PROJECT SHATTERSTAR

VOLUME 1 OF GUIDE TO THE **ONI**-VERSE

OXYGEN NOT INCLUDED

SPACED OUT!

By- the stormfather

CHAPTER 5 : Food, Oxygen and Atmosuits

Cycle 70 (Main Planet)

Cycle 120 (Main Planet)

A few, but highly significant changes have taken place over the last 80+ cycles. We now have a strong foundation for our midgame.

Highlights :

- We build the Rodriguez oxygen maker
- We set up a metal refinery
- We add atmosuit systems on 2 planets
- We build an integrated storage + pantry

https://linktr.ee/Stormfather

PROJECT SHATTERSTAR

CH 5: Food, Oxygen and Atmosuits

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.

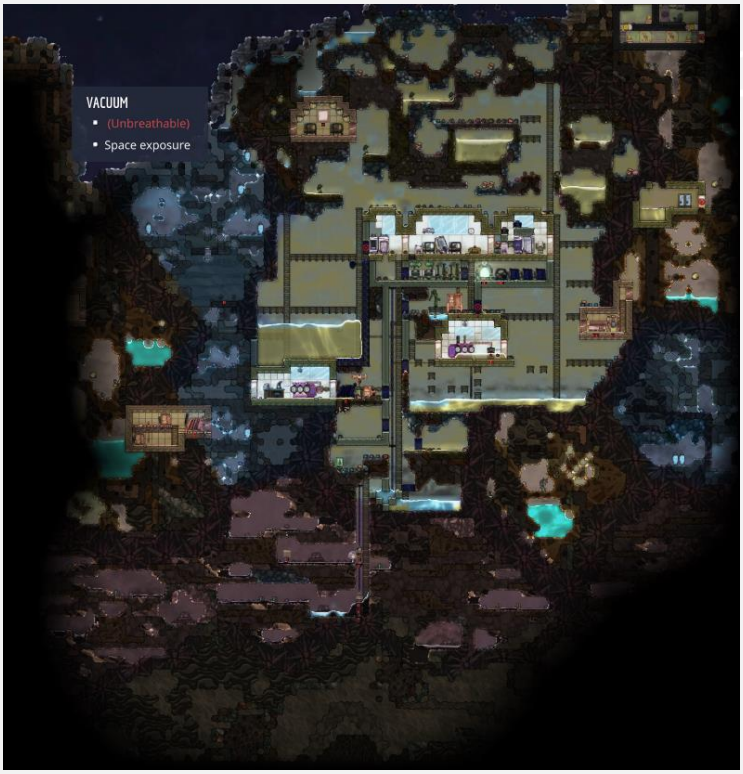
The series will use the following mods. These are quality of life mods and do not affect core gameplay

- Wounded go to Med bed
- Per-planetoid materials
- Blueprints fixed
- Pliers 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

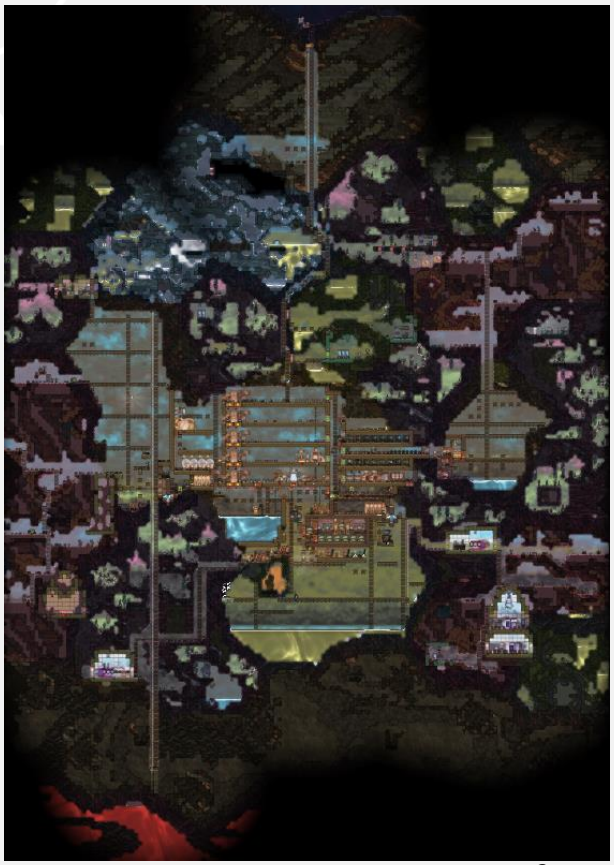
Game Coordinates – ‘SNDST-C-360860549-0’

The Starmap

Petra



Neo Terra



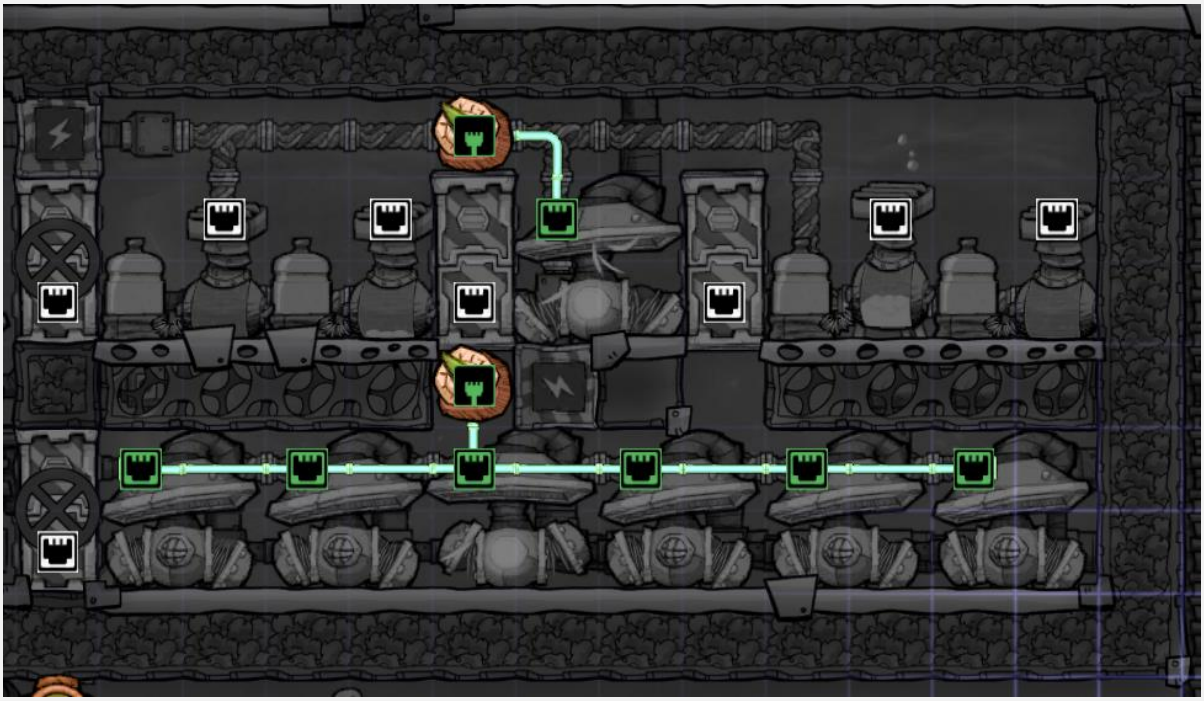
1) Meet Mr Rodriguez -

The Rodriguez is the gold standard when it comes to oxygen production. Named after its inventor, it strikes a good balance between practicality and efficiency. I feel no shame in saying that I have spent plenty of time trying to develop a better system and have failed consistently. If it ain't broke, don't fix it, I guess.

