WDP 4 – Commissioning

Part 1: Individual Facility Commissioning Plan

Note: This Commissioning Plan is a live document and will be subject to updating during the Works Period prior to a final Commissioning Plan being submitted for review.

The Contractor shall develop a detailed Commissioning Plan in accordance with paragraph 5.1.1 of Schedule 2 (Output Specification) of the Contract.

The Commissioning Plan will be submitted to the Authority as a minimum three (3) Months prior to the Planned Readiness Date and shall include, but not be limited to, the Contractor's proposals for the items described in paragraph 5.1.2 of Schedule 2 (Output Specification) of the Contract. Details of all Tests are set out in Schedule 11 (Tests) of the Contract.

The Commissioning Period of the Works includes the incremental Acceptance and Processing of Contract Waste. The activities during the Commissioning Period of the Facility will include the activities set out below.

- Construction completion/Cold Commissioning
- Readiness Tests
- Drying out of refractory
- Steam blowing
- Commissioning of turbine/generator
- Trimming of plant
- Functional tests
- Environmental tests
- Acceptance Tests

1.1 Timeline sequence

The key stages of completion and phases of the Commissioning Period are illustrated in Figure WDP4.1 below.

★ Test Certificate issued by the Independent Certifier.

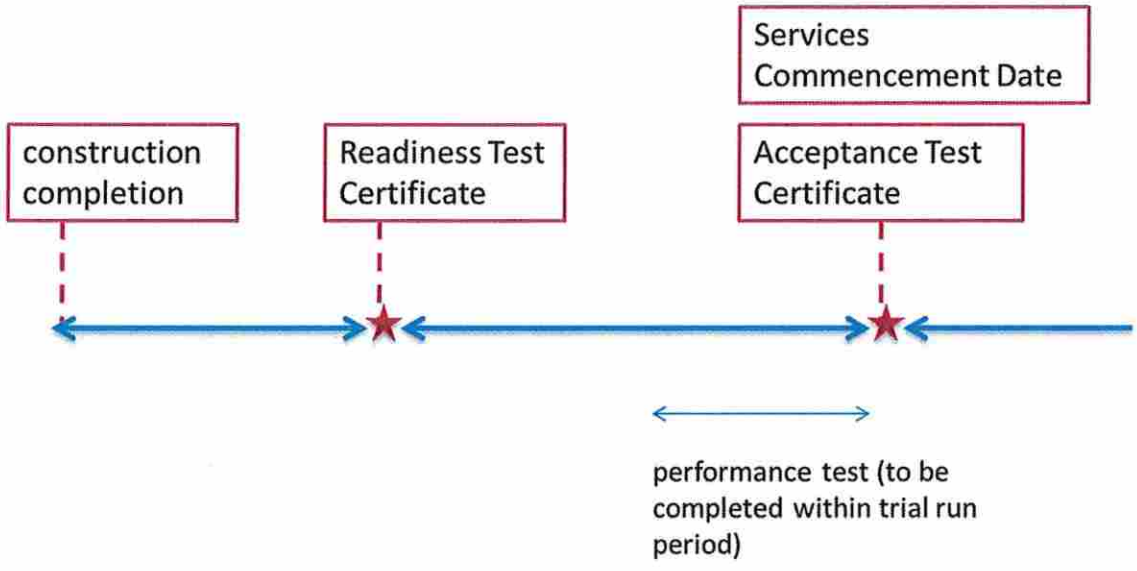

Figure WDP 4.1 - Timeline sequence

The key milestones for the construction and commissioning phases are indicated in the Construction Programme (Part 3 of Schedule 3 (Service Delivery Plans) of the Contract) and are as set out below.

- Start of Cold Commissioning
- Issue of Readiness Test Certificate
- Start of Hot Commissioning
- First fire with burners
- Contract Waste available for utilisation by the Contractor
- Start of drying out of refractory
- First fire with Waste
- First steam to turbine
- Turbine synchronisation to the grid
- Start of Acceptance Tests
- Issue of Acceptance Test Certificate
- Services Commencement Date

1.2 Test Procedures

The Contractor shall ensure that the Construction Sub-Contractor shall conduct the Acceptance Tests in accordance with Schedule 11 (Testing) of the Contract. The format of such Acceptance Tests shall be developed having regard to the matters stated in the Contract, the Construction Sub-Contract, Good Industry Practice and any necessary Consents for the operation of the Facility.

