APPENDIX 1

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO ID 150105
Regional Demonstration Project for Coordinated Management of ODS and POPs Disposal in Ukraine, Belarus, Kazakhstan and Armenia

TERMS OF REFERENCE FOR THE PROVISION OF EQUIPMENT AND SUPPLIES AND RELATED SERVICES (TURNKEY) FOR SETTING UP A NATIONAL POPS/ODS DISPOSAL FACILITY, BELARUS

1. PROJECT BACKGROUND

The United Nations Industrial Development Organization (UNIDO) is the specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization and environmental sustainability. The mandate of UNIDO is to promote and accelerate inclusive and sustainable industrial development in developing countries and economies in transition.

The "Regional Demonstration Project for Coordinated Management of ODS and POPs Disposal in Ukraine, Belarus, Kazakhstan and Armenia" will demonstrate environmentally sound approaches for the collection and destruction of Persistent Organic Pollutants (POPs) stocks and Ozone Depleting Substances (ODS). This demonstration project will assist the countries involved in meeting their obligations under the Stockholm Convention and the Montreal Protocol and establish local capacities for destruction of ODS and some POPs substances. Through the demonstration activities, the project aims to destroy a minimum of 11,700 MT of PCB/ODS containing waste and 418 MT of ODS (4.14 MM of CO2e). It will introduce regulatory reforms in Armenia, Belarus, Ukraine and Kazakhstan and strengthen national capacity in identifying, assessing, managing, and treating such wastes in an environmentally sustainable manner. It will also maximize opportunities for public-private partnership through the development of appropriate policies and regulations. If the project is successful, it has the potential to become a pilot program for countries with economies in transition (CEIT), and reduce the cost of POPs destruction.

2. PROJECT OBJECTIVES

The project supports the GEF-5 strategy for chemicals, the aim of which is to consolidate the persistent organic pollutants and ozone layer depletion focal areas, as well as to broaden the scope of GEF's engagement with the sound management of chemicals. Specifically, it addresses GEF Chemicals Strategy Objectives 1 and 2, to "Phase out POPs and Reduce POPs Releases" and "Phase out ODS and Reduce ODS Releases".

Focal area	Outcome
Chem-1: Phase out POPs and reduce POPs releases	Quantifiable and verifiable tons of POPs eliminated or reduced. The Project aims to destroy a minimum of 11,700 MT of PCBs.

Chem-2: Phase out ODS and reduce ODS releases	Outcome 5.1: Countries have phased out Ozone Depleting Substances and replaced them with zero ODP, low GWP alternatives. The Project aims to destroy 418 MT of ODS (4.14 MM of CO2)

The project is being implemented at the country level, in cooperation with the Government focal points in each country, namely the Ministry of Ecology and Natural Resources of Ukraine, the Ministry of Natural Resources and Environment Protection of the Republic of Belarus, the Ministry of Energy of the Republic of Kazakhstan and the Ministry of Natural Protection of the Republic of Armenia.

Under this project, three independent but linked ODS/POPs co-destruction centres will be created - one in each of the three countries[1] - as listed below:

Country	**Facility to be created**	**Location**
Belarus	1 x ODS/POPs co-destruction centre	CUE "Complex for Processing and Disposal of Toxic Wastes of the Gomel Region" (Gomel Oblast, Chechersk Rayon)
Kazakhstan	1 x ODS/POPs co-destruction centre 1 x Recycling centre for recovery of ODS refrigerants and foam blowing agents	Several options indicated
Ukraine	1 x ODS/POPs co-destruction centre 1 x Recycling centre for recovery of ODS refrigerants and foam blowing agents	Several options indicated

In Belarus, the project will provide for an incinerator with a capacity of no less than 1,600 ton of waste per year. The beneficiary of the ODS/POPs co-destruction centre in Belarus is CUE "Complex for Processing and Disposal of Toxic Wastes of the Gomel Region" (Gomel Oblast, Chechersk Rayon).