I don't really know what the OG Rodriguez build was like, as every person has their own spin on it. I was introduced to the concept via Francis John's videos, but my build is my own… with modifications and variations that make sense to me. This is the standardized build I now use in all my games, but feel free to add your own masala (literally means 'spice') to it.

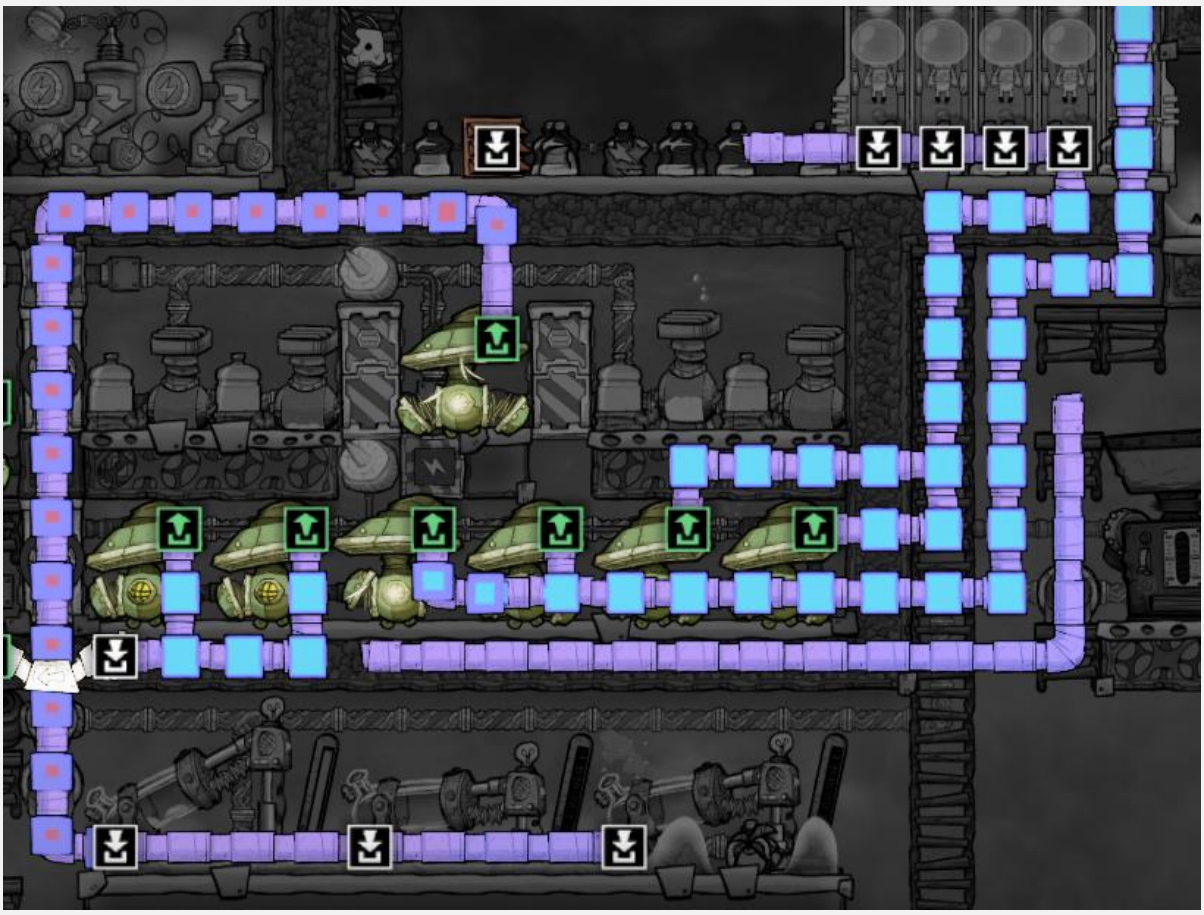
When an electrolyzer splits water into hydrogen and oxygen, the two gases automatically separate into layers due to the difference in their density. The Rodriguez uses this concept to separate out the oxygen and hydrogen without gas filters. It achieves this feat in a very compact build and with minimal automation.

The ratio of oxygen to hydrogen by weight is 8:1. The Rodriguez is designed with a ratio of 6:1 (with 6 oxygen pumps for every hydrogen pump) to provide some slack and buffer. All pumps are attached to an atmosensor. The hydrogen pump only turns on when the pressure exceeds 250 grams, and the oxygen exceeds 450 grams. This asymmetry ensures that hydrogen is removed on a priority basis and does not slip into the oxygen supply by mistake.



The above setup allows for blockages in the oxygen pipe but not in the hydrogen pipe. Through consistent testing, I've found that the build usually does not break when the output oxygen pipes are blocked or when the water supply to the electrolyzers is cut. However, any blockage in the hydrogen pipe is a sure recipe for disaster. So make sure that the hydrogen pipe is NEVER blocked, or your gases will mix and break all your buildings.

The gases are all mixed-up on starting up the build, and it will take some time to bring it to equilibrium, where the 'hydrogen box' and at least the top layer of gas is hydrogen, and the rest is oxygen. Once this equilibrium is reached, blocking the hydrogen pipe is the only real way to break it. If you are a bit paranoid, you can use gas filters to ensure that the outputs are clean, but that is unnecessary, in my opinion.



The result is a build that can supply almost three full oxygen pipes while also producing enough hydrogen to more or less power itself. This quirk of ONI mechanics is not in line with the real world and can be exploited in the game.

There are variations of the oxygen maker called SPOMs (Self-Powered Oxygen Makers). Such builds are not connected to the main grid but use the produced hydrogen to power itself (with batteries to store emergency power and such).

