear reactor with automation that would run its turbines only when required. Turns out that's a terrible idea for a number of reasons –

Firstly turbine control does nothing for us in terms of conserving fuel. Restricting fuel to a reactor will decrease thermal output, but it will not change the consumption rate, making this a terrible deal, unless you really want a sub-par output in order to build a smaller reactor.

Secondly, Stagnant water in pipes, even insulated pipes will burst at some point or another, and I had to deal with a lot of that over the next few hundred cycles. There are ways to prevent this, but again, not worth the effort

The best way to run a reactor would be to have a system that runs the reactor to a certain temperature and shuts off the fuel supply till it comes back down to a lower temperature. But full disclosure I do none of this even till cycle 1800 as there was just no need for it.



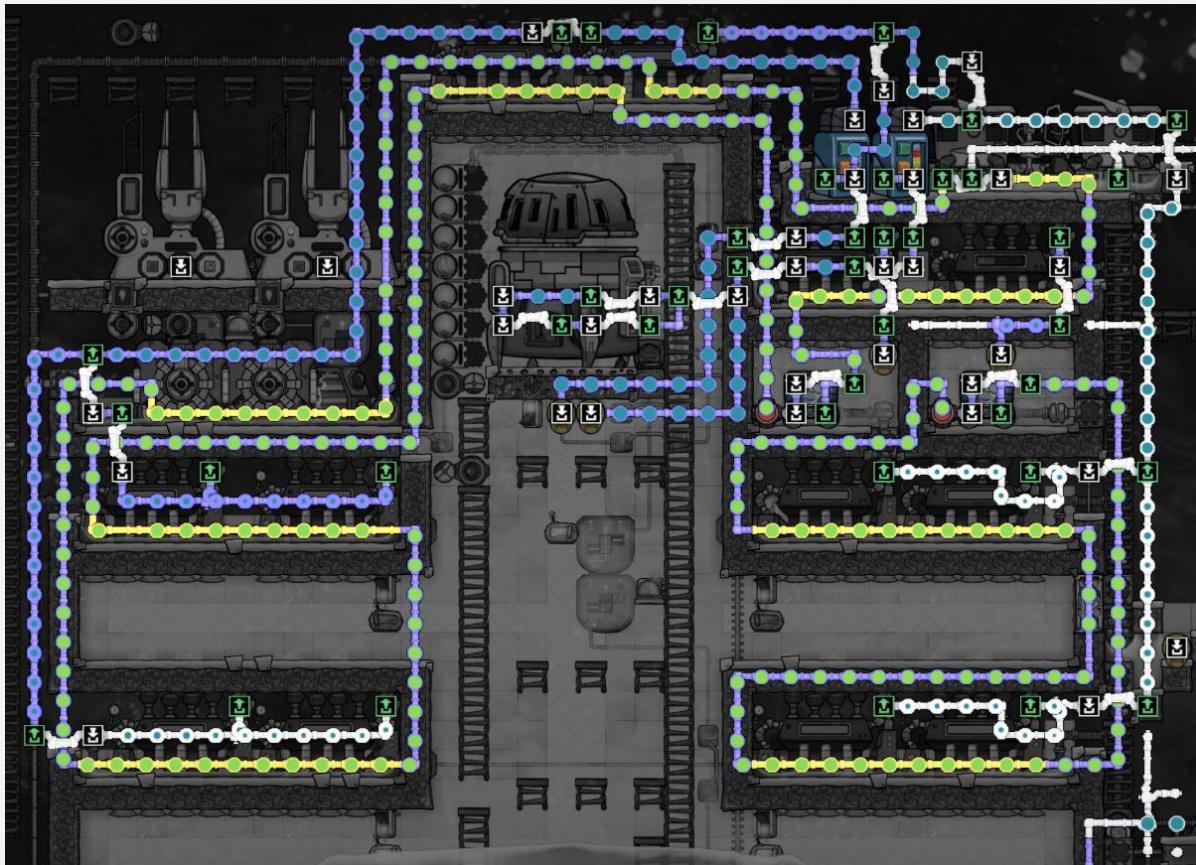
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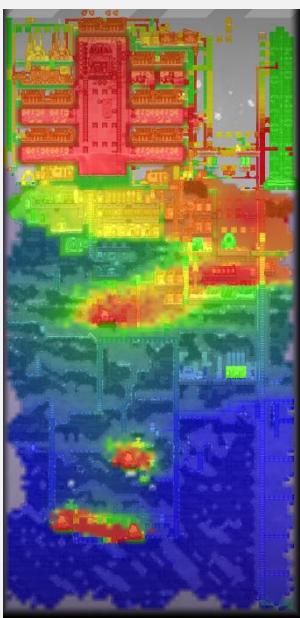
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Maybe one day. In a few hundred cycles I remove all automation restrictions and just let the reactor run normally.



The habitation station is badly placed and frankly unnecessary. It's destined to spend a lot of time empty before I finally have to decommission it because it's too hot for dupes to live in. All in all a total waste of time.



How on earth did Svalbard get too hot to live on, did you ask? Well, while Svalbard is cold now, it doesn't have any sources of cold, such as geysers etc. It does have volcanos, that produce a lot of heat. Ultimately all the iron that we're producing will melt the entire planet down to nothing.

But that will take hundreds of cycles. For now, we still have a nice cosy iceball to live on. Keep in mind that frequent exposure to outer space will give your dupes some level of radiation sickness. Either give them frequent toilet breaks (we have discussed this in previous chapters) or build your world such that it limits their exposure.



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8) Florida Man –

We landed on a new planet and found experiment 52B, a plant that I know can eat food and produce resin as a result. We have no need for it yet, but we will return to this strange swampy land that we will henceforth call Florida.



Careful though, the tree is deadly and will incapacitate your dupes if you are not careful.

9) Base Check-

The following tech was researched



Monuments technology

And with this, all our research is done. I can decommission all the research stations going forward.



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10) Comparison To The StormFather's Guide to the Galaxy-



We have completely deviated from where we were at the same point in SGG and for the better. Our gameplay is much more advanced, and we are a lot more advanced as far as space is concerned

Going forward, I will drop the comparisons to SGG as they are no longer relevant. We're on a completely different path here.



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Author's Note –

Thank you for taking the time to check out Project Shatterstar. I hope this helps you to up your game. Each episode will be updated when necessary, so do keep an eye on the change history.

This series is a labour of love and an attempt to create quality written content. It does take up a lot of effort, though, so If you do like the work, please share and recommend it actively. You can also support me directly if you are willing and able.

There is always scope for improvement and new perspectives, so I encourage you to reach out to me if you have any specific thoughts on the work, be it good, bad or ugly. Reddit is the best way to get a hold of me. Do follow me there to keep up to date with the latest on what I do.

Check out the 'Stormfather's Guide to the Galaxy' and 'Academy Not Included', both of which are series that I built on Reddit. SGG is now scrapped, thanks to some complications when Spaced Out came out of Beta. But ANI will continue in some form or another.

Reddit is also the perfect place to point out any errors in the file. Due credit will be given to those who find errors or provide feedback that is incorporated into the file.

To check out any past or future work, or to support or follow me, do check out the following link-

<https://linktr.ee/Stormfather>

Until next time



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Change History –

Date	Version	Change	Credits
16 th April '23	0	New Release	-



StormFather