WORK PROGRAMME of EURL for PESTICIDES REQUIRING SINGLE RESIDUE METHODS

PERIOD: 2019/2020

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SUMMARY

INTRODUCTION

(Regarding relevant regulations and functions)

The concept of the EU Reference Laboratories (EURLs, former CRLs) and National Reference Laboratories (NRLs) is laid down in the Regulation (EC) No 882/2004 of the European Parliament and of the Council. From 29 April 2018 onwards Regulation (EU) 2017/625 shall apply.

The overall objective of the EURLs is the improvement and harmonisation of methods of analysis to be used by official laboratories and of the analytical data generated by them. The European Union reference laboratories should in particular ensure that NRLs and official laboratories (OfLs) are provided with up-to-date information on available methods, organise or participate actively in inter-laboratory comparative tests and offer training courses for national reference laboratories or official laboratories.

The responsibilities of the EURLs are laid down in Article 32 of Reg. 882/2004. From 29 April 2018 onwards Article 94 of Reg. 625/2017 will apply, which foresees the following responsibilities (insofar included in the work programmes):

- providing NRLs with details of analytical methods, including reference methods;
- providing reference materials to national reference laboratories;
- coordinating the application of methods by NRLs by the organisation of regular inter-laboratory comparative testing or proficiency tests;
- coordinating practical arrangements necessary to apply new methods;
- conducting training courses for staff from national reference laboratories and, if needed, from other official laboratories, as well as of experts from third countries
- providing scientific and technical assistance to the Commission;
- providing information on relevant national, Union and international research activities to national reference laboratories;
- collaborating with laboratories in third countries and with EFSA;
- establishing and maintaining up-to-date lists of available reference substances and reagents and of manufacturers and suppliers of such substances and reagents
- cooperate among themselves and with the Commission, as appropriate, to develop methods of analysis
- publish the list of the national reference laboratories designated by the Member States;

Regulation (EU) 625/2017 Art 94(2):
European Union reference laboratories designated in accordance with Article 93(1) shall be responsible for the following tasks insofar as they are included in the reference laboratories' annual or multiannual work programmes that have been established in conformity with the objectives and priorities of the relevant work programmes adopted by the Commission in accordance with Article 36 of Regulation (EU) No 652/2014:
(taking into account Art 147 of (EU) 625/2017)

1 TO ENSURE AVAILABILITY AND USE OF HIGH QUALITY METHODS AND TO ENSURE HIGH QUALITY PERFORMANCE BY NRLs.

Please, provided activities related to Regulation (EU) 2017/625:
(Number of Sub-activity boxes can be adjusted by EURL)

- *Art. 94.2.a* ***Providing national reference laboratories with details and guidance on the methods of laboratory analysis, testing or diagnosis, including reference methods.***
- *Art. 94.2.b* ***Providing reference materials to national reference laboratories***
- *Art. 94.2.c* ***Coordinating the application by the national reference laboratories and, if necessary, by other official laboratories of the methods referred to in point (a), in particular, by organising regular inter-laboratory comparative testing or proficiency tests and by ensuring appropriate follow-up of such comparative testing or proficiency tests in accordance, where available, with internationally accepted protocols, and informing the Commission and the Member States of the results and follow-up to the inter-laboratory comparative testing or proficiency tests.***
- *Art. 94.2.l* ***Where relevant for their area of competence, cooperate among themselves and with the Commission, as appropriate, to develop methods of analysis, testing or diagnosis of high standards.***

Sub-activity 1.1 Provide NRLs with details and guidance on the methods of laboratory analysis, testing or diagnosis, including reference methods

Keep Joint EURL-Portal-Website and individual EURL-SRM Website up-to-date (www.eurl-pesticides.eu)
Objectives: Provide visitors of the joint portal website and the specific EURL-SRM website with up-to-date information of interest and in particular access to analytical methods.