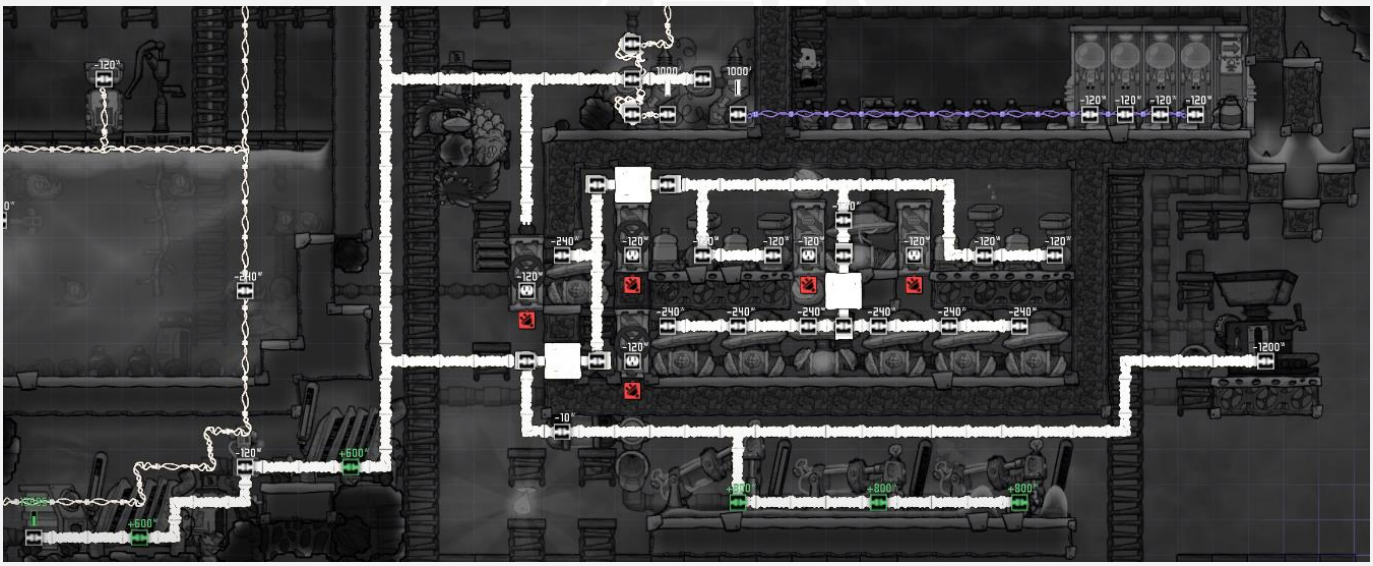
Personally, I'm not a fan of self-powered or isolated systems. I like integrating everything as much as possible, where either everything works or nothing works. But this is an individual decision, and SPOMs are a valid playstyle if you can deal with their quirks. In my build, the oxygen maker will take power from the main grid, and the hydrogen it produces will be burned to provide power to the main grid.

2) Heat and electricity -

This is also a good time to discuss heat generation and the electrical grid, using the Rodriguez as an example. While the build may be producing enough power to pay for itself, it's still a power-hungry build with 4 electrolyzers and 7 gas pumps. Thus far, we have been using simple wiring, which is only rated for 1000W. These buildings will take much more than that, meaning we need to upgrade the wiring to heavy watt wires.

These wires take more metal ore, have a décor debuff and cannot pass through buildings without the use of special joint plates. On the positive side, they can support 20,000 W of power, making them ideal.

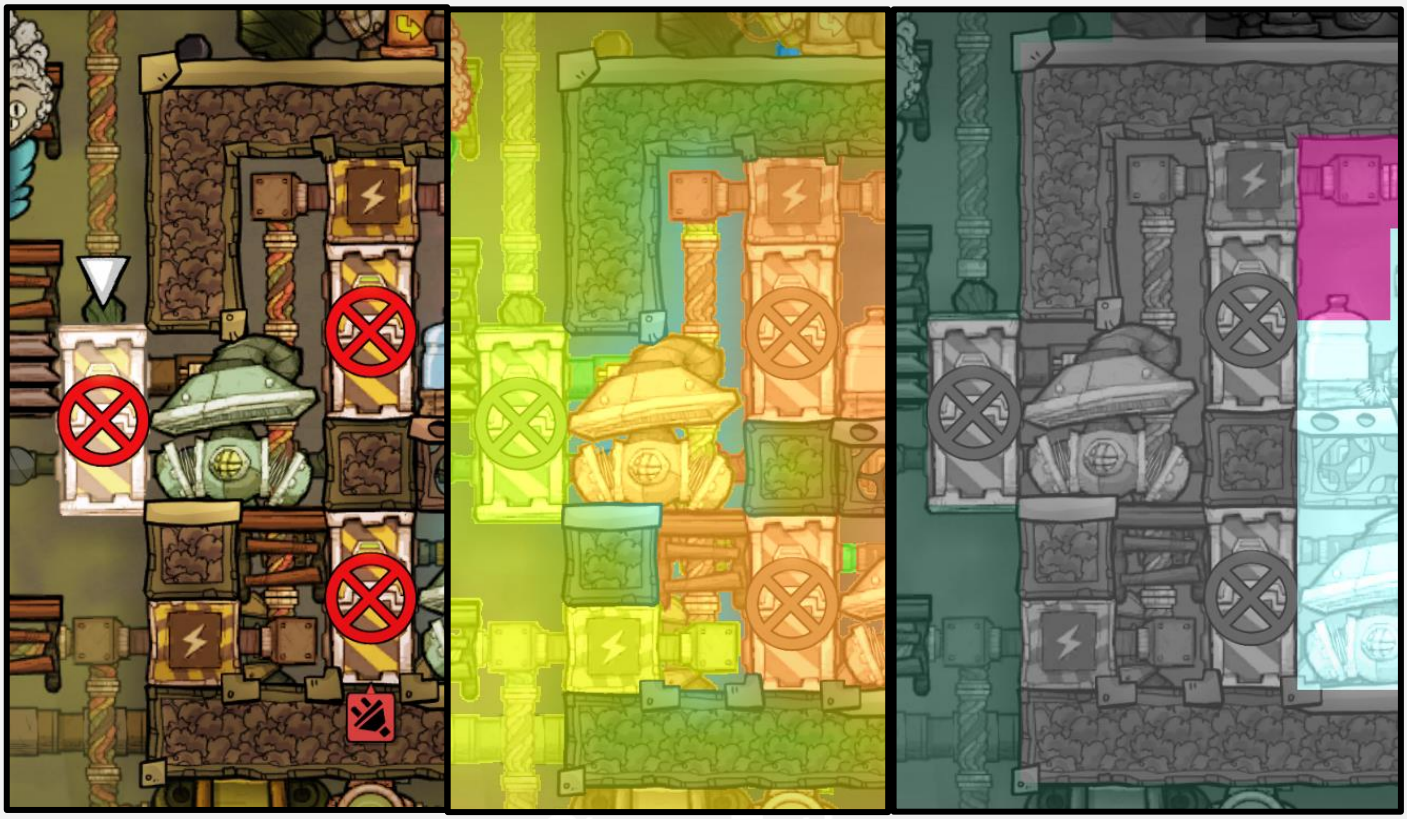
When using a heavy watt grid, the electricity can be used in 2 ways. You can connect the buildings to the grid directly or connect them to a transformer, which will take a heavy watt input and output a maximum of 1000W, which can be connected to a wire. There is no advantage to connecting a heavy watt wire directly to a regular wire as any power above 1000W will overload the regular wire.



There is a time and place to use transformers, but they take up metal ore and produce heat, meaning I try to use the heavy watt wire directly whenever possible. I will be using transformers to power my main base, but the Rodriguez will be connected directly to the main power spine.