The Contractor shall prepare and submit the test procedures to the Authority and the Independent Certifier (or IC) for review as a minimum three (3) Months prior to the Planned Readiness Date.

No approval by or comment by the Authority or the Independent Certifier in relation to any test procedures shall in any way relieve the Construction Sub-Contractor of any liability or obligation, including the obligation to produce test procedures which contain procedures and all other matters necessary to demonstrate whether or not the whole of the Works are capable of a sustained operation which meets the performance guarantees detailed in paragraph 2.1.4 of Schedule 2 (Output Specification) of the Contract.

The test procedures shall describe all the Tests and other relevant matters of detail and shall, in particular:

a. list the instruments to be used in the Acceptance Tests;

b. detail data recording and reporting procedures;

c. detail coordination methods (including meetings, exchange of data, forms);

d. specify required resources, materials, consumables, Personnel and other facilities;

e. specify the dates and times when the Acceptance Tests are to be carried out;

f. specify the commissioning organisation and commissioning instructions;

g. describe the inspection prior to the start of each Test and the sequence and procedure of each Test; and

h. specify the labelling, safety measures and precautions including regular information on each activity.

1.3 Construction completion (end of assembly)

Before the start of Cold Commissioning, the Contractor will demonstrate that construction completion (end of assembly) has been achieved and the Facility is ready for a secure start of the Commissioning Period. For this purpose, the Contractor shall follow the procedures described in this section 1.3.

Prior to undertaking the Readiness Tests relevant to the Facility, the Contractor will submit to the Independent Certifier the document packages. These are documents to be prepared by or on behalf of the Contractor for the various systems or parts of the Facility. The document package for each individual system shall include the items set out below.

- General arrangement drawings
- System definition

- Pressure test sheets
- Test Certificates for insurance purposes
- Process and instrumentation diagrams (PIDs)
- Combustion diagram
- Electrical single line diagrams
- Alarm/trip schedules

The construction completion (end of assembly) will be recorded in a protocol. The protocol will include a list of all components (drive systems and instrumentation equipment) sub-divided into function groups. When all checks have been completed, these components will be initiated by the Contractor following the instructions and manuals provided by the suppliers.

The Contractor will carry out testing of the function groups as indicated in each protocol. In these protocols, the Contractor will confirm that the function sequences, signals and graphic displays are in full working order. Each function group will be tested during construction completion at least to the extent that it can be operated alone (possibly with simulations). Operation, together with other groups or with process control equipment, will be performed as far as appropriate and possible. Otherwise this will form part of the cold or hot start-up.

The Contractor will fill in the corresponding form for the circuit diagram. From that moment, a module will only be activated by following the switching-on procedure.

The construction completion (end of assembly) protocol will occur when:

- all of the above listed checks have been performed;
- an updated and agreed version of the Snagging List is available; and
- full documentation is on Site.

1.4 Cold Commissioning

The process to achieve the Readiness Tests will be completed when all materials and equipment successfully pass the Cold Commissioning and an updated and agreed version of the Snagging List is available. The Cold Commissioning protocol will be prepared and signed by the Contractor and the Construction Sub-Contractor and submitted to the Independent Certifier. The Construction Sub-Contractor will assist the Contractor in obtaining the Readiness Test Certificate.

During the Cold Commissioning, the proper functioning of all parts of the supplied installation will be tested without Waste in order to demonstrate compliance with the requirements set out in paragraph 5.1.4 of Schedule 2 (Output Specification) of the Contract.

Readiness Tests will be performed when the Construction Sub-Contractor has finished the final assembly on the Site.

