



Waste4Generation Contingency Plan (2023)

The Waste4Generation Contingency plan provides key steps to be taken should the plant have to shut down or be key equipment shut-down or fail. At all times the duty manager and senior management team is to be kept informed of actions being taken.

No action to be undertaken unless safe to do so, with no exceptions

The plant is designed to fail-safe so that there is not excessive gas production or storage on-site, and should the power fail or equipment fail, the process can cease operation safely.

Failure of Key Plant & Machinery

In the event of breakdown of any essential equipment or machinery:

- Report the failure to the site manager as soon as possible.
- Trained personnel to attempt on-site repair or replacement.
- Call technician to repair machinery or equipment as soon as possible.
- Make arrangements for alternative machinery to be hired as necessary.
- While essential equipment is out of use, ensure incoming waste is minimised to avoid a backlog of stockpiled waste and diverted to partner sites for sustainable treatment & recovery.

All key spares are kept on-site with both a list of suppliers (as well as back-up suppliers) documented on site, with a list of lead times. Key pieces of equipment, including CHP, boiler, pumps & flare stack are routinely maintained as part of a maintenance contract with suppliers.

The plant is designed to fail-safe, and whole areas of the process can be isolated to facilitate repairs and often the plant can be kept operational.

Due to the nature of our AD process, with the waste treated within 48 hours, there is no buildup of waste within the system. There is no more than two day's feed stored on site at any one time. Should an equipment failure not be resolved within 24 hours, there will be no further waste received at site and any waste remaining within the reception tanks or batch tanks which cannot be processed will be tankered away to an authorised and approved disposal/treatment route with partner sites.

Our site is split into several different processes, of which one can fail however the others can continue as entirely independent processes.

The SCADA system sends out alarms to operatives and management 24/7 as soon as selected parameters change on the plant. The plant and process can be controlled and shut down entirely remotely should this be required. The operatives additionally are required to attend site within one hour (if outside of standard operating hours) on notification of an emergency alarm.



Waste4Generation Contingency Plan (2023)

Staff training:

- All existing staff will be trained and fully understand and comprehend the contingency plan.
- Key staff will be trained to undertake basic maintenance and repairs on essential equipment.
- All new operative staff will be trained within 2 months from commencing employment including in-house competency test which will they need to pass in order to carry out lone working.
- Designated staff will need to complete the following training:

<i>Designated Staff Training</i>			
COSHH	First Aid	Telehandler	Fire Marshal
Confined Space	Banksman	COTC/WAMITAB	IOSH/NEBOSH



Waste4Generation Contingency Plan (2023)

Power Failure on Site

Should the power fail to site, the CHP engine is designed to power site independently. Site is to be manned at all times during a power failure.

Should the CHP not be operational and the site experience a power failure. The following will cease the operation:

Key Equipment which will cease to operate during power failure to site
Scada System – which controls process, displays tank levels & monitors site pressures
Both flares
Process pumps

1. The SCADA system controls the feeding and recirculation of the AD plant which will cease on a power failure to the site. This limits the production of biogas. The SCADA system displays all the site tanks levels and operational pressures.
2. With the ceasing of feeding, this limits the production of biogas and limits the release of biogas from the plant.
3. With no CHP & flares out of commission, surplus biogas after ceasing of feeding will only then be released from the pressure release valves on top of the digesters, at a pressure of between 60 – 70 mb, where the gas is then vented to a DSEAR approved location on top of each reactor. **No personnel to be within the DSEAR zone (including on top of the digesters).** Gas monitors to be worn at all times.
4. Should the PRV's fail, any surplus biogas is discharged via the water traps (U bends) which vents at a pressure of 80 - 90 mb (designed at a higher pressure to discharge following the PRVs). There is daily checks on the water traps to ensure sufficient depth of water to maintain 80 – 90 mb of pressure. **No personnel to be within the DSEAR zone (including on top of the digesters).**
5. The gas production will be immediately reduced once feeding and the recirculation pumps stopped. The biogas is stored and intermittently released via the PRV's to ensure the reactors integrity.
6. The Anaerobic Digestion plant **will not** be operated without power to the SCADA, CHP and Flares. This will require a controlled shut-down of the AD facility.
7. The site alarm send a power failure escalation alarm to oncall operative, who will escalate to the duty manager and will immediately attend site.
8. The safety measures at site will store and control the safe release of biogas whilst operatives attend site.
9. During operational hours or once operatives attend site, the site's standby generator will be put into operation to provide the sites parasitic demand.