As part of this activity, a Working agreement was concluded between UNIDO and CUE "Complex for Processing and Disposal of Toxic Wastes of the Gomel Region". According to this agreement the parties are responsible for setting-up a national modern ODS/POPs decontamination facility at CUE "Complex for Processing and Disposal of Toxic Wastes of the Gomel Region". In particular, the agreement provides for the establishment of the facility by June 5, 2020, and the key obligations of UNIDO are the purchase and supply of equipment for the destruction of ODS/POPs waste for the subsequent operation by the CUE "Complex for Processing and Disposal of Toxic Wastes of the Gomel Region". At the same time, the CUE "Complex for Processing and Disposal of Toxic Wastes of the Gomel Region" undertakes to obtain in accordance with the established procedure, the required permitting

[1] Armenia has decided not to host any PCBs treatment facilities at present.

documentation (certificates, licenses, technical specifications, etc.) necessary for the commissioning and intended use of the equipment (POPs decontamination) in compliance with the national legal requirements of the Republic of Belarus and ensure that the operating and running costs are financed, including the creation of new jobs and working conditions for the personnel operating the equipment, from the start-up of the equipment and until such time when the activities carried out with the use of such equipment become self-sufficient.

3. SCOPE OF SUPPLY

The scope of this present RFP relates to the provision of a hazardous waste incineration system for setting-up a national POPs and ODS destruction facility in Belarus.

Bidders are invited to submit proposals for a set of equipment which meets the desired incineration capacity relative to the type and volume of waste, as described below and in *Annex I - Technological Nodes and Blocks*. Bidders may also choose to include the supplementary equipment (Lot 2 and Lot 3) in their proposal.

CORE EQUIPMENT

Lot 1. Incineration System and Equipment for disposal of Hazardous Waste

Equipment:	Integrated incineration system for the destruction of hazardous waste (POPs and ODS), capable of treating wastes consisting of, containing or contaminated with POPs and ODS. Incinerators should be designed to accept wastes in any concentration or any physical form, i.e., gases, liquids, solids, sludges and slurries. Potential destruction technologies include, but are not limited to: rotary kiln incinerators, industrial furnaces and plasma technologies (e.g. argon plasma arc or nitrogen plasma arc) Bidders are welcome to submit proposals with more than one technology that meets the requirements of these terms of reference.
Type of input material:	Wastes consisting of, containing or contaminated with POPs and ODS (obsolete pesticides, including chlorinated; soils contaminated by obsolete pesticides and PCB; medical waste; PCB oils in transformers and capacitors), ODS (liquid and gaseous).
Requirements:	Suitable incineration technologies must be certified for the purpose of POPs and ODS disposal and found to be environmentally acceptable by the TEAP Destruction Taskforce for the Montreal Protocol and in line with the guidance on best available techniques and best environmental practices for the disposal of POPs under the Stockholm Convention.
Capacity:	Capacity to dispose of solid, liquid, paste-like and gaseous hazardous waste, at a rate of approximately 200 kg per hour (1 600 tons per year)

SUPPLEMENTARY EQUIPMENT

Lot 2. Automatic Repacking Unit of Solid Waste

Type of input material:	Solid waste - obsolete pesticides, including chlorinated; soils contaminated by PCB or obsolete pesticides in unusable packaging (plastic, glass, big bags) and in bulk
Capacity:	Approximately 200 kg of repacked solid waste per hour
Aim of the equipment:	Shredding waste and packaging for feeding to the kiln

Lot 3. Overflow heat energy recovery unit

Aim of the equipment:	Heat recovery with subsequent electricity generation
Capacity:	At least 1.0 kW of electricity per 1 kg of waste incinerated

4.) TECHNICAL SPECIFICATION

The below table, supplemented by *Annex I: Technological Nodes and Blocks* to the Terms of Reference, provides a detailed description of the scope of the supply:

4.1. COMPOSITION OF THE SET OF EQUIPMENT AND ITS DESIGN SPECIFICATION

4.1.1. The set of equipment for disposal of hazardous waste shall consist of the following devices and units:

- Technological nodes and blocks detailed in Annex I;
- A set of mounting parts;
- A set of spare parts;
- A kit containing the operational documentation.
- All further technical requirements detailed in Annex I

4.1.2. Technical requirements for the construction and equipment are indicated in Annex I.

4.1.3. The control system must be built on the basis of a programmable logic controller (PLC) and include a set of control signals, input/output modules and an electronic display and control panel.