Background: Following an agreement between the COM and the other 3 EURLs on pesticides the EURL-SRM has introduced a Joint EURL-Website for the four pesticide EURLs (www.eurl-pesticides.eu). The Joint EURL-Website aims to facilitate the dissemination of information to NRLs and OfLs in an efficient, timely and transparent way. It consists of a joint portal-website that is administered by the EURL-SRM as well as by 4 individual websites that are administered by the 4 respective EURLs. The information provided includes links to documents of analytical methods that were either developed or validated by the EURLs. Each EURL-website contains its own list of methods, but a general overview of methods concerning compounds of relevance to monitoring activities is published in the portal site (Method finder list, see also Sub-section 2.1).

Description:

In 2019 and 2020 the joint portal-website and the individual web-sites of the EURLs will be gradually filled with new information (e.g. method protocols, workshop reports, EUPT-reports etc.). Existing links, overview-sites as well as documents will be updated. Where necessary new pages or features will be gradually added considering the needs and suggestions by DG-SANTE, the EURLs and the lab-Network.

Expected Output: New or updated websites under *www.eurl-pesticides.eu*.

Exemplary sites to be created or updated by the EURL-SRM in 2019 and 2020: Joint Annual EUPT-Calendars; Joint Annual Workshop Calendar; Joint site on Control Programs; Individual EUPT-SRM Websites for 2019 and 2020; List of Analytical Observations (provided by EURL-SRM); List of Residue Observations (provided by EURL-SRM); List of Methods (provided by EURL-SRM).

Duration: Throughout 2019 and 2020

Sub-activity 1.2 Follow up on requests from NRLs for providing analytical standards

Standard Distribution Service

Objectives: Facilitate the expansion of the analytical scope of NRLs by providing them with analytical standards.

Description: Where NRLs have difficulties expanding their scope due the non-availability in the market of analytical standards of pesticides and metabolites or of isotopically labelled internal standards (ILISs), the EURL-SRM will be offering, upon request, stock or working solutions, so far these are available in sufficient amounts. The synthesis of ILISs for chlorate and phosphonic acid and their distribution to labs will be continued. A document showing sources of certain analytical standards will be generated (see subchapter 4.1).

Expected Output: Distribution of analytical standards to NRLs where this is requested and feasible

Duration: Throughout 2019 and 2020

Sub-activity 1.3 Analysis of official samples

Analysis of official samples - counter analysis (if required)

Objectives: Analyze samples in case of disputes

Description: The EURL will ask DG-SANTE for approval of any activity concerning this, and request for additional eligible budget, if required.

Expected Output: Results of sample analyses if required and only after consultation with DG-SANTE

Duration: unpredictable

Sub-activity 1.4 Organisation of proficiency tests and follow-up on the results

EU Proficiency Test SRM 14 in 2019

Objectives: Give labs the possibility labs to check and demonstrate their proficiency when applying routine or newly established methods for the analysis of pesticide residues in liver. Help labs localize sources of errors and provide assistance for eliminating these errors.

Description: Following consultations with COM the commodity for the EUPT-SRM14 will be liver. The PT material will be spiked, homogenized and portioned. The relevant homogeneity and stability tests will be conducted following international protocols. All relevant documents and instructions will be distributed to the participants through the EURL website. Both participant registration and collection of results and method information will be conducted using online tools. Each participant will receive a detailed report summarizing the PT-scope, results, z-score calculation and, where relevant, evaluations regarding the influence of methods or particular analytical steps on the results. Prior to, during and after the EUPT, the EURL-SRM will furthermore address any PT-related requests of participating labs. At request, NRLs will be provided with PT-related information regarding OfLs within their network. Underperforming NRLs will be assisted. The PT results will be discussed with the EUPT-Scientific Committee and presented during the joint EURL-FV/CF/AO workshop. The participants will finally receive a customized certificate of participation which will be also uploaded in the "myLab"-section of EURL DataPool.

Expected Output: Distribution of PT material to participating labs, distribution of preliminary report within 3 weeks after PT deadline; distribution of final EUPT-report and distribution and upload of certificates within H1 2020

Duration: Preparation of documents, sample preparation, sample shipment, drafting and distribution of preliminary report within H1 2019, drafting and shipment of final report and certificates throughout H1 2020

EU Proficiency Test SRM 15 in 2020

Objectives: Give labs the possibility labs to check and demonstrate their proficiency when applying routine or newly established methods for the analysis of pesticide residues in a matrix that is still to be defined. Help labs localize sources of errors and provide assistance for eliminating these errors.