Should the onsite generator fail to site (in addition to the above):

1. The site also has a smaller genset with the capacity to run the flare to safely manage the biogas until the power returns or the production of biogas stops which drastically reduces over 48hrs.



Waste4Generation Contingency Plan (2023)

2. Schedule loads in for the AD will be diverted to partner sites and the site will remain manned until power resumes.



Waste4Generation Contingency Plan (2023)

Failure of the CHP Engine

On failure of the CHP engine:

1. When the CHP fails, an alarm will be raised on SCADA. When the CHP fails, the emergency flare/s should automatically kick in.
2. Ensure that the emergency flare/s is in operation. This can be checked on SCADA:
3. On failure of the CHP, staff are to immediately attend the engine. Gas monitors to be worn. Should the CHP fail outside of operating hours, the site is to be immediately attended by on-call personnel & duty manager to be informed.
4. On attending site or during operating hours, if the site operator is competent and able to identify and reset the fault, they are to carry out the remedial action. If they are unable to identify to fault or unable to carry out the repair, they are to escalate this to duty manager.
5. If Waste4Generation are unable to remedy the fault, the duty manager is to immediately contact the service provider, who is under contract to remotely log in to the engine to identify and resolve the issue.
6. Should the fault be unable to be resolved remotely by the service engineers, an engineer is to attend site as soon as possible.
7. Whilst awaiting an engineer to attend site, the feeding and the recirculation of the digesters is to be stopped to reduce biogas production. Biogas produced whilst the engine is down is to be managed by the flare.
8. On attending site, the engineer is to ascertain potential downtime and from this, future deliveries of waste streams can be determined and proposed diversion duration.
9. When the repair is completed and tested, the plant & feeding can be ramped up slowly, with gas production increased to the point where the engine is fully operational and generating.

Should the emergency flare/s fail see below

10. On failure of flares, staff are to immediately attend and start the back up flare . Gas monitors to be worn.
11. Immediately carry out points 3, 4 & 5 (above).
12. Try identify the fault and remedy the fault to be able to reset the main &/or standby flare. Likely faults to be checked power failure or electrical problem (fuse), Compressor failed , Sparkpark failure. Relevant spares and standby equipment stored at site.
13. Should neither the main or back up flares kick in, escalate to the duty manager and the duty manager is to get hold of the service contractor to attend site ASAP.
14. Whilst awaiting an engineer to attend site, the feeding and the recirculation of the digesters is to be stopped to reduce biogas production. Biogas produced whilst the engine & flares are down is to be managed by the PRV's.
15. When all repairs have been completed and tested on both the flares and CHP, the plant & feeding can be ramped up slowly, with gas production increased to the point where the engine is fully operational and generating.

Site is to be manned at all times during a CHP failure where the flares are **not** in operation.



Waste4Generation Contingency Plan (2023)

Failure of the Emergency Flares (when the CHP is not in operation)

There are two emergency flares on site: 1 x 10 NM³/hour and 1 x 100 NM³/hour. In standard plant operation (non-commissioning), the 100 NM³/hour flare runs in priority over the 10 NM³/hour flare.

On failing of the 100 NM³/hour flare:

1. On failing of the 100 NM³/hour flare, the biogas is automatically is automatically diverted to the alternative flare. SCADA alarm to inform operatives of the failure of the flare. Duty manager to be informed.
2. Operatives to determine if small flare in operation. Gas monitors to be worn at all times. Duty manager to be informed.
3. With the CHP not in operation, the feeding of the digesters would automatically be reduced to reduce biogas production. Should the larger flare not be in operation, the feeding would be reduced even further so that the biogas production is adjusted to the be sustained by flaring on the 10 NM³/hour alone.
4. Should biogas production surpass 10 NM³/hour flares capability, there will be a safe release of excess biogas from the PRVs on top of the digesters, at a pressure between 50 – 70 mb, where gas is vented into a DSEAR approved location on top of each reactor. No personnel to be in that area.
5. Should the PRVs fail, the biogas produced is then safely discharged from the digesters via the water traps (U-bend) which then vents at a pressure of 100 mb. There is daily checks on the water trap, to establish that there is sufficient depth of water to maintain 100 mb of pressure. No personnel to be in that area.
6. Flare to be inspected (if safe to do so), and trained personel to assess fault / repair if possible.
7. If Waste4Generation are unable to remedy the fault, the duty manager is to immediately contact the service provider, to attempt a repair / resolution remotely.
8. Should the fault be unable to be resolved remotely by the service engineers, an engineer is to attend site as soon as possible.
9. On attending site, the engineer is the ascertain potential downtime and from this, future deliveries of waste streams can be determined and proposed diversion duration.
10. On repair of the 100 NM³/hour biogas flare, deliveries can be re-established as required and in agreement with the duty manager.

