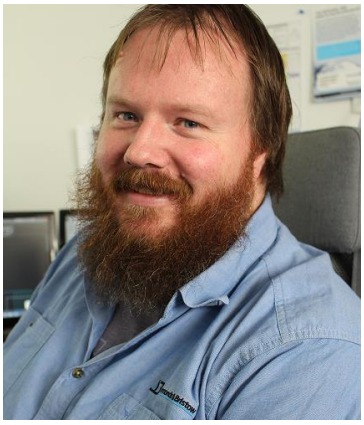
Simmonds & Bristow Pty Ltd
The Regional and Remote Water Specialist

TALKS WITH TERRY



Restart - Sewage Treatment Plants
Restart - Water Treatment Plants

- So you're coming out of a period of low flows and need to get your water assets up to scratch?
- Trying to get your STP ready for a big influx?
- If you're not used to having to wind your process up-and-down, then it might seem a bit daunting, or maybe it looks super easy?

Well, if it sounds hard, listen up; if it seems easy, cool, let me know how you go.

Okay, so, yeah, it's been a while huh?

Yeah totally. Let's have a bit of a chat!

Okay, what did we want to discuss?

Well, there's been a fair bit of stuff going on lately with the pandemic and its associated affects, and we've put out some info about how to run a treatment plant slowly. With everything taking off again, let's have a bit of a chat about how to get your plants up and running again. How's that sound?

Yeah good. Let's do that. So… where do we start?

Let's start with the more difficult one: **Sewage Treatment Plants.**

Choice.

So, how you go about restarting your STP depends on whether it was ramped down to operate at low flows, or if it needed to be shut down completely.

If you've ramped your process down, then it's mainly a process of re-building your biomass to accommodate higher loads.

If the process has been shut-down completely, or complications during the low flow period have resulted in significant biomass die-back, then the process is a little more involved as you now need to re-grow (or acquire) new sludge (biomass).

Ok, so, we ramped our process down; how do we go about starting it up? Can we not just throw it straight back online? It's not like we turned it off or anything

Yeah, see the main problem here is that running your treatment plant to deal with low flows generally involves letting part of the biomass die off. This allows you to run your plant at a minimal feeding rate, which helps to save money on process feeding.

This minimal biomass, however, tends to not respond well to a shock load or a big step-change in influent quantity. Your plant will most likely fail to achieve its effluent license limits, typically for Nitrogen, and you can even run the risk of washing part of the remaining biomass out of your process if you get a large enough hydraulic surge.

Oh really? Damn, that's no good.

Yeah, right? So to make sure it works, you normally need to pre-load the treatment plant to build up sufficient sludge to accommodate the increase in load.

Right, sounds simple enough… so… how do we do that exactly?

Okay, so, as we mentioned, you've probably let part of your sludge die back to make sure your plant operates relatively stabily. You now need to build your sludge back up so that you're prepared for the higher loads (both in terms of flow and pollutants) that will hit your plant.

Doing this is generally pretty simple; just slowly add more of the same food you've been using to keep your plant ticking over. Try to do this slowly, over a few weeks, as this allows you to control how fast you ramp your process up, so you can make sure that the additional food is being processed successfully before you run into problems.

On that note, make sure you don't ramp it too fast, or may end up causing your plant to go out of compliance; give your sludge time to acclimatise before you hit it too hard.

Oh, that sounds easy enough, but from what you're saying, it's not good if we add too much straight up… any easy way we can work out what we're supposed to be doing?

Yeah you're right there; add too much food and you might just cause yourself to go non-compliant.

The simplest way is to estimate the required carbon dose you need to get to is to use the the design or operational F:M (food to microorganism) ratio for your plant and its design biomass (MLSS) concentration. Take a look at the calculator we put together for helping out with feeding plants at low flows, and you'll find it can be useful helping you work out your dosing rates and loadings for this.

Try this Calculator for your feeding regime: ☞ Simmonds & Bristow STP Feeding Tool

Sweet, what if we don't know our target F: M ratio?

Your operators will usually have an idea of what your target F:M ratio is. If not, you can often find it in the design details for your treatment plant, or the Operation & Maintenance manuals.

If you don't know your F:M ratio, then typically most extended aeration activated sludge (EA-AS) plants run an F:M ratio of about 0.05 kgBOD/kgMLSS/day (mixed liquor suspended solids).

Working it out for processes like Trickling Filters is much harder. If we're interested in that, we can have a chat another time.