Description: The commodity for EUPT SRM 16 will be decided in 2019 after consultations with the EUPT-Scientific Committee and taking into consideration any requests by the COM.

Expected Output: Distribution of PT material to participating labs, distribution of preliminary report within 3 weeks after PT deadline; distribution of final EUPT-report and distribution and upload of certificates within H1 2021

Duration: Preparation of documents, sample preparation, sample shipment, drafting and distribution of preliminary report within H1 2020, drafting and shipment of final report and certificates throughout H1 2021

Administrative procedures for the registration of labs in EUPTs and the identification of labs that are obliged to participate in EUPTs (horizontal task for the benefit of all 4 EURLs)

Objectives: Update information on function and commodity scope of OfLs/NRLs. Use this information to determine which laboratories are obliged to participate in each EUPT organized in 2019 and 2020. Ensure a smooth and uniform registration of laboratories for participation in all EUPTs organized by EURLs in 2019 and 2020. Enable the export of specific participant's information in a format that can be easily imported in the EUPT data submission tool run by the EURL-CF. Make sure that all labs familiarize with the procedures of the new EUPT-administration system. Provide assistance to any OfL that requires help in updating data or registering for the EUPT and to all NRLs requiring assistance in administering the data of its OfL network.

Background: The organization of proficiency tests involves several procedures. The four EURLs of the pesticide sub-cluster have decided to harmonize these procedures as far as possible for the benefit of the participating laboratories. Most of the tasks were allocated to the EURL-SRM as all lab-specific data is administered within the EURL-DataPool, the central information management tool of the 4 EURLs. The main harmonized PT-administration procedures are the following:
a) Collection/updating of data relevant to the EUPTs (e.g. PT-contact persons, sample delivery address, invoice address …*);*
b) Collection/updating of information regarding the commodity scope profiles of the 290 laboratories within the network (note: this information (e.g. analysis of cereals on behalf of Belgium) is filled-in by the OfLs and confirmed by the NRLs);
c) Establishment of a list showing which labs are obliged to participate in the upcoming EUPT organized by the 4 EURLs (note: participation in EUPTs is mandatory for all invited official laboratories as far as the analyses required by the EUPT overlap with the analyses they perform as official laboratories (Reg. 625/2017/EU). To simplify the procedure, the obliged list released is tentative and generated only based on the commodity scope and comments provided by the OfLs. It does not consider the scope of pesticides covered by each lab in the commodities or commodity groups represented in the upcoming EUPTs. Such specific information is collected and taken into account during EUPT-registration. NRLs are responsible to check their national lab-network for completeness and report any errors);
d) Registration of labs in EUPTs (Note: obliged labs not participating are requested to provide explanations, information relevant to the EUPT can be completed/updated here, this information will be stored in the database and will be available for future PTs);
e) Collection of EUPT results and methodology information.
The first 3 procedures are run within the EURL DataPool (www.eurl-datapool.eu) and the fourth within the EUPT Registration Tool (www.eupt-registration.eu)*, which is directly linked to the DataPool. These two tools are administered by the EURL-SRM, whereas the EUPT result submission tool is administered by the EURL-CF.*
Description: The EURL-SRM will ask the OfLs and NRLs to login to the EURL DataPool in order to update the data on the commodity types covered within their routine sample scope. In parallel, all NRLs will be asked to confirm the information given by the labs belonging to their network. Based on the (confirmed) commodity-scope of each OfL and additional comments provided by the labs, the EURL-SRM will define, for all EUPTs organized by the EURLs in 2019 and 2020, the participation status (obliged/not obliged) of all laboratories. This information will be entered into the EURL-DataPool and will be accessible to OfLs/NRLs when entering the EUPT Registration Tool (www.eupt-registration.eu). Labs will be asked to register for the EUPTs they wish to participate. Labs deciding not to participate at a specific EUPT for which they are obliged to participate, will be asked to provide an explanation. NRLs will be asked to cross-check the registered OfLs of their lab-network, to identify missing labs and to get into contact with them if needed. The EUPT organizers (the four EURLs) will be asked to download, from the EURL DataPool, the list of labs having registered, and submit it to the programmer of the EUPT-result submission website hosted by EURL-CF.
Expected Output: Updated commodity scope of NRLs and OfLs within the EURL DataPool (Q1 2019 and Q1 2020), decision on the participation status of all OfLs / NRLs (obliged/not obliged), uptake of this information into the EURL-DataPool, registration of labs through the EUPT Registration Tool, export of the participants' list and submission to the programmer EUPT-result submission website.
Duration: For the EUPTs in 2019 this activity (collection/updating of lab contact data, defining EUPT status of all OfLs) started in December 2018 and will be finalized in January 2019. For the EUPTs in 2020 this activity will start in December 2019 and continue in January 2020. For the EUPTs in 2020 this activity will start in December 2020. EUPT-Registration and the submission of this information to the EURL-CF for uploading into the EUPT-results submission website, will take place in H1 2019 and H1 2020.