This presents another problem- heat leakage. See, insulated tiles are not completely resistant to heat but are pretty good at isolating heat in general. Joint plates, on the other

hand, are very heat-conductive. The Rodriguez will produce heat over time which will leak into the outside world via the joint plate. If we add some cooling to the build, that too will leak.



The solution is to use what I call a 'vacuum joint'. See, the heat conduction does not happen via the wire itself but rather by the interaction between a joint plate and the air around it. So if you have two joint plates and a vacuum between them, heat from one joint plate will not go to the other.

With this concept in mind, we build a little chamber to the side of the Rodriguez, where the air can be pumped out. Once the chamber is in vacuum, we have a build that is connected to the grid directly but will not exchange any heat with the surroundings - the best of both worlds.

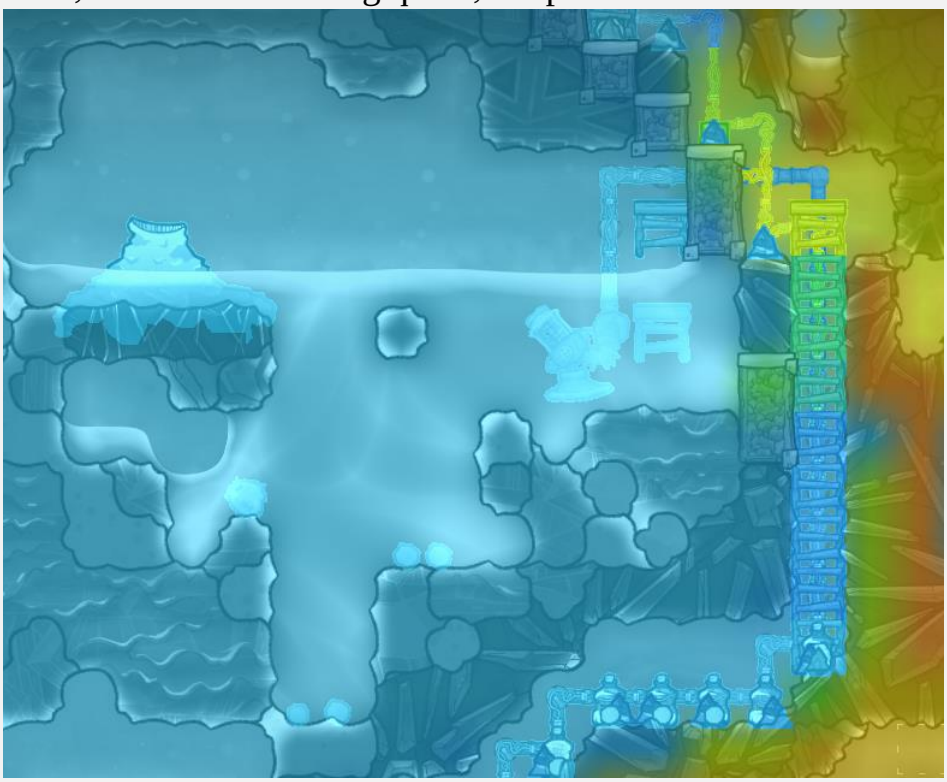
Full disclosure, the vacuum joint is not strictly necessary, and you can easily run a few hundred cycles without it. But it's a cool feature (pardon the pun), and it doesn't take too much time to set up, so why not?

3) Cool Oxygen -

Yes, we're still talking about oxygen, but trust me… this is important.

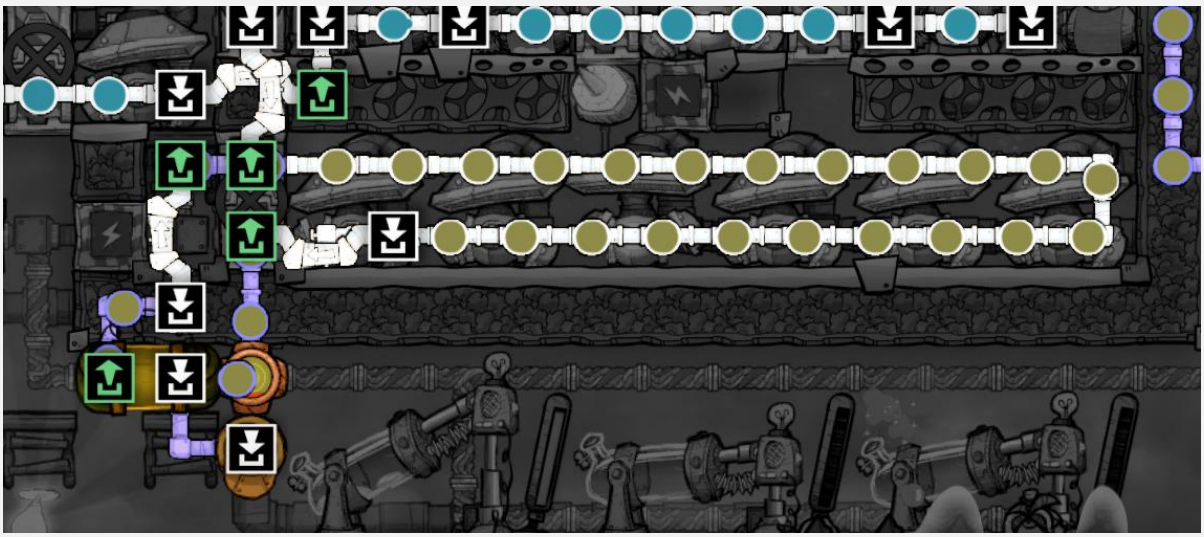
The Rodriguez will give you oxygen, but the temperature of the oxygen will climb over time, especially because we have built the system with a vacuum joint and insulated tiles. This means that the base will overheat, potentially even killing your dupes over time. If you grow plants, this will become a nightmare much, much sooner, with entire crops failing.

When it comes to heat, prevention is better than cure. You'll find it much easier to just cool your oxygen before distribution rather than cooling your base later. There are fancy and advanced ways to cool oxygen, but that's not something for the early game. Right now, we need something quick, simple and effective.



Source of cold coolant

Usually, I build my Rodriguez in an ice biome, relying on the ambient temperature to keep my oxygen cold. But this time, I used a different, more effective method. On the top of the map, I found 2 geysers which are a perfect renewable coolant. I ran an insulated pipe from the source down to the Rodriguez and added a simple automation loop. If the pipe liquid is above 30 degrees, it gets vented out of the loop, and fresh liquid is added. If it's less than 30 degrees, it gets recirculated. You can set the limit to whatever temperature you like.



This is not a perfect system. For one thing, the loop also cools the hydrogen to an extent, which is a waste of cooling. For another, if the cooling liquid runs out, the oxygen will heat up.

But for now, this is more than enough. Note that I have built the loop with regular pipes and not radiant pipes because I don't have intense cooling needs. But if you are growing plants in your core base, I suggest that you invest the refined metal and make radiant pipes instead.