Ten (10) Business Days prior to any Readiness Tests, and in order to comply with paragraph 5.1.3 of Schedule 2 (Output Specification) of the Contract, the Contractor shall:

- give written notice to the Independent Certifier and the Authority (the Authority's Representative) of the commencement of Readiness Tests relevant to the Facility;
- invite the Independent Certifier and the Authority's Representative to witness the carrying out of the Readiness Tests;
- provide the Independent Certifier and the Authority's Representative with all information either of them may reasonably require in relation to the undertaking of the Readiness Tests; and
- submit to the Independent Certifier, for review, a programme for the carrying out of the Readiness Tests, complete with a sample of test record sheets. All test record sheets shall be fully completed and signed by the Contractor and the Independent Certifier.

The Independent Certifier and the Authority's Representative shall be entitled to comment on the carrying out of the Readiness Tests. The Contractor shall ensure that all due regard is given to such comment (if any) but shall not be bound by any such comment in accordance with clause 21.2.1 of the Contract.

The Readiness Tests will include the activities specified below.

- Implementation of the control and monitoring system (CMS)
- Test of signals
- Test of systems and safety functions
- Pressurising of systems
- Lockable service switches checked
- Control of interface between motors and motor control centres (MCC)
- Direction of rotation testing
- Completion of loop testing
- Calibration of instruments
- Testing of control valves, transmitters, switches
- Testing of operational control of equipment
- All systems cleaned, flushed and ready for cold start-up
- Testing of all interlocks/shut down systems
- Pressure test of relevant components and systems
- Completion of all occupational health and safety issues meaning that all escape routes and fire sectioning must be completed as well as any safety issues in relation to storage and handling of consumables and Products

Further, all safety systems necessary for operation of the Facility must have been tested and found fully functional and operational as part of the Readiness Tests.

1.4.1 Site acceptance test, control and monitoring system

A Site acceptance test (SAT) of the CMS will be carried out with a suite of tests covering as a minimum the items set out below.

- Process description as the basis for the SAT
- Process screen graphics and other operator interfaces
- Alarms
- Operator and engineering facilities
- Reports
- Automation level
- Redundancies
- Main CMS performance and spare capacities
- Sub-CMS systems performance and spare capacities
- Education and training

The SAT will be carried out for all groups of functionalities and all process systems.

The above tests will comprise all of the functional tests carried out in the factory acceptance tests (FAT) together with verifying actual interfaces and communication links, plus any additional tests/inspection/checks necessary to ensure the overall integrity of the CMS.

During the loop testing, any CMS failure will be recorded on test incident sheets, together with the "time to repair".

1.4.2 Test of signals

After installation of the CMS at the Site, the Contractor will perform tests of all signals.

Test of signals will cover the function test of the different components, including control of signals.

The Contractor will draw up a detailed plan for test and control of components and control systems. Before implementation of the plan, it will be presented to the Independent Certifier and the Authority.

The plan will ensure that components are calibrated, that the entire CMS has been checked and controlled and that sub-systems, of which the components are a part, have been controlled and ready for operation.

1.4.3 Tests of systems

The tests of systems will include the activities set out below.

- Performance tests of all water and air systems and complete function tests of all sub-systems (dry running)
- Repeated start/stops of independent electric motors; this will include testing of emergency stops, local control panels and other control and safety devices
- Electromagnetic compatibility (EMC) measurements by an independent party and monitored by the Contractor as mentioned in the DS/EN 61000-6-2 and DS/EN 61000-6-4 standards
- Sequences of operation of all automatics and all components will be controlled, and all safety systems and interlocks will be tested and controlled

- The systems for measuring emissions are fully operational at completion of Cold Commissioning
- All instrumentation and process control systems that are not bound to the process, such as the communication systems, video monitoring and filing of operational data, must be functional at completion of cold start-up
- Any other tests required to check the proper functioning of the supplied installation, including, but not limited to:
  - Adjusting of limit switches
  - Setting of speed monitors/regulators
  - Setting of set point for switches
  - Checking of all parameters for the electrical, measurement and control system

1.4.4 Issue of the Readiness Test Certificate

The criteria for the issue of the Readiness Test Certificate are set out in Schedule 11 (Tests) of the Contract.

After the successful completion of all the Readiness Tests detailed above, the Independent Certifier will issue the Readiness Test Certificate.