Import of EUPT-results from 2018 and 2019 into the EUPT-Archive

Objectives: Import of results from EUPT-FV20 and 21, CF12 and 13, AO13 and 14 and SRM13 and 14 into the EUPT-Archive. Introduction of an upload-functionality for EUPT-certificates of each participant into the EUPT-Archive.

Description: The results of the EUPTs organized in 2018 and 2019 will be collected from the individual EURLs and formatted as necessary to be imported into the EUPT-Archive DB, which is implemented within the EURL DataPool. The possibility to upload the EUPT-certificates will be introduced into the database giving the participants a convenient access to the certificates via the "myLab"-section of EURL DataPool.

Expected Output: updated EUPT-Archive within the EURL-DataPool.

Duration: H1 2019 (for EUPT-FV20, CF12, AO13 and SRM13) and H1 2020 (for EUPT-FV21, CF13, AO14 and SRM14)

Sub-activity 1.5 Cooperation and meetings with other EURLs

EURL Coordination

Objectives: Cooperation and meetings with other EURLs for coordination purposes

Description: Inter-EURL-meetings, in some cases in presence of DG-SANTE representatives, will be carried out with the aim to discuss, plan, coordinate or evaluate EURL-activities such as the preparation of work programs, workshops, EUPTs or web-applications. This activity may involve one or several missions of EURL-SRM staff. In certain cases online-meetings or tele-conferences will be carried out. Date and place of these events will be decided later.

Expected Output: Decisions for future work

Duration: To be decided later following consultations with the other EURLs and/or DG-SANTE.

Sub-activity 1.6 Development and validation of analytical methods

Further development of the Quick Polar Pesticides Method (QuPPe Method)

Objectives: Further develop the QuPPe method to improve analysis of several problematic compounds in various commodities and to include further analytes such as thiocyanate.

Background: The EURL-SRM has introduced a method for the simultaneous analysis of several highly polar pesticides not amenable to multiresidue procedures (QuPPe method). The QuPPe method involves a common one-phase extraction step followed by various LC-MS/MS analysis options. It is nowadays employed by a large number of OfLs. The QuPPe method in connection with LC-MS/MS sometimes suffers from poor sensitivity for some compounds (especially when using instruments from certain manufacturers) as well as from difficulties in robustness of separation columns. Ion chromatography (IC) and Capillary Electrophoresis (CE) are two separation techniques that are well suitable for ionic or ionisable polar compounds and that are well amenable to LC-MS/MS. The two techniques are thus potentially well suitable for the analysis of the compounds covered by the QuPPe method and offer additional options to the laboratories that would like to embark in the analysis of highly polar pesticides. Thiocyanate is used in form of various salts (potassium, sodium, ammonium) as a herbicide and is in the process of being approved within the EU. For properly setting MRLs there is the need to study the natural background levels in various commodities such as brassica and allium crops.