Oh ok, found it. Can you give me any more detail on how to use it?

Okay, so, background; the F:M ratio provides an indication as to how much food (BOD) you have, compared to the amount of biomass (MLSS) at the treatment plant's design point. It's important as it influences pollutant removal, especially nitrogen, and having the wrong F:M will often result in the treatment plant's performance being impacted.

The F:M is usually calculated simply by dividng the available food, calculated based upon your influent sewge BOD concentration and flow, by your biomass, calculated based upon your MLSS concentration and reactor volume.

However we want to flip this around, and use the ratio to calculate how much food we need for a given MLSS. That can be done simly by multiplying the biomass by the F:M ratio. This gives you a BOD target in kg/day.

You can work out your biomass by simply multiplying your MLSS (in mg/L) by the bioreactor volume and converting it to kg. Be careful with units; if you use m3 (or kL) for your bioreactor volume you get a value in g, if you use L you'll get it in mg.

The BOD dose you worked out is the total mass of food you need for that F:M ratio. That includes any BOD present in your raw sewage, so you need to take that into account. If you don't know what your influent BOD is, you can estimate it using the number of people you have currently on site (there is some guidance in the Simmonds & Bristow STP Feeding Tool , or you can take BOD samples for a more accurate figure.
Once you know how much BOD you have in your sewage, can now work out how much material to a dose based upon how much BOD is present in your carbon source. If not, you can take a look at our previous advice for feeding your plant at low flows and the calculator for low flows.

Don't forget that you do need to taper your feeding off as your flows increase, as you will be getting more BOD in. You can do this simply as a ratio, or re-calculate how much BOD is in the raw sewage via either tests or estimating via population as we mentioned earlier.

☞***Click here to view How to Deal with Reduced Inflows into your STP***

Okay, sweet, got the food! Anything else?

Yeah, you also need to dose nutrients to make sure things grow; if you just add sugar, your plant might end up growing a bunch of filamentous bacteria, and you'll have issues settling your sludge.

Oh yeah, we're dosing stuff for nutrients now, aren't we?

Damn, right you are.

So if you're using the calculator things should be simple, but to explain; ammonia is typically dosed at about ¼ the mass of the carbon, and phosphors at about 1/10th. This roughly replicates the ratios for sewage; technically, the minimum rates you need for your biomass to survive are less, but if you dose less, you might acclimatise your biomass to lower nutrients, which will cause problems down the road.
The actual amount you need to dose will vary depending on the material you use, and you should also adjust the amount based on site observations and on-site testing results; don't stubbornly stick to your dosing plan if you see your plant going bad.

Again, take a look at our previous advice for guidance on how much DAP, Urea or Blood & Bone you might need.

☞***Click here to view How to Deal with Reduced Inflows into your STP***

Oh, nice, thanks. Okay so we've got food and nutrients sorted. Anything else we need to watch out for?

Naturally, there's always something else.

When ramping up, keep a really close eye on effluent quality and sludge settleability. An STP running on artificial food sources tends to be more fragile an ecosystem than one running on sewage, and it can be easily upset. These upsets generally translate into poor settlement, which causes loss of biomass and high TSS in the effluent, and can be a serious setback.

Any advice for fixing it?

Cutting back feeding can be an easy way to address non-compliances; if you're not dosing as much ammonia, you're much less likely to have a Total Nitrogen (TN) non-compliance. That said, the viability of this response is limited by the amount of time you have to actually stabilise your plant; you can't just not dose and say 'sweet it works' then have it crash when you finally do get increased sewage flow.

Sludge settleability issues can be addressed by a number of methods, including increasing sludge wasting rates, which is usually a good option if you're able to do so. This won't help your ramping process, but sometimes it's better to get rid of the old or poor sludge out to let the good new sludge grow.

Other options to address settleabilty include the use of micro-clay dosing (typically with bentonite or zeolite) or the use of a coagulant (such as Alum or ACH) to improve the settleability of the sludge.
Take care with Alum or ACH dosing, as if you dose too much, you'll just float your sludge, making your settlement problems worse. Make sure you do some bucket testes beforehand to work out the dosing rate; otherwise, you really will just have to waste all your sludge.

If you choose to use Zeolite dosing, make sure you get the volume right and make sure you dose that amount; it works well when you do it properly, and it doesn't work at all when you don't.