4.1.4. The control system must also handle emergency situations.

4.1.5 The continuous emission monitoring system, should account for all instrumentation and control for optimisation of operational costs (consumables of the incinerator plant)

4.2. OPERATING CONDITIONS

4.2.1. The equipment shall be designed for 24\7 operation mode, with breaks for maintenance according to service regulations. Annual operating time of at least 8000 hours.

4.2.2. The bidder shall acquaint himself with the precise climate conditions of the place of delivery:

- Maximum outside temperature in summer: 40°C
- Minimum outside temperature in winter: -35°C
- Expected snow up to 50 cm in winter.

4.2.3. All electrical equipment must comply with Belarus or CE/EAC electrical standards (specifically including power supplies, sockets and plugs). All cabling required for installation and use of the equipment must be included. The Contractor shall work with the beneficiary company CUE to ensure that all equipment is fully compatible with the Belarus electrical system and the infrastructure of the plant.

4.3. DESIGN AND ERGONOMIC REQUIREMENTS

Equipment shall comply with national (Belarusian) and international Norms and Standards. In case of discrepancies between national and international standards, standards with stricter requirements will apply. Standards and codes including addenda shall be valid at the date of submitting the tender. The equipment must comply in particular with:

- ISO 12100:2010 (Safety of machinery), or similar
- Standard EN 60204 (Safety of machinery – Electrical equipment of machines), or similar
- Directive 2014/34/EU relating to equipment and protective systems intended for use in potentially explosive atmospheres, or similar

4.4. SAFETY REQUIREMENTS

4.4.1. Materials used in construction shall not be dangerous or harmful to humans or the environment. Safeguards for safety and protection, including posting danger signs and other warnings against hazards, shall be erected and maintained.
4.4.2. All reasonable precautions for the safety of employees at the work site and all other persons who may be affected shall be taken; and all reasonable protection to prevent damage or injury from the equipment (including drives, piping and cables) shall be provided. Compliance with Directive 2013/35/EU on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) shall be enforced.

4.4.3. Current-carrying parts, cables and connecting harnesses shall be reliably insulated or fenced.

4.4.4. The design of the equipment shall include an alarm in case of violation of the normal operational mode, as well as a means of automatic shutdown and supply disconnection.

4.4.5. Clear and visible signs or symbols shall be applied near the signal lamps and controls indicating their purpose.

4.4.6. The design of an electrical automation system shall have means preventing the occurrence of a hazard when the power supply is cut off completely or partially, as well as

means that prevent the spontaneous activation of actuators when the power supply is resumed.

4.4.7. The electrical automation system shall set off an alarm in case of violation of the normal operational mode of the equipment.

4.4.8. Metal non- current-carrying parts of the line, which due to insulation damage may be under voltage, shall have protective grounding clamps, next to which signs of grounding shall be located.

4.4.9. Electrical cabinets shall have locks with removable keys.

4.4.10. The equipment design shall ensure safety during installation, operation, repair, transportation and storage.

4.5. ENVIRONMENTAL REQUIREMENTS

4.5.1. The atmosphere shall be protected from the discharge of harmful substances and residual pollutants, in compliance with the requirements established by the Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus of July 18, 2017 No. 5-T "On Approval of Environmental Norms and Rules" or the Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control). In case of discrepancies between national and international standards, standards with more strict requirements will apply. Standards and codes including addenda shall be valid at the date of submitting the tender.

4.5.2. The concentration of harmful substances in the air emissions shall not exceed the MPC (maximum permissible concentration) values established for these substances, as stipulated by documents mentioned in the item 4.5.1 above.

4.6. QUALITY STANDARDS

The equipment must comply with national and international norms and standards, in particular those specified in Section 4.3.