Description: The main focus will be in testing the possibilities offered by Ion Chromatography and Capillary Electrophoresis in order to improve the analysis of the most problematic among the QuPPe-

compounds (e.g. glyphosate). A method for the analysis of thiocyanate will be developed and applied within a pilot monitoring on at least 50 samples belonging to minimum 25 different commodities.
Expected Output: Update of the QuPPe method protocol by Q1 2021. Results of thiocyanate pilot monitoring to DG-SANTE.
Duration: throughout 2019 and 2020

Interlaboratory Validation of the QuPPe method ("Glyphosate&Co." group of compounds)
Objectives: Pursue a standardization of the QuPPe method at CEN level through an interlaboratory method validation study for polar compounds analysed in the LC-MS/MS ESI neg. mode ("Glyphosate&Co.").
Background: The QuPPe method is among the OfLs meanwhile the most widely used method for polar pesticides. With 50-100% of the OfLs applying this methodology. For the purposes of standardization there is a need of validating methods within the framework of interlaboratory method validations studies. In the past years the EURL-SRM has already run two interlab validation rounds: one on the compounds of the Quats&Co. group and one on chlorate, perchlorate, phosphonic acid and bromide.
Description: An interlaboratory validation of the QuPPe method for compounds within the "Glyphosate&Co." group (ethephon, HEPA, (ethephon metabolite), glyphosate, AMPA (glyphosate metabolite), N-acetyl-glyphosate (glyphosate metabolite), N-acetyl-AMPA (glyphosate metabolite), glufosinate, MPPA (glufosinate metabolite), N-acetyl-glufosinate (glufosinate metabolite), fosetyl-Al, maleic hydrazide and cyanuric acid). The validation scope will cover liver and one additional commodity of animal origin (preferably kidney).
Expected Output: Evaluation of the results of the study within Q1 2020
Duration: throughout 2019

Analysis of Fluazifop, Haloxyfop and Ioxynil in Commodities of Animal Origin
Objectives: Develop a method for the analysis of fluazifop, haloxyfop and ioxynil in food commodities of animal origin.
Description: Fluazifop, haloxyfop and ioxynil are among the compounds for which, according to the *SANCO/12745/2013 ("W*orking document on pesticides to be considered for inclusion in the national control programmes …"*),* support by the EURLs is required as regards commodities of animal origin. As the residue definition of these compounds includes conjugates and esters two approaches will be tested: a) analysis focusing on the free forms of haloxyfop, fluazifop and ioxynil (which can serve for screening purposes) and b) analysis involving a hydrolysis step to break up esters and conjugates followed by the analysis of the free acid.
Expected Output: Method report within H1 2020
Duration: throughout 2019

Studies on the Enantioselective Separation of Pesticides
Objectives: Explore the enantioselective separation of constituent isomers of various pesticides in order to gain the ability to separately quantify (where necessary) individual components or to identify in which form a pesticide was applied in the field (misuse detection).
Background: Many pesticides that were registered as mixtures of stereoisomers are nowadays registered as one specific (typically the most active) stereoisomeric form. Analytical methods routinely applied in pesticide residue laboratories do not allow enantiomeric separation, thus not allowing to distinguish which of the pesticide forms was applied in the field. In other cases, where individual isomers differ significantly in their toxicity, the lack of quantitative results on individual enantiomers does not allow proper risk assessment. For example, fenvalerate, which is a mixture of two enantiomeric pairs (RS/SR, RR/SS), has lost approval within the EU, and was essentially replaced by esfenvalerate, which consists of one single enantiomer (SS). Using traditional separation techniques,

the constituent isomers of fenvalerate cannot be chromatographically separated and in addition using GC an isomerization of SS/RR to RS/SR takes place, making it difficult to distinguish between esfenvalerate and fenvalerate, or to separately quantify esfenvalerate to enable risk assessment calculations. Other examples of compounds where enantiomeric separation would be of interest are: Haloxyfop, Fluazifop, Quizalofop, Metalaxyl, Dichlorprop and Benthiavalicarb. In a project in 2018 the enantiomeric separation of the two gamma cyhalothrin components was achieved using LC-MS/MS and a special chiral column. In 2019/20 this project should be extended to include more pesticides. Additional pesticides could be scheduled for 2021 ff..

Description: Development of methods allowing the enantioselective separation of the constituent isomers of various pesticides (e.g. *fenvalerate, metalaxyl, haloxyfop)*. Priority will be given to pesticides for which quantification of single enantiomers will improve risk assessment calculations and pesticides that used to be employed as enantiomeric mixtures but are nowadays employed as single isomers will be prioritized.