Should gas production be in excess of the 10 NM³/hour flare or should the 10 NM³/hour flare fail in addition to the 100 NM³/hour flare:

1. SCADA alarms to operatives provides alerts on the failure (& non-operation) of both flares. Duty manager to be informed.
2. On failing of both flares, feeding to the AD plant is to be stopped.



Waste4Generation Contingency Plan (2023)

3. Following the ceasing of feeding, there will be a safe release of excess biogas from the PRVs on top of the digesters, at a pressure between 50 – 70 mb, where gas is vented into a DSEAR approved location on top of each reactor. No personnel to be in that area.
4. Should the PRVs fail, the biogas produced is then safely discharged from the digesters via the water traps (U-bend) which then vents at a pressure of 100 mb. There is daily checks on the water trap, to establish that there is sufficient depth of water to maintain 100 mb of pressure. No personnel to be in that area.
5. Operatives to investigate fault on the 10 NM³/hour flare (on investigating the 100 NM³/hour flare previously). If a repair cannot be conducted by onsite personnel, the service engineer is to be called to attend site as soon as possible to repair one or both flares.
6. Service engineer to determine repair viability and potential downtime of flare/s.
7. Deliveries are not to resume (from being diverted) until the flares have been repaired, with the view for the CHP repair to be completed. (Flares can ramp up biogas production, whilst re-commissioning established).
8. Once flare/s have been repaired, feeding can resume at an agreed rate to not surpass flaring capacities or site operations.



Waste4Generation Contingency Plan (2023)

Failure of the Boiler System

The boiler system is only utilised during commissioning and when the CHP is down (either for repair or maintenance) to supply heat to the process to keep the digesters at optimal temperatures. When the CHP is in operation, the failure of the boiler has minimal process implications and the AD process can continue for a short period of time whilst repairs are being undertaken.

Should the boiler fail (whilst the CHP is down):

1. When the boiler fails, a SCADA alarm is sent to the operatives to alert them to the issue.
2. The operative is to attend site (if not within operational hours).
3. Should there be no power to the boiler or boiler failure, operative to attempt repair. If a repair cannot be made, engineer to be called.
4. Whilst awaiting repair of the boiler, feeding to the digesters is to be stopped to minimise heat loss within the reactors. Delivery schedule for the AD plant to be reviewed and adjusted as required.
5. Whilst the boiler is not operational, fuel deliveries to be rescheduled and the fuel tank to be isolated.

Waste4Generation Contingency Plan (2023)

Failure of the Pumping & Pipework System

There are various different pumping systems on site, please see below:

AD Process Pumping

Failure of Pumping System – AD Process Pumping	
Feed Pump Failure	<ol style="list-style-type: none"> 1. Stop Feeding 2. Repair or replace where possible. A spare is kept on site. 3. Only to be undertaken by site operatives experienced in this operation 4. Should there be a prolonged power cut / inability to power the feed pump system, re-schedule incoming loads to partner AD plants.
Reception Pumps	<ol style="list-style-type: none"> 1. Pause receiving waste to assess the situation 2. Repair or replace where possible. A spare is kept on site. 3. Only to be undertaken by a site operative experiences in this operation. 4. Tankers can be loaded/loaded utilising their own pumps, however the tankers must be connected to our centralised odour abatement system. Odourous loads are to be rejected and not offloaded until the reception pumps are operable again. 5. Should there be extended downtime / prolonged power cuts, re-schedule of incoming loads.
Recirculation Pump Failure	<ol style="list-style-type: none"> 1. Stop Feeding 2. Repair or replace where possible. A spare is kept on site. 3. Only to be undertaken by site operatives experienced in this operation. 4. Should there be a prolonged power cut / inability to power the feed pump system, re-schedule incoming loads to partner AD plants.

Waste4Generation Contingency Plan (2023)

Feedstock Pumping Failure

Recirculation on feedstock side failure – repair / replace . repair or replace , spare kept on site operatives experienced in this operation.