4.7. TECHNOLOGY REQUIREMENTS

4.7.1. The equipment components shall be designed for ease of manufacturing, assembly, installation and handling, whilst ensuring excellence in the performance and quality of the specified product throughout the course of its manufacture, installation, maintenance, and repair.

4.7.2. The equipment design shall allow free access to its components for technical inspection, repair, and maintenance.

4.7.3. Selection and analysis of relevant pollutants, including flue gas sampling, measurement of process parameters and quality assurance of automatic measurement systems, as well as control measurements for testing such systems should be carried out in accordance with CEN standards. If it is impossible to apply the CEN standards, it is

necessary to apply ISO, national or other international standards that guarantee the provision of scientific information of equivalent quality.

4.8. REQUIREMENTS FOR UNIFICATION AND STANDARDIZATION

4.8.1. The equipment shall consist of structurally complete units and parts with a wide use of unified, standardized and standard units.

4.8.2. The responsibility for providing documentation (permits and licenses) required for the import of the equipment supplied rests wholly with the Contractor. All certificates for component materials shall be handed over to the beneficiary company CUE.

4.8.3. The beneficiary company CUE is responsible for the timely preparation of documents and the submission to the Ministry of Economy of the Republic of Belarus of the List of goods (assets, including cash), works and services provided for the implementation of international technical assistance projects.

4.9. REQUIREMENTS FOR TRANSPORTATION AND STORAGE

4.9.1. The equipment packed in a container shall be transported by road, ship, aircraft or rail in accordance with the carriage regulations being applicable to each mode of transportation.

4.9.2. After delivery on site and checking the state and consistency of the goods, the Beneficiary shall take them under its responsibility and provide a safe storage until their installation.

4.10. MANUALS

Producer’s manual and service manual in English and Belarusian and/or Russian, inclusive of detailed instructions for operation of plant and assemblies, basic maintenance and troubleshooting and component replacement should be provided for the entire set of equipment.

4.11. SPARE PARTS

A set of spare parts to cover the first 2 years of operation and maintenance of the equipment.

Offers should be accompanied by adequate technical documentation, datasheets and other printed material or pertinent information in English and Belarusian and/or Russian for items quoted.

The layout of the facility, with indications on available spaces for the equipment, will be provided after the tendering period. The Contractor shall be flexible with regards to the size of the offered equipment, which shall be suitable for any available space.

5. DELIVERY TERMS

Delivery should be no later than month 12 after countersignature of the Contract.

The beneficiary company CUE has the right to inspect and carry out a pre-shipment acceptance of equipment at the Contractor's plant before shipment. Inspection and pre-shipment acceptance is carried out by the beneficiary company CUE's specialists. At the factory, the Contractor shall provide everything necessary for testing equipment in various modes on the product for at least two hours.

All goods are to be delivered DAP (INCOTERMS 2010), Dubrovka village, Chechersk district, Gomel region, Belarus (52°47'22.7"N 30°49'45.9"E), including unloading.

The offer shall include the transport expenses to final destination accordingly, including unloading.

6. INSTALLATION, COMMISSIONING AND ACCEPTANCE

The Contractor shall be responsible for the installation, testing and commissioning of the plant at the end-user site and shall include all costs related to this in its offer.

The Contractor shall be responsible for and provide all materials needed to assemble and install the equipment at the facility and shall provide all services needed for the technical reception of the equipment at the time of the installation of equipment. The Contractor must provide support for the equipment to reach its designed capacity.

7. TRAINING

The Contractor shall provide adequate on-site training to the personnel designated by the Project Beneficiary. The training shall be provided by an authorized trainer for a number of participants as specified in the table below in a way that they will be able to operate and carry out maintenance of the equipment without any support (start-up, set-up, operation and use, health & safety associated with equipment provided). The Contractor is responsible for advising of any health & safety risks associated with equipment provided and of suitable protective measures.

All didactic materials referring to the training must be supplied both on paper and electronic format in Belarusian and/or Russian language.