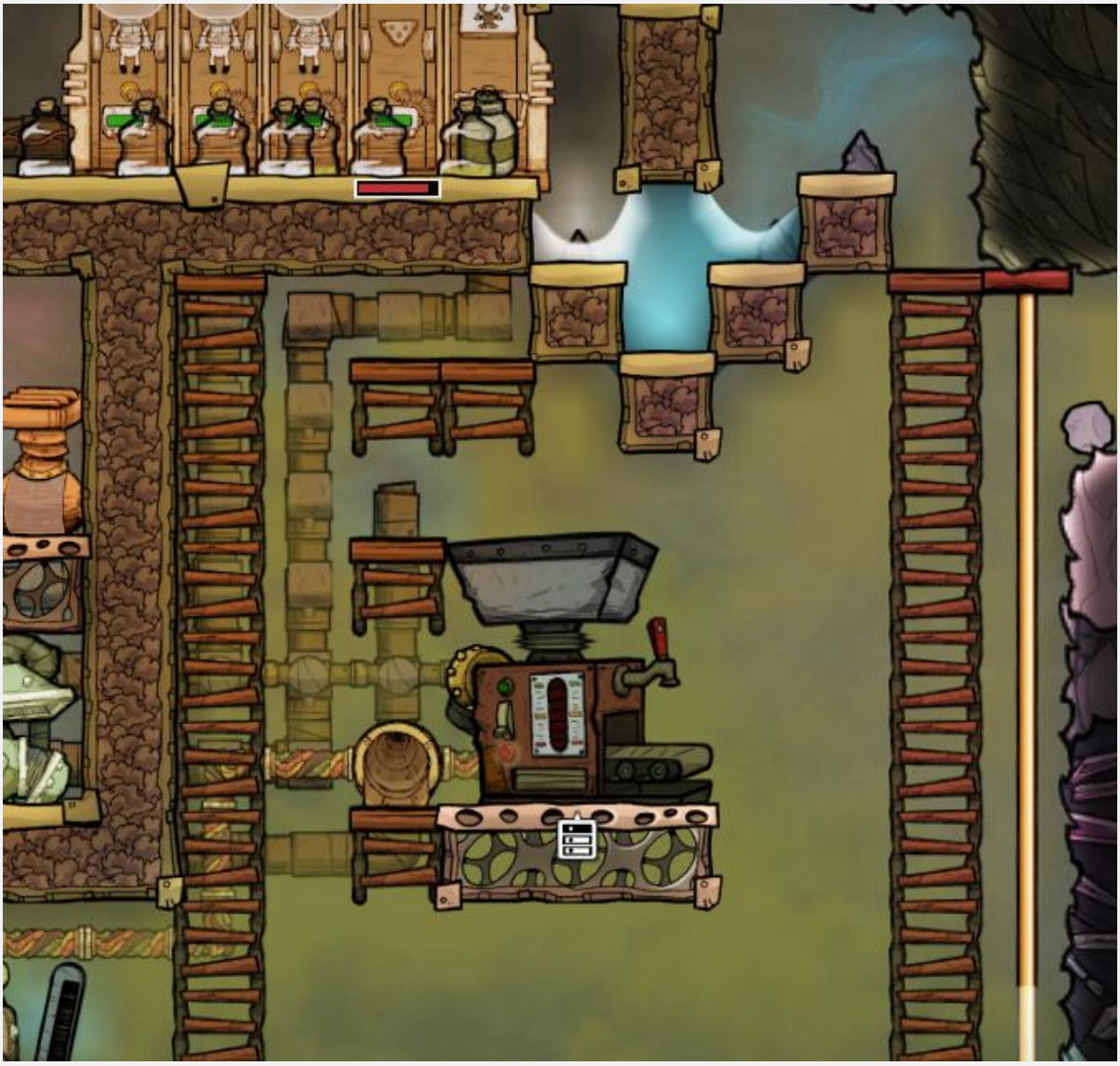
And there we have it. 3 pipes of cooled oxygen. We are currently using 2 for atmosuits and one for filling up the core base with oxygen.

4) Speaking of Refined Metal –

As mentioned in the earlier chapters, the starting map has not been kind to us. Neo Terra has absolutely no metal volcanos, which is an absolute bummer. We can see from the star map that Chernobyl has some metal volcanos but no iron.

Refining ore to metal is not ideal because I need the ore for my conveyer rail system later in the game. Also, refined metal becomes much more readily available than ore as the game progresses. So we have to strike a balance, producing only enough refined metal to meet our requirements.

It's time to stop using the rock crusher and build a metal refinery to refine our metals. The advantage is that a metal refinery converts 100% of the ore to metal. The disadvantage is that it needs a coolant.



The refinery is in close proximity to the atmosuit docks to allow for easy access.

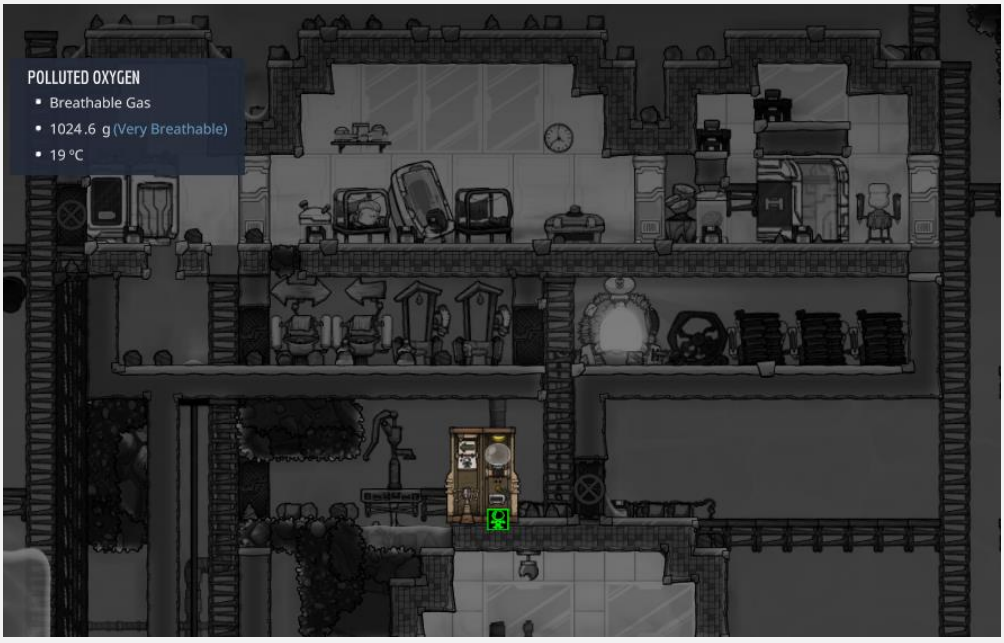
We just set up a coolant line for the Rodriguez, so taking a pipe from it to power our refinery is a pretty simple task. And just like that, we have a new refinery set up. We will mostly use it to refine copper ore for now.

5) Suit Up -

Most of our newly-refined metal has gone into making atmosuits and atmodocks. The primary reason for rushing the Rodriguez and the atmosuits was to be able to set up an atmosuit network on Petra. But now that we have the tech available, we might as well implement it on Neo Terra.