The Contractor shall ensure that the Construction Sub-Contractor will prepare a list containing defects, Snagging Items and omissions to be rectified. The Independent Certifier shall issue the Readiness Test Certificate notwithstanding the existence of snagging matters. The latest Snagging List will be approved and issued by the Independent Certifier with the Readiness Test Certificate.

1.5 Hot Commissioning

The Hot Commissioning period (tests with fuel/Waste) will only start after the Readiness Test Certificate has been obtained.

Any issues related to health and safety will be resolved and completed prior to commencement of the Hot Commissioning period. For example, safety issues in relation to storage and handling of consumables and Products must have been taken care of. Furthermore, all safety systems necessary for operation of the furnace and boiler and other necessary systems must have been tested and found fully functional and operational before any hot testing can commence. The Contractor will also have provided evidence to the Independent Certifier that the Facility complies with all relevant health and safety Legislation and Guidance.

During the Hot Commissioning period, the proper function of all parts of the supplied installation under full and partial load conditions shall be tested in order to demonstrate compliance with the requirements set out in paragraph 5.1.5 of Schedule 2 (Output Specification) of the Contract.

During this stage, and in order to comply with paragraph 5.1.3 of Schedule 2 (Output Specification) of the Contract, the Contractor shall:

- give ten (10) Business Days' prior written notice to the Independent Certifier and the Authority's Representative of the commencement of Acceptance Tests relevant to the Facility;

- invite the Independent Certifier and the Authority's Representative to witness the carrying out of such Acceptance Tests relevant to the Facility; and
- provide the Independent Certifier and the Authority's Representative with all information either of them may reasonably require in relation to the carrying out of such Acceptance Tests relevant to the Facility.

The Independent Certifier and the Authority's Representative shall be entitled to comment on the carrying out of the Acceptance Tests relevant to the Facility. The Contractor shall ensure that all due regard is given to such comment (if any) but shall not be bound by any such comment in accordance with clause 21.2.1 of the Contract.

The Hot Commissioning period of the Facility shall include the activities set out below.

- Drying out of refractory
- Steam blowing
- Commissioning of turbine/generator
- Trimming of plant
- Functional tests
- Environmental tests

The Hot Commissioning will be performed in accordance with the steps set out below.

a) Flushing (at least three (3) times for the entire boiler)

b) Preparation, for instance, filling up the boiler, commissioning the flue gas treatment, combustion air systems, Waste charging, incineration, ash removal and other subsystems

c) Boiling at low combustion capacity; boiling shall be carried out several times in accordance with the commissioning programme. The equipment shall be flushed several times after each boiling process

d) Commissioning of the feed water tanks and feed water pumps

e) Blowing out of the live steam system up to the turbine inlet. Blowing out will be repeated until the level is accepted by the Contractor and the Authority's Representative. When blowing-out has been completed, the headers, feed water and condensate tanks will be cleaned. Steam blowing shall be performed during the daytime (during daytime the number of operational Personnel will be higher than during night time, which will help to control the process)

f) Drying of the refractory in parallel to blowing out by running the plant at the temperatures given in the refractory curing curve

g) Trimming of the boiler until the steam quality is in accordance with boiler supplier requirements

h) Commissioning of bypass and turbine/generator set

i) Trimming of the plant components and system to achieve stable operation, to meet the functionalities and the guarantees given

The Authority's Representative and the Independent Certifier shall be entitled to inspect the refractory lining, the scrubbers, including demisters after drying-out and the Contractor will include such inspections in its commissioning time schedule.

Feeding of Waste shall only commence after it can be demonstrated that the grate, air systems, ash and slag conveyor systems, conveyance of consumables, measuring systems and CMS are working correctly. The parts of the flue gas cleaning system which are necessary for cleaning the flue gases in accordance with the Environmental Permit shall be in operation before any feeding of Waste. Special attention shall be paid to the avoidance of desorption of previously adsorbed dioxins from fly ash in the combustion process.

As part of the Hot Commissioning period, all safety systems and interlocks will be tripped deliberately and all associated components will be checked to ensure that they are functioning properly.

During the Hot Commissioning period, all process control systems must run in automatic operation without fault. It is acceptable to carry out optimisation of the process control circuits during trial operation, but all operational guarantees shall be met before the Acceptance Tests can commence.