All necessary accessories for the training are to be supplied by the Contractor. All training costs shall be accounted for by the Contractor, including the interpretation to Belarusian/Russian. Costs for the training shall be included in the offer.

The contractor must provide information on the necessary qualifications and level of education (secondary, secondary special, higher), as well as experience in the field if applicable, of personnel.

Training should be provided in Belarusian/Russian. The content, minimum number of end users to be trained and the minimum duration of the training is provided in the table below:

Number of participants /city	Minimum number of days required	Special training requirements (if any)
Maintenance: 2 persons Operation: 5 persons	10 days Place of training: Gomel	The training on use and correct manipulation of the equipment shall be carried out, at the latest 30 days after installation, commissioning, testing of the equipment. The training shall cover: brief overview on the aim of the equipment, detailed information on operation of each unit of the item, routine work, daily checks, user maintenance and troubleshooting procedures.

8. MANUALS AND DOCUMENTS

Complete operating and maintenance manuals in English, as well as Belarusian and/or Russian language, with full description of the operating and security systems shall be provided for all equipment. Manuals shall include identification references for all spare parts.

9. GUARANTEE / WARRANTY REQUIREMENTS

The Contractor shall be responsible for the goods included in the delivery having used the appropriate structure and materials being of high quality and the work being done in accordance with standard norms.

The Contractor shall warrant that during 12 months from the date of issuance of the certificate of acceptance the goods supplied by him, his subcontractor(s) and/or sub-contractors shall be new and free from defects in workmanship, materials and design.

The Contractor shall commit that it will repair or replace at his own expense as soon as practicable and no later than three (3) months any of the goods which, within the warranty period, prove to be defective as mentioned above or as a result of any erroneous or inadequate engineering drawings, technical specifications and/or operating instructions of the Contractor.

10. LANGUAGE REQUIREMENTS

The official project language is English. The drawings, catalogues, illustrations, printed specifications and other documentation on the equipment (one manual per set of each item) shall be in Belarusian and/or Russian and English.

11. DELIVERABLES/REPORTS

The Contractor will be paid upon receipt and acceptance of UNIDO of the deliverables/reports listed in the table below:

Deliverable / Report:	**Activity covered by the report and/or content:**	**Submission Date***
Design of the equipment	Detailed technical specifications	Month 2
Manufacturing report	Manufacture of the equipment	Month 7
Shipping of the equipment	Shipping documents	Month 8
Steady operation report	Assembling of the equipment at the project site; Steady operation; Training	Month 10
Final report	Performance testing; Certificate of acceptance	Month 12

* The time of submission is expressed in months and is calculated from the signature of the Contract

The making of a payment hereunder by UNIDO shall not be construed as an unconditional acceptance by UNIDO of the work accomplished, or the equipment or technical documentation delivered by the Contractor up to the time of such payment.

ANNEX I - TECHNOLOGICAL NODES AND BLOCKS

NOTES:

i) Preparation of design estimates and permits to carry out the work based on the detailed technical specifications, as well as its commissioning after installation is the responsibility of the beneficiary company CUE.

ii) Technological units and blocks are delivered in the "newly created" state, the supply of technological units and blocks that were in consumption or restored is not allowed

iii) Specified technological nodes and blocks are supplied in an outdoor-use design. If any of the blocks does not envisage such a use, the contractor's obligation will include the construction of a facility necessary for their operation

iv) All required components that are not stated explicitly in this Technical Specifications but are necessary to satisfy the specifications herein shall be supplied in order to provide a smooth operation of equipment.

v) These technical specifications represent minimum requirements for the equipment to be purchased. Any equipment with better specifications will be accepted as compliant. In case of protocols, standards and software, any supplies offered with higher specifications and/or of the most recent versions must still be compatible with the requirements of these technical specifications.

vi) Instruments such as meters, pressure gauges, thermometers (and others, are not included in the list below, but is part of nodes and blocks) must be conform to the Belarus norms of certification for each type of instruments. It is responsibility of the Contractor to obtain the needed certificates where not already available.