As your load increases and you back off on your artificial food dose you may have a short period of impacted processing as your sludge reacclimatises to a natural food source; if you have the ability to
store and re-process effluent (i.e. a balance tank, storage lagoon, etc.) it can be a good idea to have plenty of capacity available, as you may be pushed out of compliance for a short period while the sludge switches back over to running on sewage again after being artificially fed for so long.

Damn that's a lot. Wait that's only for starting from ramp-up? What's different if you need to start up from scratch?

Yeah, complete shut-down of an STP is never an ideal situation, and the process essentially needs to be completely re-commissioned, which can be a time-consuming and expensive exercise. You may also need to restart your plant if you've had a bad die-back in sludge, or a wash-out event. Same principals apply.

Oof, that sounds like a process. Where do we start?

First thing, if you've been shut-down for a while, check and recommission your Mechanical & Electrical equipment. Check your pumps, blowers, valves, actuators, pipework, seals, tanks, mixers, walkways, diffusers, PLC, switchboard, etc. and make sure they all work properly. Make sure pumps turn freely, that dosing pumps and pipework are not clogged, and that blower and pipework seals are intact.

If you have blowers and diffusers, DO NOT turn your blowers on if your tanks are empty; you want at least 200mm of water covering the diffusers or you run the risk of rupturing the membranes.

If you dose chemicals (chlorine, Alum, etc.), there's a chance they may have gone off. Some chemicals can harden, which cause clogs, and chlorine will lose strength over time, so you may end up not actually dosing enough to make your bacto targets.

Ideally, you should run water through your dosing pumps prior to shutting them down long term so there's not chemical accumulated in them. If you have time, dismantle the pump head and clean it out. You can take this chance to inspect the seals, diaphragm and ball valves. Replace worn parts as necessary.

Anything else we should be doing while everything's quiet?

Yeah, if you have had to shut-down your process, it's probably a good time to do at least some minor equipment maintenance (and maybe even major maintenance if you've got the time). Go check the seals and bearings on your other rotating equipment and do any servicing they might need.

Yep! We've taken advantage of the slow time to do some fixes on our gear! It's all in tip-top shape now.

Okay, now that you're sure your pumps, blowers, and other rotating equipment will work without failure, it's a good idea to give your plant a test-run if you're able to.

You can do this by filling your plant with fresh water and running the pumps, blowers and mixers. While you can bump test some pumps and equipment to make sure they run while dry, it can be hard on the equipment. Don't try to run positive displacement (PD) pumps, like mono's or roto's, dry; there's a chance you may damage the stator.

If you can, it's best to shut your plant down with clean water in the tanks; it reduces falling risks and helps to reduce UV exposure to equipment that's typically submerged. It also stops issues that can occur in in-ground tanks that are installed below the groundwater level, which includes the tank trying to float out of the ground, and groundwater leaking into the tank via cracks or seals due to the greater differential pressure.

Yep! Done that. Now what?

Awesome. Once you're sure everything is going okay, you need to get some biomass going to start the process up. Generally speaking, you have two main options to choose from:

- Seeding the process with fresh sludge from an external source
- Growing your own biomass in-situ

Seeding works well for suspended growth processes, such as Activated sludge (AS), sequencing batch reactors (SBR's) and Membrane Bioreactors (MBR's). For most fixed film processes such as trickling filters you'll most likely have to grow your own sludge since the seed sludge will more likely either clog your filter media or pass straight through and be caught in your clarifier.

Hybrid systems, such as an integrated fixed film activated sludge (IFAS) can be seeded.

Fixed film systems tend to be more robust against flow variations and low loading, so with luck, you won't need to restart them from scratch.

Seeding sounds good, how's that work?

Seeding is a good option for a suspended growth plant so long as you have a suitable donor plant nearby.

Your donor plant should preferably be a large treatment plant in the general vicinity of your STP that can spare

some fresh sludge to get yours going. Check beforehand they can actually spare the sludge and that they're not having issues of their own; it sucks when you inherit issues from your donor. If they don't have sludge to spare, they'll usually tell you. Note that it also has to be the same kind of plant; for example, you can't seed an extended aeration activated sludge (EA-AS) plant from a lagoon or a trickling filter.

It's good if the plant is close by, since transporting the sludge can affect it. The sludge could go anaerobic, or start to release Extracellular Polymeric Substances (EPS), which are sticky and tend to cause settlement issues. It's unlikely your sludge will have a completely stress free trip, but making it reasonably fast helps minimise any damage that might occur.