The trial run will begin after:

a) the start-up and shut down of the individual components and the complete plant has been successfully performed on three (3) consecutive occasions;

b) all components of the installation have been continuously and successfully in operation without problems or defects, that would result in a hindrance, limitation or hazard to normal operation;

c) all control loops, alarms, trip settings, interlocks and safety devices have been set and successfully tested;

d) the proper and complete functioning of the main and auxiliary systems have demonstrated that normal operation is not hindered, fundamentally limited or the installation brought into danger;

e) it is possible to run all process control systems in automatic operation without fault;

f) conditions in the Environmental Permit are fulfilled. The Contractor shall make sure that the Environmental Permit conditions are fulfilled in such a time margin before the start of the Acceptance Tests that the Independent Certifier's and the Authority's evaluation of the data can be finalised;

g) noise emissions are in accordance with the Contract;

h) continuous production of energy corresponding to nominal thermal load with Waste as a fuel has been demonstrated;

i) education of operation and maintenance Personnel has been finalised;

j) black out test and CMS safety modes are ensured through the necessary tests;

k) the total installation has run forty eight (48) hours without intervention by the Contractor and without critical alarms; and

l) island mode is successfully tested.

1.5.1 Acceptance Tests

Conduct of Acceptance Tests

The Contractor shall conduct Acceptance Tests relevant to the Facility in accordance with the Commissioning Plan.

In compliance with paragraph 5.1.3 of Schedule 2 (Output Specification) of the Contract, the Contractor shall:

- invite the Independent Certifier and the Authority's Representative to witness the carrying out of the Acceptance Tests; and
- provide the Independent Certifier and the Authority's Representative with all information either of them may reasonably require in relation to the carrying out of the Acceptance Tests.

Time for Acceptance Tests

All Acceptance Tests relevant to the Facility shall be conducted in accordance with the measures and procedures detailed in the Commissioning Plan.

Acceptance Tests

The Acceptance Tests shall be performed to demonstrate to the Contractor and the Independent Certifier that the Works meet all contractual requirements including the Environmental Permit requirements and a minimum acceptable level of performance and reliability.

The scope to demonstrate the performance shall be to the required levels to meet the guaranteed performance targets set out in paragraph 2.1.4 of Schedule 2 (Output Specification) of the Contract. It is anticipated that certain parameters specified in paragraph 2.1.4 of Schedule 2 (Output Specification) of the Contract will not be measured as part of these Acceptance Tests because they are an annual figure that cannot be extrapolated from a short period of time. Specifically, the Acceptance Tests will not measure:

- GULP, Guaranteed Unprocessed Landfill Performance;
- BMW diversion rate;
- Guaranteed Diversion Rate; or
- guaranteed net power production (MWh/year).

Furthermore, the Facility's availability is another guaranteed parameter that must be evaluated on an annual basis.

An outline of the basic approach to the measurable elements of the tests is given in Tables WDP4.1 and WDP4.2 below. These tables show the principle of demonstration for each of these parameters and the period when such Tests shall be undertaken. It should be noted that these principles and periods are for illustration only and the detailed procedures will be set out in the Commissioning Plan along with the agreed methods for undertaking these Tests.

Parameter	Unit	Guarantee figure	Proposed principle	Proposed test period
ITEM 1: Continuous Waste throughput at design calorific value, 100% mechanical and thermal load averaged over a twenty-four (24) hour period. (Note 1)	t/h	[ ] (at LHV=des MJ/kg)	Use of Facility metering equipment recorded on Facility distributed control system (DCS). Test durations to be agreed with IC.	Twenty-four (24) hour period, during the performance test phase of the trial operation period
Other limits of the combustion diagram - thermal overload (Note 2)	%	[ ] temporary (Refer to combustion diagram)		
Environmental requirements				
Maximum emission concentrations of pollutants (including dust, CO, TOC, HCl, HF, SO_2, heavy metals, PCDD/Fs, NH_3, NOx)	as appropriate to determine and see Table [2]			
TOC in incinerator bottom ash (IBA)	% w/w	[ ]	Sampling by Facility Personnel. Analysis by external test organisation to appropriate standard reference methods.	Sampled over a twenty four (24) hour period, during the performance test phase of the trial operation period
Loss on ignition in IBA	% w/w	[ ]		
Flue gas residence time at 850°C	seconds	≥ 2	Measurement by external test organisation to appropriate standard methods.	Measurements made during stable operation at ratings as required by Environmental Permit. Measurements to be made during the performance test phase of the trial operation period.
Recyclables/residues				
Quantity of air pollution control residue (APC Residue) without boiler ash	kg/t of MSW	[ ]	Facility weighbridge records will provide data for proving performance and guarantees. Test durations to be agreed with IC.	
Quantity of IBA (Note 3) as IBA	kg/t MSW	[ ]		Measurements to be made during the performance test phase