vii) The bidder shall supply an installation scheme and its main requirements for execution by the Beneficiary in its tender in order to enable the Beneficiary to evaluate the installation works and develop project design.

viii) The bidder shall make available to himself all tools, materials and equipment required for commissioning

CORE EQUIPMENT

Lot 1. Incineration System and Equipment for disposal of Hazardous Waste

Equipment:	Integrated incineration system to destroy hazardous waste (POPs and ODS) in an engineered device.
Dimensions:	The design of the incineration system and equipment should offer flexibility in terms of size and installation. The exact dimensions are subject to confirmation from the beneficiary company CUE.
Type of input material:	Wastes consisting of, containing or contaminated with POPs and ODS (obsolete pesticides, including chlorinated; soils contaminated by obsolete pesticides and PCB; medical waste; PCB oils in transformers and capacitors), ODS (liquid and gaseous).
Capacity:	Approximately 200 kg per hour (1 600 tons per year) of destruction of liquid, paste-like and gaseous hazardous waste

The incineration system must include the following equipment:

1. Incinerator
2. Feeding System
3. Post-thermal Treatment System
4. Flue Gas Cleaning System
5. Emissions Monitoring and Control

1. HIGH TEMPERATURE INCINERATOR

Incineration / Reaction Chamber	Proposals will be accepted for all destruction technologies certified for the purpose of POPs and ODS disposal. These include, but are not limited to: rotary kiln incinerators, industrial furnaces and plasma technologies (e.g. argon plasma arc or nitrogen plasma arc) **<u>Single chamber incinerators</u>** Whereupon proposals are submitted for single chamber incineration systems, they must ensure the incineration of all aggregate states of waste. • The minimum temperature shall be no less than 1,100°C. **<u>Double chamber incinerators</u>** Whereupon proposals are submitted for double chamber incineration systems, they must ensure the incineration of all aggregate states of waste. **Primary combustion** • The primary combustion chamber shall be accepted as the primary combustion zone and shall be equipped with (a) burner(s) • Primary air supply is to be controlled efficiently • The minimum combustion temperature of the primary chamber shall be no less than 850°C **Secondary combustion** • The secondary combustion chamber shall be accepted as the secondary combustion zone and shall be fitted with (a) burner(s) • Secondary air supply is to be controlled efficiently • Flame contact with all the gases shall be achieved • The residence time in the secondary chamber shall not be less than two seconds • The gas temperature as measured against the inside wall in the secondary chamber, not in the flame zone, shall be no less than 1100°C Both the primary and the secondary temperatures shall be maintained until all the waste has been completely combusted. An audible and visible alarm shall be installed to warn the operator when the secondary temperature drops below the required temperature. **<u>Plasma technologies</u>**

	Whereupon proposals are submitted for systems using plasma technology, they must ensure the incineration of all aggregate states of waste. • The minimum temperature shall be no less than 10,000°C • The unit is to be equipped with a plasma torch, water cooled reaction chamber (flight tube) quench and scrubbing system, power supply, associated pumps and process control system.
Input Material	Hazardous waste fed through the Automatic Loading Unit for Solid Waste, Unit of Injection of Liquid Waste and Unit of Injection of ODS
Destruction and Removal Efficiency (DRE)	The minimum acceptable DRE is: • 95% for foams; • 99.99% for concentrated sources
Housing	• The incinerator shall be housed in a suitably ventilated enclosure • The proposed housing and construction shall address possible impacts on ambient air quality, soils, vegetation, and other factors that may be relevant • The proposed site shall be duly approved by the beneficiary company CUE before installation
Materials	The nodes of the block in contact with the input materials must be highly resistant to any corrosive effects
The following instruments if required for efficient operation:	• A carbon monoxide and/or oxygen meter/recorder • A gas flow meter/recorder • Other instruments or measurement devises considered necessary

2. FEEDING SYSTEM

Controlled mechanical or automatic feeding methods have to be used which will not negatively influence the air supply and temperature in the chambers of the incinerator.