Expected Output: Report within Q1 2021

Duration: 2020

Pilot study on the occurrence of toxicologically critical pesticides in Milk and Infant Formulae

Objectives: Develop and validate methods for the analysis of certain highly toxic pesticides (not amenable to multiresidue methods) in infant formulae for children of less than 16 weeks of age as well as milk. Explore the residue situation of those pesticides in these matrices by analysing samples from the market and initiate further actions in case hotspots are identified.

Background: In May 2018 EFSA has published a Scientific Opinion on pesticides in foods for infants and young children. For infants below 16 weeks of age, the EFSA PPR Panel concluded that pesticide residues at the default MRL of 0.01 mg/kg for food for infants and young children may result in an unacceptable exposure in those compounds where the ADI is lower than 0.0026 mg/kg body weight per day. For these critical compounds lower MRLs were recommended.

Description: Development of methods allowing the sensitive analysis of certain critical pesticides from the EFSA list and validation of these methods at levels at or below the safe MRLs proposed by EFSA for each compound. Analysis of ca. 50 samples of milk, and ca. 50 samples of (conventional and organic) infant formulae of the following types: a) “Normal” Infant formulae; b) Lactose-Free Infant Formula; b) Hypo-Allergenic Infant formula (hydrolyzed milk proteins); c) Infant Formula suitable for reflux disease; d) Infant Formula suitable for coeliac disease; e) Soya based Infant formula; f) rice-based Infant formula. The study will foreseeably include the following SRM-pesticides. Amitrole, Diquat, Nicotine, Abamectin B1a, Carbofuran (sum), Emamectin B1a, Triphenyltin cation, Gamma Cyhalothrin, Diclofop acid and Haloxyfop.

Expected Output: Method reports Q1 2020, Pilot Monitoring Report Q4 2020

Duration: Method validation Q1-Q3 2019, Analysis of samples Q4 2019 –Q4 2020

Sub-activity 1.7 Analysis of dithiocarbamates

Development of a screening method for Alkylene-*bis*-Dithiocarbamates

Objectives: This sub-activity includes two research projects: (A) Develop a screening-method for mancozeb, maneb, zineb (= ethylene-bis-dithiocarbamates (DTC)) and for propineb (= propylene DTC); (B) Test various chemical reagents in order to quantify DTCs (ethylene-, propylene- and N,N-dimethyl-DTC). The aims of this sub-activity are (1) to develop a qualitative method that enables the screening for characteristic decomposition products of ethylene- (e.g. mancozeb, maneb, zineb) and propylene-DTCs (propineb) in QuEChERS-extracts by routine GC-MS techniques and (2) to test various chemical reagents in order to derivatize DTCs (ethylene-, propylene and N,N-dimethyl-DTC) to products which can be quantified by GC- and/or LC/MS-techniques. Among others, the toxicology of the derivatization-reagents is of significant importance here (e.g. the reagents must not be cancerogenic!) and the derivatization products should be amenable to multi-residue methods (e.g.

QuEChERS). The selectivity and the specificity of the methods will be tested by analyzing QuEChERS-extracts of various crops.

Background: Currently, residues of DTCs are analyzed by using common moiety methods involving the release of carbon disulfide (CS_2) via an acid digestion/hydrolysis step. These methods are however very laborious, costly and require considerable amounts of highly concentrated chemicals (e.g. hydrochloric acid, tin(II)-chloride). For these reasons, routine pesticide laboratories are often reluctant when it comes to analyze food samples for DTC residues. In addition, the specificity of the common-moiety approaches to the presence of DTC residues is compromised in case of commodities naturally containing compounds (e.g. mustard oil glycosides) that do also release CS_2 either spontaneously or during the digestion/hydrolysis step of DTC analysis. Considerable levels of phytogenic CS_2 were detected especially in crops belonging to the Brassicaceae and Alliaceae family as well as papaya as shown by various studies.

Description: Develop a screening-method for ethylene-bis-dithiocarbamates and for propineb. Test various chemical reagents in order to quantify DTCs (ethylene-, propylene- and N,N-dimethyl-DTC).