Neo Terra

Atmosuits allow you to supply oxygen to only a small core base where your duplicants live, leaving the rest of the map with whatever gas it has. This will let me dig out whatever part of the map I want without worry.



Petra

I seal off various parts of the core base, leaving only 2 points of entry and exit, where I add atmosuits and a water lock to prevent the movement of gases. You can have however many entry/exit points you want, but in my opinion, fewer is better.

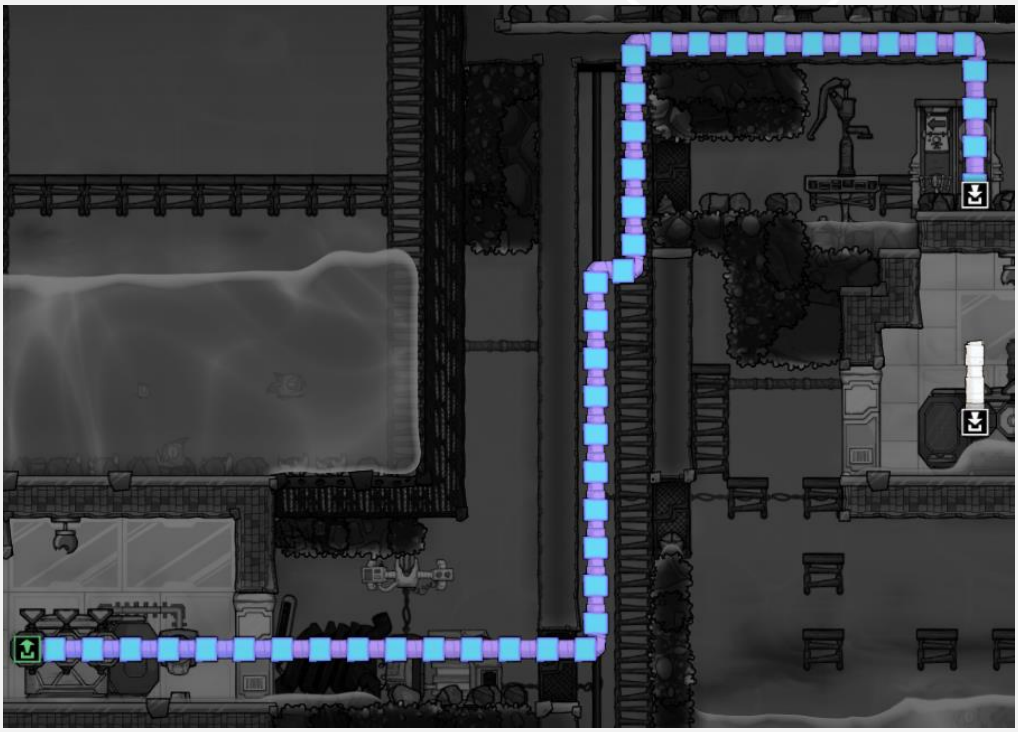
Also, I would recommend changing the atmosuit setting from always allowed to 'vacancy only'. This setting will only let duplicants through if there are empty docks available.

Word of caution with atmosuits, though – they give your duplicants an athletics debuff of -6. I typically use door permissions to allow only duplicants with an athletics score greater than 6 to use the atmosuit docks. How we can get them to 6 is something we will discuss later.

6) Teleporters Active -

As you might have noticed, our material teleporters are active and functional. These teleporters are a godsend, integrating the 2 planets on a level that is impossible with other planets.

For example, Petra has crude oil but no lava to heat it to petroleum or renewable water to pump into wells. On the other hand, Neo Terra has lava and plenty of water, but no crude. The teleporters allow me to transport 10kg/s of liquid in both directions. So I can send water to Petra and get crude oil from it. Easy.



The teleporters also allow us to use a single Rodriguez for both planets.

7) Barbeque and Pantry-

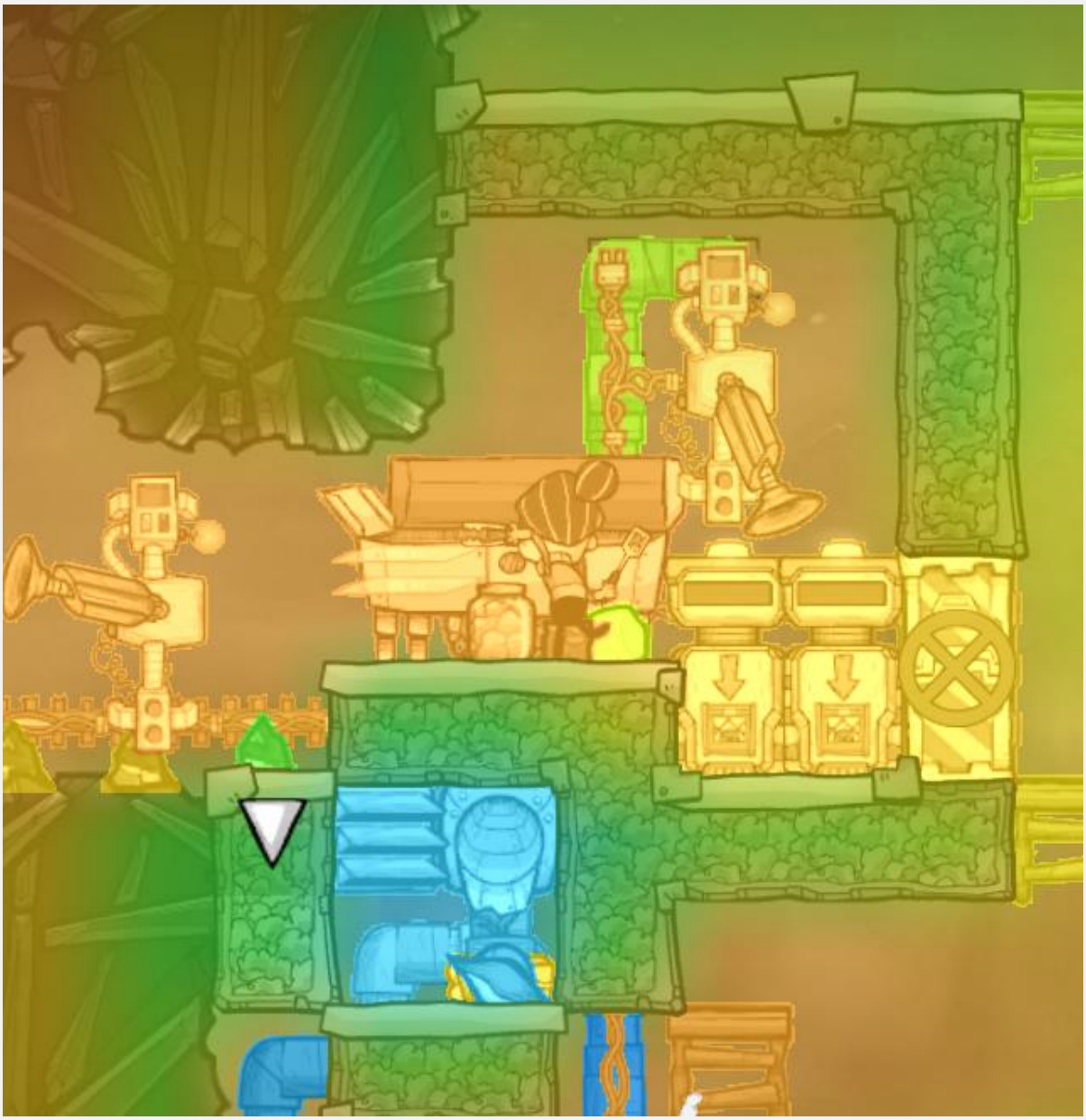
A major improvement from the last chapter is that food shortage is a thing of the past. Our ranches are in full swing, meaning that we have more than enough meat to go around. So much so that we've even dug up all that mealwood we had planted.