2.1 Injection of Liquid Waste	
Input material	Liquid hazardous waste (obsolete pesticides, including chlorinated, PCB, ODS) in UN standard HDPE drums or IBC-cubes for liquids
Unit	This unit should consist of all devices necessary for injection of liquid waste into the process.
Safety	The unit must ensure leak-tightness of waste feeding, and must be equipped with all necessary safety systems (emergency prevention)
Motorization	Electric
Control System	The unit should envisage an opportunity for unloading in a manual mode and with the use of loader. Direct contact of personnel and destruction material after unloading to this site is prohibited.
Capacity	10 kg per hour

Service life	The resource (service life) of the equipment must be at least 15 years. The nodes of the block in contact with the input materials must be highly resistant to any corrosive effects.
2.2 Injection of ODS	
Input material	ODS (liquid or gaseous) in containers from 5 to 200 l
Unit	This unit should consist of all devices necessary for injection of ODS into the process.
Safety	The unit must be equipped with an aspirated cover; sucked air is passing through a dust filter catching micro particles before exhaust to the atmosphere. Approved processes must be equipped with automatic cut-off control systems on the ODS feed system, or be able to go into standby mode whenever the temperature in the reaction chamber falls below the minimum temperature required to achieve destruction.
Motorization	Electric
Control System	The unit should envisage an opportunity for unloading in a manual mode and with the use of loader. Direct contact of personnel and destruction material after unloading to this site is prohibited.
Capacity	10 kg per hour
Service life	The resource (service life) of the equipment must be at least 15 years. The nodes of the block in contact with the input materials must be highly resistant to any corrosive effects.
2.3 Automatic Loading Unit for Solid Waste	
Input material	Solid hazardous waste (obsolete pesticides, including chlorinated; soils contaminated by PCB or obsolete pesticides; medical waste) in UN standard HDPE drums 127 - 220 litres
Unit	The incineration system must be constructed to be able to handle packaged waste in the specified drums. If the incineration system cannot handle packaged waste, the Automatic Loading Unit of solid waste must include additional equipment for grinding drums bulk packaging. In case of Single chamber incinerators, the Automatic Loading Unit of solid waste must include additional equipment for the preparation of solid waste for incinerating.
Safety	Automatic system of waste loading in the combustion / reaction chamber, allows for leak-tightness of the system.
Motorization	Electric
Control System	The unloading site of the Automatic Loading Unit must envisage the possibility of unloading of solid waste in a manual mode and with the use of loader. Direct contact of personnel and destruction material after unloading to this site is excluded.
Capacity	Corresponds to the declared capacity of the main combustion chamber (approximately 200 kg of waste)
Service life	The resource (service life) of the equipment must be at least 15 years. The nodes of the block in contact with the input materials are highly resistant to any corrosive effects

3. POST-THERMAL TREATMENT SYSTEM

Cooling System	Whereupon proposals are submitted for incineration systems which require a post-combustion cooling system, this should be included in the proposal for the core equipment. The water supply to the Cooling system is provided by the beneficiary company CUE. Attention should be paid to the amount of excess heat at peak times of the equipment during the summer period, whereupon it may be necessary to provide for a cooling tower.
Ash Removal Unit	The ash removal unit should be equipped with: • Ash removal tank • A magnetic separation unit

4. FLUE GAS CLEANING SYSTEM

Emission Standards	The equipment set for Flue-gas Cleaning must ensure emission standards that are lower than those established by decree of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus dated 18 July 2018 No.5-T “On approval of environmental standards and regulations” or the Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control). The contractor should describe chemical reactions in the gas phase to control the MPC of substances on which emissions monitoring will be performed, taking as a starting point the MPC for the most toxic substance (for example, DDT).
Cleaning System	Proposals will be accepted for different systems which reduce atmospheric emissions of substances hazardous to the environment and health. Proposals may include, but are not limited to: • Dry and semi-dry flue gas cleaning • Wet flue gas cleaning • Energy recovery with flue gas condensation
Components	All components, instruments or measurement devises considered necessary for the operation of the flue gas treatment system shall be included in the proposal. Some components of the flue gas cleaning system should be modifiable according to the composition of waste communicated by the beneficiary company CUE.