- Use of onsite petrol pump.
- Prolonged power cut --- may have to re-schedule incoming loads.

Failure of Pumping System – Feedstock Pumping	
Recirculation Pumps on Feedstock Side	<ol style="list-style-type: none"> 1. Pause receiving waste to assess the situation 2. Repair or replace where possible. A spare is kept on site. 3. Only to be undertaken by a site operative experiences in this operation. 4. The onsite petrol pump can be utilised for recirculation where required for short periods of time. 5. Should there be extended downtime / prolonged power cuts, re-schedule of incoming loads.
Reception Pumps	<ol style="list-style-type: none"> 1. Pause receiving waste to assess the situation 2. Repair or replace where possible. A spare is kept on site. 3. Only to be undertaken by a site operative experiences in this operation. 4. Should there be extended downtime / prolonged power cuts, re-schedule of incoming loads. 5. Tankers can be loaded/loaded utilising their own pumps, however the tankers must be connected to our centralised odour abatement system. Odourous loads are to be rejected and not offloaded until the reception pumps are operable again.
R&D Pumps	<ol style="list-style-type: none"> 1. Pause receiving waste to assess the situation 2. Repair or replace where possible. A spare is kept on site. 3. Only to be undertaken by a site operative experiences in this operation. <p>Should there be extended downtime / prolonged power cuts, re-schedule of incoming loads.</p>



Waste4Generation Contingency Plan (2023)

Pumping Station Failure

The pumping station controls the site drainage and the collection of run-off, rainwater and any potential spillages on site. Therefore, it is a critical component of the site's operation and the site cannot operate without a working pumping system.

Should the pumping station pumps failure or block:

1. Clean – Repair – Replace
2. Spares to be kept on site, and repairs / replacements to be undertaken by trained experienced personnel where safe to do so.
3. There are duty assist pumps in place to provide continued pumping. These pumps control the ability to collect and return any spillages on site and are process critical.
4. In addition to the duty assist pumps, there are back – up petrol pumps which can be used.

There are 2 x 20m³/hour pumps in place within the pumping station. At these pumping rates, they are more than capable of keeping up with any potential storm events or spillages. There are daily operational checks on the pumps as well as weekly maintenance checks of the pumps and emptying and clearing the pumping stations.

Should the submersible pumps fail on the pumping station, the two inch petrol pump can be used as additional back up to empty sumps either to drain (if in consent) or into RT2. Emergency fuel for the petrol pump to be stored within the flamm box.

The pumping station is designed with an overflow and a bund overflow catchment in case of a pumping station failure, equating to 40 m³ (RT1 bund & Bunds 1 & 2). On filling of any of the bunds on site, these are immediately to be pumped to be emptied, including vacuum tanker removal if required.

Unless replacement pumps are in place, all deliveries are paused until the pumping station is operational.



Waste4Generation Contingency Plan (2023)

Pipework Failure

Any pumping / pipework fails, will be picked either by the following alarms:

- Low pressure
- Low level alarm (tank)
- Bund high level alarm

Any failures to be escalated to the duty manager.

All bunds have sumps within them and a submersible pump, which will pump it either to RT2 or the ACO collecting drainage system which goes to the onsite pumping stations. The low levels alarms will automatically shut off the associated pump and escalate alarm to the on call operative.

All liquids discharged by the relevant pipe (which has failed) will be collected by that pipe's relevant bund. All reactors, tanks fitted with non-return valves to prevent any back flow from the associated vessel / tanks. Weekly checks and upgrades of all pipework as required.

Should a spillage occur and a bund is filled, all imports to be halted. Pumps will automatically cut off due to low level alarms but if spotted by an operative first, pumps are to be switched off or flows adjusted.

Pressure alarms and levels sensors checked weekly.



Waste4Generation Contingency Plan (2023)

Failure of Tanks

Failure of Digesters

Waste4Generation undertaken numerous precautionary measures to prevent digester failure including:

- Reactors are drained down and inspected as per regulations
- Liquid within the reactor systems are kept at a neutral pH.
- Tank integrity reviewed and inspected annually.
- Visual inspection on tanks weekly.
- Tanks secured if gas tight sealed and pressures hold on monthly gas pressure test.