But meat has some disadvantages. For one thing, meat is not that great a food item. The morale bonus is low, and the amount of calories is average at best. This is easy to fix, though. Simply cooking the meat into barbeque gives us a +8 morale and a pretty high calorie count. In my previous games, I have used barbeque as my food source up to the super late game, and I believe it has the highest Reward to effort ratio.

The second problem is storage. Because meat production is a time-intensive process, It's very hard to ramp up production on short notice. As such, it makes sense to produce

more than required and build up a buffer, which can be used up in case of a catastrophe, or in the event you are switching your ranch to a different type of critter. Building up to something like 40 days of food is a good idea, in my view.

This means that having an infinite storage system is absolutely essential. We've discussed the basics of food storage mechanics in Chapter 2, and here, we will be implementing it. Not only will we be storing food in CO2, we will also be dropping its temperature below -18 degrees.



It's not that hard to make cold storage early in the game. Here is the configuration I came up with. We have a closed box of CO2, which is cooled by a gas loop connected to a thermos regulator. Ideally, you should be using hydrogen in the loop, but oxygen will do

when hydrogen is hard to get your hands on. Just make sure not to use CO2 or chlorine because they will freeze in the pipes.

You need to create a closed box of insulated tiles and vacuum out all the air, replacing it with CO2. The loop in itself is a simple infinite loop, one of the most core concepts in ONI. My Academy Not Included video on Pipe mechanics should give you some insight into the topic –

https://www.reddit.com/r/Oxygennotincluded/comments/pf4ukw/academy_not_included_1_the_basics_of_pipe_and/?utm_source=share&utm_medium=web2x&context=3

I strongly recommend you spend some time understanding how these loops work and on pipe flow and priority in general. These concepts will help for gas and liquid pipes, as well as for conveyer rails.

In short, any gas first goes to a sensor that checks its temperature. If the temp is higher than the target temperature, it gets sent to the thermoregulator for cooling. If not, it gets bypassed into the loop. This keeps the gas flowing even when the gas is below the target temperature.

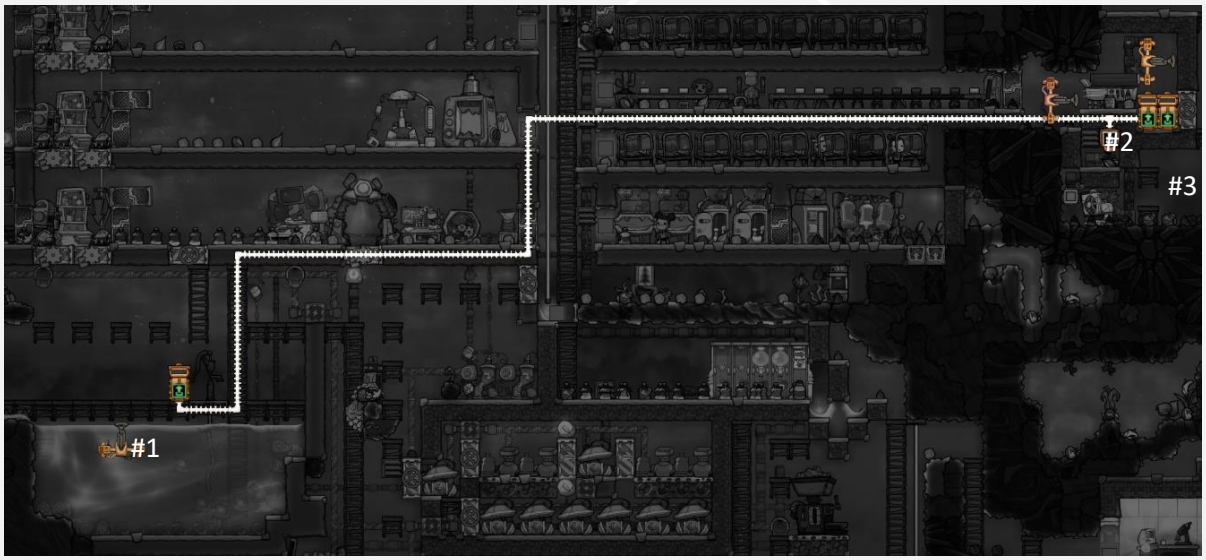
I typically keep a target temperature between -40 and -45 degrees. Whatever temperature you keep, Make sure the CO2 is below -18 degrees, but don't let it fall below -48.15 because this would cause it to liquify, and food gets spoiled in liquid CO2.

To be very clear – this setup is not ideal. There is no heat deletion system, and oxygen is not the best gas to use. But it works, and that's all I need at the moment.

8) Food Delivery and Retrieval –

Now let's address how food flows through our system. Now that the system is ready and I have enough meat production, my duplicants will only be allowed to eat barbeque on Neo Terra, with all other foods being disallowed in the consumables tab. This ensures the duplicants get the highest morale bonus while also streamlining the distribution process. The disadvantage is that any shortage of barbeque will spell disaster.

3 conveyer loaders drop food into the cold storage. To take food out of the storage, we use an autosweeper.



The 3 loaders have different purposes-

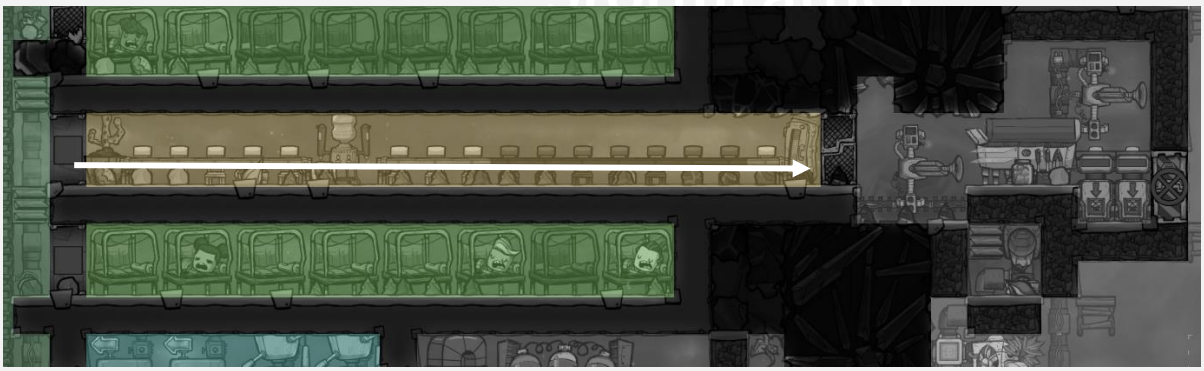
- The first loader is located at the evolution pit. Its purpose is to pick up all the newly 'evolved' meat and drop it into the cold storage. It is loaded by an autosweeper
- The second loader picks up the cooked food that the grill drops and sends it into the cold storage. It is loaded by autosweeper.
- The third loader allows any food randomly found on the map to be picked up and dropped into storage. It is set to be loaded by duplicants.