5. EMISSIONS MONITORING AND CONTROL

System Requirements	The system must meet the requirements of the Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control), the decree of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus dated 18 July 2018 No.5-T "On approval of environmental standards and regulations", which establishes the list of controlled substances that must be continuously measured at hazardous waste incinerators, or similar.
Control for chemical elements in the input material	Portable device(s) for analytical control for chemical elements in the input material: • Wastes with mercury, chlorine, sulphur and fluorine • Radioactive waste
Continuous Monitoring	Continuous Monitoring should include: • Operating conditions (i.e. combustion chamber temperatures, estimated resident times, etc.) • Regulated emissions, as well as mass balance inputs covering all residual release paths (solid, liquid and gaseous) • Analysis for key contaminants in solid bottom ash, scrubber residuals and any liquid residual streams
Emission Monitoring	At a minimum, the equipment must determine the presence and value of: • particular matter; • nitrogen oxides (in nitrogen dioxide terms); • carbon dioxide; • oxygen; • sulphur dioxide
Destruction and Removal Efficiency (DRE)	Monitoring should be to provide assurance that input materials are being destroyed with an acceptable destruction and removal efficiency (DRE): • 95% for foams; • 99.99% for concentrated sources

6. CONTROL-COMMAND-AUTOMATION

SCADA (Supervisory Control and Data	The whole incineration system should be equipped with an automatic control unit and automatic control panel which are installed to the system for the continuous monitoring of the whole incineration process. Automatic control panel has manual control switches to be used in case of

Acquisition) reporting	emergency. Control panel is installed in a Control Room. With the automatic control unit following actions are monitored and controlled. • Unit of Injection of Liquid Waste; • Unit of Injection of ODS • Loading Unit for Solid Waste • Incinerator • Ash Removal Cycle, • Safety interlock of the system display and control, • Temperature measurement and recording, • Cooling system conditions • Flue-gas cleaning systems conditions; • All other relevant processes

SUPPLEMENTARY EQUIPMENT

Lot 2. Automatic Repacking of Solid Waste Unit

Automatic Repacking Unit for Solid Waste	
Input material	Solid waste - obsolete pesticides, including chlorinated; soils contaminated by PCB or obsolete pesticides in unusable packaging (metal, plastic, glass, big bags) and in bulk
Unit	The unit includes: • Accumulation site, with the installation of a lifting and transport mechanism with the possibility of remote control, for supplying material in a container (plastic drums) to the crusher; • Crusher • Conveyors (screw feeder or piston feed or analogue) • Equipment for processing of packaging
Safety	The hopper, the conveyors, the crusher, and the packaging device are equipped with an aspirated cover; sucked air is passing through a dust filter catching micro particles before exhaust to outside atmosphere. Direct contact of personnel and destruction material after loading into the hopper for the repacking of waste to drums is excluded.
Motorization	Electric
Capacity	200 kg of repacked solid waste per hour
Service life	The resource (service life) of the equipment must be at least 7 years. The nodes of the block in contact with the input materials are highly resistant to any corrosive effects

Lot 3. Overflow heat energy recovery unit

Overflow heat energy recovery unit
The design of the equipment should include a steam boiler, a turbine and an alternator and provide the possibility of heat recovery with subsequent generation of electricity, as well as the removal of thermal energy for the needs of the enterprise facilities.
The equipment must be technologically and structurally compatible with the equipment supplied under Lot 1: • Steam boiler. The excess heat produced by the Incineration System is used to produce steam with a steam boiler. The vapour pressure is approximately 40 bar. • Turbine and alternator: Steam under pressure, which is produced by a steam boiler, is directed to the blades of the turbine impeller. • Alternator. The turbine is connected to the alternator with a clutch. Due to the rotation of the turbine and its output shaft connected to the generator, electrical energy is generated.
Electricity production: from 1.0 kW per 1 kg of waste incinerated.
The resource (service life) of the equipment must be at least 15 years.