Parameter	Unit	Guarantee figure	Proposed principle	Proposed test period
as ferrous materials as non-ferrous materials	kg/t IBA kg/t IBA	[ ] [ ]		of the trial operation period
Proportion of IBA recycled; as aggregate as ferrous materials as non-ferrous materials	%	[ ] [ ] [ ]		Measurements to be made during the performance test phase of the trial operation period
Electricity and heat				
Net power output at maximum continuous rating (MCR) without heat production measured at the transformer output terminals Required net power output over a [XX] hour period at MCR	MWh/y MWh	116,750 [XX]	Use of Facility metering equipment. Test durations to be agreed with IC.	Measured over [XX] hour period during the performance test phase of the trial operation period
Noise				
Maximum noise level in excess of the background levels (as measured at the boundary of the property adjoining the Retained Land)	dB(A)	[+5] above background levels	Measurement by external test organisation to appropriate standard methods. Test durations to be agreed with IC.	Measurements to be made during the performance test phase of the trial operation period
Odour				
The IC will ensure that odour control measures at the Facility are operational and functional				

Table WDP4.1 Plant Performance Tests

For the avoidance of doubt the requirements of Legislation and Consents shall take precedence in the event that any of the guarantees provided by the Contractor fall short of the requirements of Legislation and Consents.

MCR is the maximum continuous rating which shall be defined on the Contractor's combustion diagram. This shall be determined during the Acceptance Tests using appropriate correction curves, to be at least the guarantee figure stated in "ITEM 1" in the Table WDP4.1 above.

Where measurements will be made by an external test organisation, such an organisation will be appropriately accredited and independent. Where appropriate standard sampling and analysis methods (such European Standards or other appropriate norms) will be followed, these will be the latest available and accepted methods (in accordance with

Good Industry Practice) recognised for the determinand being measured. The appropriate standards will be defined in the final Commissioning Plan.

Notes:

1. The Facility shall be operated as part of this demonstration from maximum thermal load (100%) and minimum thermal load (70%) based on the actual Waste calorific value. The data obtained shall then be referenced to the MCR and extrapolated to provide the combustion diagram extremities.

2. This criterion shall be fulfilled by monitoring (trending) the boiler thermal load over the test period. The objective shall be to demonstrate that the plant is capable of controlling combustion to accommodate changes in fuel calorific value, including overload conditions.

3. The values given for IBA production are determined for the sole purpose of deriving aggregate and metals recycling efficiency guarantees, and are not given as guarantees in themselves.

Parameter	Units	Basis[3]	Emission Limit Values (daily avg)	Emission Limit Values (half-hourly (97 %) B)[2]
Total dust	$mg.m^{-3}$	CEM[4]	10	30
Hydrogen chloride (HCl)	$mg.m^{-3}$	CEM[4]	10	60
Hydrogen fluoride (HF)	$mg.m^{-3}$	CEM[4]	1	2
Sulphur dioxide (SO_2)	$mg.m^{-3}$	CEM[4]	50	200
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2) expressed as NO_2	$mgNO_2.m^{-3}$	CEM[4]	200	400
Ammonia (NH_3)	$mg.m^{-3}$	CEM[4]	10	20
Cadmium + thallium taken together (average values over sample period)	$mg.m^{-3}$	extractive test[5]	0.05	N/A
Lead + other metals taken together (average values over sample period)	$mg.m^{-3}$	extractive test[5]	0.5	N/A
Mercury (Hg) (average values over sample period)	$ug.m^{-3}$	extractive test[5]	0.05	N/A
Carbon monoxide (CO)	$mg.m^{-3}$	CEM[4]	50	100
Gaseous and vaporous organic substances expressed as total organic carbon	$mgC.m^{-3}$	CEM[4]	10	20
Dioxin and furans (expressed in toxic equivalents) (average values over sample period)	$ngI\text{-}TEQ.m^{-3}$	extractive test[5]	0.1	N/A