Yep, there's a plant nearby, I've called, and they've got heaps of sludge for me. How much do I actually need?

The short answer is as much as you can get… within reason.

You don't really need to seed up to 100% operational biomass. That's not typically what's done since

it usually requires too great a volume of activated sludge to be feasible from a transportation perspective (sludge tankers can be expensive).

That said it's usually best to seed as much as you can; aim to get to about a quarter to a third of your biomass concentration. The actual volume will depend upon whether you get straight mixed liquor, or thickened Return Activated Sludge (RAS). If it's straight mixed liquor you'll need about a third of your reactor volume. If it's RAS, the concentration will be about half of what's in the clarifier, so you'll need about a sixth of your reactor volume. Note that this does depend upon how much thickening occurs in the clarifier; if the donor plant runs a high RAS return rate or has poor settlement you'll need to get more. Check with the plant beforehand to see if they have concentration data.

The seed helps you to kick-start your process, but you'll need to grow the rest of the sludge. If you're expecting a slow or tapered start to your sewage flow then that might actually get you there without having to dose, if not, you'll need to use the same process for building up your biomass we discussed previously.

Anything I should be watching out for?

Yeah, when sourcing seed sludge try to ensure that:

- The treatment plant runs on at least similar sewage to yours
- You don't get old WAS from a digester; fresh WAS, or RAS are the best.
- The plant is nitrifying properly and performing well
- There are no existing settlement issues

- That the donor plant isn't too far away; if it is, you might get significant sludge degradation in transport.

So that's it? I don't need to feed it, do I?

Actually, you might, it depends on how you expect your flows to start up. If you expect a slow start to your season, it might be possible to let the process ramp up naturally. However, if you're expecting a rapid start to your flows, you will need to build up a bit more biomass before things really get going. If you need to feed your plant after seeding, make sure you start straight away; a long period without food will cause the newly acquired biomass to die back, possibly putting you back where you were.

Ok, where do we put it? Just straight into the reactor?

Yeah that works, especially if you have primary clarifiers or really fine inlet screens, since they'll actually get rid of a whole bunch of the nice new sludge you've purchased.
If you just have comparatively coarse (like greater than 5mm) screening into the bioreactor or an activated balance tank you can consider adding the sludge through the headworks, since the screens get a chance to pull out any random material that might be present from the donor plant or the tanker used for transport.

If necessary, you can also add sludge to the terminal manhole of your pumping station network. If you have fine screens (<2mm) or primary settlement you'll probably need to temporarily bypass these to make sure you don't lose any sludge. Also make sure the tanker doesn't overwhelm the pumps,

since then you'll just have sludge on the ground, and that there's no storage that might accidentally grab a bunch of your sludge as you throw it into the pumpwell. Also, you'll want to flush your pumping station, preferably with un-chlorinated water, afterwards to make sure you transfer all the sludge over to your STP, or time it so that you get a good flow in from your catchment to do the flushing for you.

Right, but what about those of us who aren't close enough to another plant to get seed sludge? Are we stuffed?

Nope, if worse comes to worst, you can always grow up your own sludge from scratch.

Oh that sounds way cheaper than seeding, why wouldn't we do that anyway?

So the benefit of seeding is that it kick starts your process and lets you reduce the time you end up spending non-compliant with your license.

Oh, right… yeah that makes sense. So…

Yeah. Growing your own works best if you have plenty of time and plenty of storage for non-compliant effluent, at that point you don't really have to worry as much about the compliance issues.

Alternatively you might be able to get some form of temporary emissions license to help out. You'll probably want to discuss this with your regulator.

Yeah ok that's sorted. Give me the how!

Ideally, you should be growing your sludge from influent raw sewage; all the bugs you need are already there, so just make the conditions right, and the sludge will grow.

So what do we use if we don't have sewage?

If you have virtually no raw sewage, you'll need to dose something to help the process along, since you won't be getting sufficient bacteria in to inoculate the plant properly.

In that case, you can dose the reactor with a (typically proprietary) bacteria product. These products generally are used to make your septic tank work better, help reduce nutrients in a lake or pond, etc. and can also be used to kick-start sewage treatment processes. There are a variety of these products available; they often consist of pelletised bacteria, enzymes and some food.

Actizyme is one such product made in Australia. There are a wide variety of other products as well, with some companies selling specialist bacterial strains.

The specific bacteria/enzyme combination is generally the proprietary part of the product, and typically you'll need some support from the product manufacturer or their local vendor to get appropriate dose rates nailed down for your process.