Taking food out is an easier task for now because we are currently only catering to Neo Terra. We use the 'diagonal trick', where an autosweeper can access points that are in its diagonal path. There was a time when duplicants could build diagonally too. While duplicants can no longer use the diagonal trick, it's an extremely useful mechanic for autosweepers.

The storage limit of the fridge is set at 1 kg. If you have duplicants working in large shifts, this might be inadequate. Because I use a different shift for every duplicant, 1 kg is more than enough for me.

The logic here is that the 1 kg of barbeque is available to the duplicants to pick up and eat. The autosweeper will automatically refill any food that the duplicants take. The system isn't perfect, though. Duplicants can eat barbeque in fractions of a kg and are programmed to pick up the freshest food they have access to, making a FIFO (First In, First Out) system impossible to implement. As a result, a small amount of barbeque will rot every now and then. This is an acceptable loss, given that the quantity is small and the occurrence is rare.

The Great Hall design does have a feature that prevents a much larger wastage of food, a feature that I came up with myself and am very proud of. If you've been playing ONI for any length of time, you know that duplicants are idiots that love dropping things. You might have even noticed a bunch of perfectly good food lying on the floor of your great hall, which often gets wasted.



The simplest way to counter this is to build your great hall with only one entrance and have your food source on the other side of the hall. Duplicants are designed to pick up the food that is closest to them. In such a configuration, duplicants will pick up and eat any food they find on the floor first, going to the refrigerator only if the floor has no food on it. This ensures that no food goes to waste needlessly.

9) Beware of Loops –

I'm not talking about the liquid loops here. I'm talking about logistics loops. For example, let's assume loader No. 3 is set at priority 8 and has barbeque as one of the allowed items. Let us also assume that the fridge has a priority of 5.

How the storage system works is that things move from lower priority to higher priority. Since Loader No. 3 is enabled for manual use, duplicants will come to pick up barbeque from the fridge and drop it at the loader. The barbeque will then be dropped into cold storage, from where the autosweeper will again pick it up and dump it in the fridge. This loop will continue forever.

Such loops are unproductive and a massive waste of duplicant time. They also make the material unavailable to dupes that actually need them. Such loops are invisible base killers that will greatly hamper your progress if you are not careful. I can assure you that logistics loops are a common mistake that even experienced players like myself are guilty of.

10) Base Check –

The age of the atmosuits has begun, and with that, the entry into a new stage of the game. I wouldn't say we're in the midgame just yet….but this is a solid step in the right direction.

Petra is still a mess. The base isn't sealed, and the air is polluted, but that's fine. We only have one dupe in there, and they'll manage.

The following tech was researched –

- Solid transport
- HVAC
- Air systems
- Notification systems
- Celestial detection
- Liquid tuning
- Smelting
- Advanced combustion
- Plastic manufacturing
- Artificial friends
- Robotic tools
- Fine art
- High culture
- Advanced automation
- Liquid-based refinement
- Flow redirection
- Liquid distribution
- Advanced gas flow
- Gas distribution
- Parallel automation
- Food repurposing
- Computing

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

For the first time, I really feel we're behind now compared to our run in SGG. There we had already built our Rodriguez by cycle 75, had tamed a hydrogen vent by cycle 110 and had even had plastic by cycle 125. We can even see that the planet is visibly more dug up in SGG than in our current playthrough.

Does that mean I should abandon this run and start over? Of course not. It's important to remember that ONI is not a competition. Different games, different goals, different rules and different results.

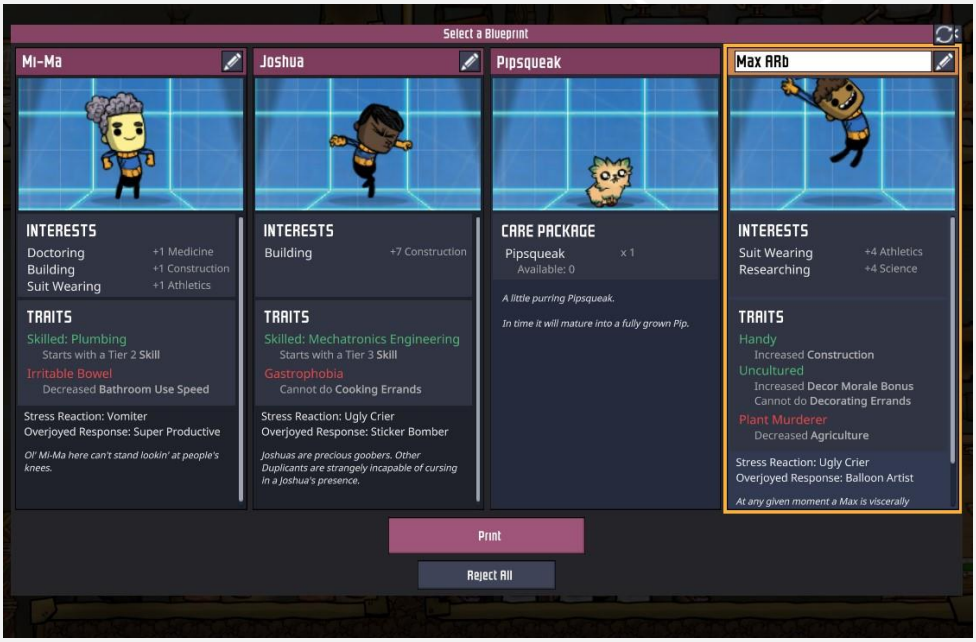
For example, we have a presence on 2 planets and have already explored space, something we had not started yet in SGG. But from now on, our progress will vary wildly and diverge completely.

But my aim in showing the comparison with my previous playthrough is not to constantly drive home the fact that we aren't doing well. It is to demonstrate (hopefully) that by cycle 1000, those small delays and bumps in the early game mean nothing because you end up in the same place. Let's see how that goes.

In SGG, my next priority was a permanent refinery, followed by a petroleum boiler. I'm skipping the permanent refinery and going straight for the petroleum this time. I won't have much steel to refine for a really long time anyway, so there's no point in upgrading the setup.

12) Meet the duplicants-

We've only picked up one dupe in this chapter. I usually pick more, but I'm trying to recruit fewer duplicants in this game. Let's see how well that goes.



Suit wearing and researcher doesn't make him a superduplicant, but those are solid traits in my eyes.

Increased construction is not too bad either.

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

Change History –

Date	Version	Change	Credits
2nd May '22	0	New Release	-
2nd May '22	0	Spell-check and editing	diet_gingerale