Table WDP4.2: Air Emission Limit Values[1]

Note:

[1] - All values are daily averages or stack extractive test results as appropriate, corrected to reference conditions of standard temperature and pressure (STP), dry, 11% O_2.

[2] - N/A is not applicable.

[3] - Basis refers to the mode of measurement for the determinant in question.

[4] - "CEM" means the installed continuous emission monitoring system (that will be installed and operated in accordance with EN14181 and the Environmental Permit).

[5] - "Extractive test" means emissions tests undertaken in accordance with appropriate reference test methods and test durations as accepted under the terms of the Environmental Permit, and undertaken by an appropriately accredited independent test organisation.

Issue of Acceptance Test Certificate

The criteria for the issue of the Acceptance Test Certificate are set out in Schedule 11 (Tests) of the Contract.

Evaluation of results

The results of the Acceptance Tests shall be compiled and evaluated by the Independent Certifier (paragraph 5.1.3 of Schedule 2 (Output Specification) of the Contract). Any necessary adjustments to the results will take account of:

- the measuring tolerances of the Acceptance Tests; and
- any differences between the operating conditions under which the Acceptance Tests were conducted and the operating conditions that were anticipated and recorded in writing prior to the commencement of such Acceptance Tests. The Acceptance Tests shall be carried out in a manner that is fair and reasonable.

1.5.2 Waste inputs during the Commissioning Period

Following the Readiness Tests, the feed systems and the boiler systems will be commissioned using the oil burners to gradually bring the boiler up to normal working pressure and temperature.

Once the boiler steam raising tests are completed, Waste feed will commence with the incinerator load increasing to 100% over two (2) to three (3) days. There will then be a period of around two (2) weeks where the load is varied in order to carry out specific tests.

The Contract Waste input requirement over this period is shown in Table WDP4.3 below, with Waste fed to the incineration line commencing in week 0.

A timescale for Contract Waste deliveries during the Commissioning Period will be agreed with the Authority, WCAs, HRC contractors and the relevant collection contractors.

In accordance with clause 21.2.3 of the Contract, the Contractor shall provide to the Authority an indicative estimate of the levels, timings and periods of deliveries of Contract Waste necessary for commissioning and testing. Notice will be given to the Authority at least sixty (60) Business Days prior to the Target Testing Date. The maximum amount of Contract Waste that can be requested will be limited to the amount of Waste the Authority is obliged to deliver in accordance with clause 23.3.

All levels, timings and periods of deliveries will be confirmed no less than twenty (20) Business Days prior to the Target Testing Date. This will allow the Authority sufficient opportunity to procure the necessary levels, timings and periods of deliveries of Contract Waste and for the necessary arrangements to be agreed with the WCAs, HRC contractors and their respective contractors.

Once deliveries have commenced, the Contractor will continue to Accept all Contract Waste delivered in accordance with the agreed schedule of deliveries. It will be the Contractor's responsibility to arrange for the proper disposal of Accepted Contract Waste.

Where Unacceptable Waste is detected within a Contract Waste Load during the Commissioning Period this will be dealt in accordance with paragraph 1.5.2 of MS 2B (Waste Reception).