Note that these products can be quite expensive as well, so knowing how much you need to dose will help you save money and help to make sure the start-up is successful.

Sounds like snake oil to me…

Yeah, there are probably products out there that will claim to be a lot more than they are. Make sure you do a bit of research into the product and the vendor to ensure you're not buying snake oil, and always remember, if it sounds too good to be true, it's probably not (true…).

Okay, magic potion is in! Now what?

Now you'll need to optimise your plant for biomass growth. Make sure you stop any automatic sludge wasting when you start-up, otherwise you might accidentally waste all of your sludge as you make it. You'll probably have to shut off wasting for the first few weeks of operation, until your MLSS and settled sludge volume (SSV) come up.

You may also need to do some pH correction before you get a stable nitrification de-nitrification cycle going. If you're only nitrifying, your treatment plant will use up a lot of alkalinity, causing a pH drop. Once you get stable operation, you should be able to either back off on alkalinity dosing or no dose at all; it depends upon the dynamics of your specific plant.

Any testing we can do to make sure it's going ok?

Yeah, actually, it's a good idea to take consistent (daily is best) SSV and MLSS samples. Knowing your MLSS will help you optimise your process far more rapidly, and you can pick up on settleability issues before they get away from you.

You should also be doing daily effluent sampling for important parameters (i.e. Total Nitrogen, Total Phosphorus, etc.)

So is this lab testing or?

It's best to do this stuff in the field if you can since lab tests tend to take a few days and it's possible that your process has gotten away from you before you get sufficient info back from the lab to know what's going on.

As such, it's good to have MLSS testing gear when you're doing this, since getting a handle on your actual MLSS concentrations is very useful. Doing regular MLSS tests is useful in ongoing operation as well, so buying kit for this part won't necessarily be a waste of capital.

A basic MLSS kit can be pretty simple; a vacuum flask, filter papers and a microwave will get you the drying you need to do the test and can all be purchased relatively cheaply… The accurate scale (ideally down to 0.001 g) is what will probably be the expensive part. If you can't afford the equipment, getting semi-regular tests done at the lab is an alternative. That said, you'll be waiting for a day or two for results that can hamper response times.

You should also do SSV a lot; at least once a day, possibly more if you know you've got flow or solids loading variations.

Knowing both your SSV and MLSS allows you to work out your SVI, which lets you know if your sludge is bulking like a movie star before a Marvel movie, or if it's settling properly.

$$SVI(mL/g) = \frac{Settled\ Sludge\ Volume\ (SSV)(mL/L)}{Mixed\ Liquor\ Suspended\ Solids\ (MLSS) concentration, mg/L} \times \frac{1000mg}{g}$$

Generally, an SVI result of greater than 150 mL/g is considered to be a bulking sludge, although your process may vary.

If you can't do MLSS on the regular, then SSV is an okay stand-in, but you will still need to get a few MLSS tests done externally to confirm the relationship between MLSS and SSV since this isn't constant.

What else?

Keep an eye on your dissolved oxygen (DO), as it can also be a good indication of how well your biomass is going. It will typically start at close to saturation (somewhere around 7-8 mg/L or as high as 10-12 mg/L if it's really cold) as you have no biomass to use the supplied oxygen and will drop as your biomass grows.

If you have automatic DO control you may not see as much variation in the actual DO, but keep an eye on blower speeds or run times; they'll work harder over time indicating the sludge is growing.

You may need to adjust your aeration below what you'd typically expect, as over-aeration can cause floc shear, especially if your sludge floc is fragile (which can be the case with sludge fed on artificial food sources). If you shear up your floc, you can both lose your biomass and have a Total Suspended Solids (TSS), Biological oxygen demand (BOD) and TN issue in your effluent.

If you've timed it properly you can taper off your dosing as the load comes on, there might be a few days of poor performance as the sludge acclimatises to the new food source.

Damn man, that was a lot. We're done right?

Oh wait, you mentioned Water Sewage Plant's too? Are we going to talk about them?

Yes, you're not getting off that easy.

Ugh, fine, so what about WTP's? Are they as hard as an STP? Because that was a lot.

Actually no, WTP's are way easier to start up than an STP; they're actually made to be shut down without killing off part of the process since they're by-and-large chemical and physical processes.

Oh good. So what do I need to look out for here?