Should the reactors integrity fail:

1. Isolate tank from inlet and outlet pipework
2. Isolate gas line to digester and open up valve on the PRV line to prevent any chance of implosion
3. Stop feeding & recirculation
4. Identify source of leak
5. Determine if it can be repaired or if it is a catastrophic failure.
6. Site operatives to attempt a temporary repair if possible.
7. Containment bund will hold the volume and the sump pump within the bund will pump the volume to RT2.
8. Arrange for capacity to be available in RT2.
9. Tankers to be arranged to remove additional waste or digestate from site, utilising all available capacity on site to empty the bund ASAP.
10. Cease all deliveries/divert tankers to other sites, diverting all loads to suitable alternatives locations.
11. Arrange for the cleaning and inspection of the damage reactor, after establishing the cause of the breach.
12. Check all other reactors integrity and physically isolate the damage reactor prior to starting up the AD process again.

Failure of Other Tanks

Should other tanks fail (excluding the digesters):

1. Isolate tank from inlet and outlet pipework.
2. Identify source of leak.
3. Containment bund will hold the volume of tank spill.
4. The sump pump will pump the volume to RT2.
5. Arrange for capacity to be available in RT2.



Waste4Generation Contingency Plan (2023)

6. Tankers to be arranged to remove additional waste or digestate from site (Utilising all available capacity on site to empty the bund ASAP).
7. Keep the tank isolated and arrange for emptying and cleaning of the tank for inspection.
8. Reduce deliveries and feedstock production to accommodate the reduction in the sites storage and processing capacity.
9. Identify and repair fault prior to bring the tank back into operation.

Stop, isolate, assess, clean up & remove waste, take that tank out of action, then continue process if fit to do so.



Waste4Generation Contingency Plan (2023)

Failure of the Weighbridge System

Should the weighbridge fail, Waste4Generation are to stop all incoming loads, unless the load is accompanied by a weighbridge ticket from the supplier or a partner weighbridge used.

Any loads where the weight / volume cannot be verified are not to be accepted.



Waste4Generation Contingency Plan (2023)

Failure of the SCADA System

Should the SCADA system fail remotely, Waste4Generation would get an alarm to attend site, where the operator can determine whether the SCADA system is still running or not, or whether it is a remote access issue.

The SCADA system will have an emergency power bank to remotely power the unit should the power to site fail. The below will apply should the power bank fail / prolonged power cut.

Failure of SCADA system (no power)/(non-operable)

1. If the actual SCADA system fails, the system will be taken off of auto SCADA control and manually operated to manage process with 24 hour site attendance (as alarms are down).
2. As the SCADA monitors the process levels, pressures, flows and temperatures which can be remotely monitored and activates alarms on equipment failure and set level breaches. Without SCADA, can only manually operate the plant (and to manually shut-down operations safely).
3. If we are unable to get the SCADA system running, the site will be continually manned to operate and monitor AD process.
4. The SCADA engineer is to be contacted to resolve the SCADA issues. Should there be an extended delay in the SCADA becoming operational, a planned shut down of the AD plant shall be implemented.
5. The Feedstock processing can continue under strict management and levels be manually checked prior and after every load.
6. The processing of FOG'S and complex waste will cease until SCADA operational.
7. Physical check on feedstock levels.
8. Planned shut down of plant to be overseen by duty manager and senior management team. Site is not to be unattended at any point during a manual shut down.



Waste4Generation Contingency Plan (2023)

Enforced Shutdowns & Company Liquidation

Whilst there is no expected shutdowns of the plant planned except for scheduled maintenance, both enforced shutdowns and dissolution of the company have been planned for.

Should the company stop trading, no more waste will be imported into site, the site is to continue until all waste has been processed, and the reactors are made safe.

System purged and reactors drained down as far as possible within the effluent in consent. Biomass and remaining effluent is to then be tankered from site to an approved authorised AD facility.

It is in both the staff contracts as well as in director's agreement to ensure plant safety on dissolution of the company, and is accepted as our responsibility.



Waste4Generation Contingency Plan (2023)

Operation Outside of Standard Conditions

The plant has been designed to operate under all conditions, and not be weather dependent. As the waste is received directly by tanker, connected to the reception tank, there is no interference by the outside weather conditions.

Extreme weather is to be taken into account when receiving wastes, in regards to the safety of the staff first and foremost, and the receiving of tankers to site, and the tankers on the road. The plant itself is entirely weather proof. The site and reactors are entirely earthed in accordance with legislation.

The safety of the staff is paramount, and should the weather be deemed unsafe for operation, waste will no longer be received and the plant placed on recirculation until safe to continue operating. The decision will be made by management and trained competent personnel.