Week	Feeding rate (over NOP)	Waste required (t/week)	Contract Waste required (t/week)#	TPW required (t/week)
Week 0	50%	1,943	1,943	0
Week 1	20%	777	777	0
Week 2	40%	1,554	1,554	0
Week 3	60%	2,331	2,331	0
Week 4	75%	2,914	2,558	355
Week 5	75%	2,914	2,558	355
Week 6	75%	2,914	2,558	355
Week 7	100%	3,885	2,558	1,327
Week 8	100%	3,885	2,558	1,327
Week 9	100%	3,885	2,558	1,327
Week 10	100%	3,885	2,558	1,327
Week 11	100%	3,885	2,558	1,327

Week	Feeding rate (over NOP)	Waste required (t/week)	Contract Waste required (t/week)#	TPW required (t/week)
Week 12	100%	3,885	2,558	1,327
Week 13	100%	3,885	2,558	1,327
Week 14	100%	3,885	2,558	1,327
Week 15	100%	3,885	2,558	1,327
Week 16	100%	3,885	2,558	1,327

* ***Note:*** *Current proposed Waste delivery programme. A definitive timescale for Contract Waste deliveries during the Commissioning Period will be agreed with the Authority, WCAs, HRCs providers and the relevant collection contractors.*

It is understood by the Contractor that the actual tonnage of Contract Waste delivered can vary from the tonnage profile. Therefore it is recognised that the actual tonnage Accepted can vary -5% and +10% from the Contract Waste tonnage profile

Table WDP4.3 - Proposed commissioning Waste delivery programme

1.6 Measures to mitigate potential disruption of the Services during the Commissioning Period

The maximum expected shutdown is likely to take place two (2) weeks before the start of the trial run. If the shutdown lasts no longer than four (4) days, the Waste bunker capacity will be sufficient to handle Contract Waste received thereby avoiding any disruption to the WCAs, HRC contractors and the Authority's transfer facility operators.

The Contingency Plan for Facility unavailability will apply during the Commissioning Period as well as during the Services Period. The Contingency Plan (as detailed in MS 2G (Contingency Plan)) will ensure that the impact on the Services, its performance and the effect on the Authority, WCAs and the public will be kept to a minimum.

In the event that there is a major interruption to the thermal plant during commissioning that requires the shutdown of the treatment process, but does not prevent the continued use of the Waste reception facilities, the Contractor will continue to receive programmed deliveries of Contract Waste at the Facility. All Third Party Waste deliveries will be halted until the cause of the interruption has been rectified.

Any Waste received beyond the storage capacity of the Waste bunker will be diverted to pre-arranged alternative Contingency Delivery Points.

The high capacity of the Waste bunker will allow continuous reception of Contract Waste to the Facility while the alternative arrangements for the rerouting of delivery vehicles are carried out in accordance with the procedure set out in MS 2G (Contingency Plan).

1.7 Reporting and testing

1.7.1 Reporting during the Commissioning Period

The Contractor shall submit to the Authority a monthly commissioning progress report including, as a minimum, the information detailed in paragraph 5.2.1 of Schedule 2 (Output Specification) of the Contract.

1.7.2 Monitoring mechanisms

The Contractor will undertake proactive monitoring of Facility operations and performance to ensure that specified standards and objectives are met and/or exceeded. Details of the monitoring to be undertaken are outlined below.

Environmental monitoring

The environmental monitoring requirements for the installation will include:

- continuous emission monitoring of releases to air; and
- extractive (periodic) monitoring of releases to air and water.

The monitoring results will be reviewed and reported in accordance with the Environmental Permit. This data will provide information pertaining to key plant emissions including greenhouse gases.

Compliance monitoring

This will primarily comprise:

- Site inspections and checks to confirm operation is achieving the desired standards;
- compliance audits to assess operations in relation to ISO 14001, to the Environmental Permit and with any contract arrangements for delivery of the Services to the Authority; and
- regulator inspections by the Environment Agency.

1.7.3 Monitoring of process variables

The following parameters will be monitored in the course of the general process control strategy:

- Waste composition (monitored in accordance with Initial Baseline Sampling Event);
- material feed rates;
- in-process temperature, pressure and air volumes;
- final treatment Products - treatment residue analysis; and
- emissions monitoring.

1.7.4 Routine monitoring and spot checks

These include inspections and audits and will be used to:

- ensure that the Facility functions as intended;

- detect faults and unintended operations; and
- detect slow changes in plant performance to trigger preventative maintenance.

Auditing

The Contractor will employ a compliance audit strategy that satisfies the requirements of the Integrated Management System and will ensure that the management and operational control arrangements are implemented and are effective.