So you should only have issues if you've had to shut your plant down for a long. If you're running it making small batches of water once a week like we suggested in our previous advice then it should be fine, just make sure you have enough chemicals to run the plant at the higher rate.

Oh yeah, we had to turn our WTP off and leave it for the last 2 months… are we in trouble?

If you've had to shut your WTP down for a long time, it's a good idea to check all of the Mechanical and Electrical equipment to make sure it's going to run properly (as per the earlier tips on restarting an STP from scratch). This includes your pumps, compressors, mixers, and valves (both actuated and manual). It's never a good experience to start up your WTP just to have your dosing pumps spit acid all over the place.

Also, if you haven't already, take the chance to do some maintenance. If you have a sand filter, check the sand; at the least, make sure it's at the right level, if you can, take a core of the filter and make sure the layering is good (or do a bit of a dig down into the media).

Check your pumps and make sure all your pump seals and bearings are good, dismantle your dosing pumps and give them a clean and service.

If you have a clarifier, check its structure for signs of rust, check the gear box and mechanical equipment for the scraper drive if it has one. If you've got some time, drain it and check the internals.

Check all of your water quality sensors. Your sensors drive the process, control equipment, provide important information and are usually the first and most important warning when something goes seriously wrong. Many sensors can be prone to calibration drift, some don't like to be dry. There is also the increased chance of fouling, either biological or chemical (e.g. scaling) for sensors that are normally used to seeing flow. Fouling can be especially bad on the raw water side, due to the dirtier nature of the water.

Amphoteric chlorine sensors can be especially prone to issues if they haven't been stored properly during shut down, and since Chlorine is typically a Critical Control Point for your water treatment process, making sure your chlorine sensor works should be very high on your list of priorities. Even if it has been stored correctly, cross-check the reading using a sample and a DPD test to ensure it's reading correctly. If you're not sure about it, replace the membrane and service the sensor and check again. If even that doesn't help, just replace the sensor, it's better to deal with the cost of the sensor than the cost of a process failure.
Also check the sensors monitoring your other critical control points (e.g. filtered water turbidity) and ensure they work.

A sensor failure when you start can be a serious delay, especially if you have to source parts that have a four week lead time.

Basically, the better condition your gear is in when you go to start, the easier it'll be to get going without random failures. Better to spend time now when you're not being pressured to make water, than after plant start-up.

Right, so, is there anything else we should be watching out for?

Check your chemical dosing systems thoroughly, we mentioned the pumps, but if you have powered lime feeders, powdered activated carbon dosing systems, polymer make-up systems and ETC, check the feeders, hoppers and mixing tanks. This is especially important with materials that can go hard in storage, like Lime.

Re-check your raw water source. Do some jar testing to check and confirm your chemical dosing rates before you start-up. There's a good chance your raw water hasn't changed much since you shut down, but there's always a risk, and a half-day of jar testing is cheaper than a day of lost production.

Okay, so, water's tested, everything works, can we start now?

Hold up. If you can, it's good to do a test run of your plant. Start it up and isolate your clear water storages, and direct the water to whatever water recovery circuit or discharge you use. It's good to run it for a few hours, do a backwash, and put it through its cycles. Take samples and get them tested, this will give you confidence that you're going to make good water when you start processing in earnest.

Anything else to do after startup?

Once you get your plant back online and working, you should also ensure that your reservoirs and storage tanks are clean and that your network is in good working order.

If your plant has been offline, clean and scour the reservoirs and flush them until you have an acceptable free-chlorine residual (typically a minimum of 0.5 mg/L, but this can be higher if your network has long branches) before you put them back online.

If you've been running at a reduced rate, and you've been following our advice, you should be checking and topping up your chlorine regularly, but check the free chlorine and pH in the reservoir again just to be sure. You may want to flush the reservoir anyway to ensure the water provided is fresh.

You should also ensure that any portions of the network that have been stagnant or unused are checked and scoured before they are used. This could be accommodation buildings in an un-used section, or offices and kitchenettes in a remote part of the network. Flush out any stagnant water and keep flushing until you get a free chlorine residual in the water. Aim for at least 0.1 – 0.2 mg/L at the furthest point in the network. Also check any critical use areas (kitchens, medical facilities) as well.

Okay, now you should be ready to start up your plants.
If you do need more help, please feel free to contact Simmonds & Bristow for more specalised advice.

For specific advice on your Sewage Treatment Plants or Water Treatment Plants, please contact us

Call 1800 620 690

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