Expected Output: Report on screening method in H1 2019, on derivatization method within H1 2020

Duration: throughout 2019 (screening method), throughout 2020 (derivatization method)

Analysis of Organic samples for the release of CS2

Objectives: Support EFSA and DG-SANTE to evaluate the background levels of carbon disulphide (*CS_2)* in various crops and to establish reasonable MRLs for dithiocarbamates. This is to be accomplished by generating data on carbon disulphide background levels in organic crops.

Background: A large number of commodities naturally contain compounds that can directly or through intermediate products lead to the generation of CS_2 during the acidic digestion/hydrolysis step of methods used for the analysis of dithiocarbamates. As this CS_2 generated from naturally-occurring compounds cannot be distinguished from the CS_2 generated from residues of dithiocarbamate pesticides, there is a strong interest to determine the range of CS_2-levels released during analysis. This knowledge will help in setting MRLs and evaluating CS_2-levels more reasonably. In 2017, the EURL-SRM and EFSA jointly elaborated a list of crops suspicious to release CS_2 during analysis. This list was distributed to the MS in November 2017 with the aim that products prioritized within this document will be included in the national and regional control programs. But there is still lack of data.

Description: 100 samples of (mainly rare) products that are suspected to generate carbon dioxide will be analysed. The products to be analysed will be preferentially of organic production.

Expected Output: Introduction of the generated into the existing compilation of *CS_2* levels within 2019 and 2020

2 TO PROVIDE SCIENTIFIC AND TECHNICAL ASSISTANCE TO NRLs

Please, provided activities related to Regulation (EU) 2017/625:
(Number of Sub-activity boxes can be adjusted by EURL)

- *Art. 94.2.d* ***Coordinating practical arrangements necessary to apply new methods of laboratory analysis, testing or diagnosis, and informing national reference laboratories of advances in this field.***
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- *Art. 94.2.e* ***Conducting training courses for staff from national reference laboratories and, if needed, from other official laboratories, as well as of experts from third countries.***
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- *Art. 94.2.g* ***Providing information on relevant national, Union and international research activities to national reference laboratories.***

Sub-activity 2.1 Providing technical and scientific support to NRLs

EURL-DataPool-Services

Objectives: Maintain and develop further a database platform allowing systematic collection of information of practical use for analysts in the area of pesticide residues. Enable easy and targeted retrieval of this information by the analysts. Create added value through linkage of information.

Background: Following an agreement between the COM and the other 3 EURLs, the EURL-SRM has installed the "EURL-DataPool Service" entailing nine interlinked databases that can be accessed via www.eurl-datapool.eu (= output I). The EURL-DataPool Service is administered by the EURL-SRM as a horizontal activity and aims to a) store general and up-to-date information about the entire network of laboratories working in the area of pesticides, which help to illustrate, and at the same time, strengthen the laboratory network (see also sub-activity 2.7), b) facilitate the conservation of knowledge about pesticides, and c) offer NRLs/OfLs, EURLs, as well as COM and EFSA, fast access to valuable information that can be used to assist decision-making and strategic planning (= output II). Special focus is being placed on the generation, collection and evaluation of experimentally-obtained data generated by various laboratories including the EURLs (e.g. MS/MS-transitions, LC- and GC-high resolution MS data, method validation data, stability data of compounds and EUPT data).

Description: In 2019 and 2020 the existing databases will be maintained and filled up with further data, see individual tasks in the table below.

Databases/Website/ eTools	Task	Examples where DB is used/interlinked
EURL-DataPool-website (www.eurl-datapool.eu)	The .NET Framework of the website will be further upgraded in order to keep the website constantly up-to-date with new web-developments.	See below (Link DataPool)
Analytical Methods DB	Data collection on various methods and its import into the DB (needed in the master-data for Stability DB, Method Validation DB)	a) Method Validation DB, b) Method Finder List
Method Validation DB	Data on recovery rates achieved by various labs using	a) "Art. 12" activities,

Databases/Website/ eTools	Task	Examples where DB is used/interlinked
	various methods (e.g. QuEChERS, QuPPe, QuOil, SweEt) and experimental details of the recovery experiments, will be collected in cooperation with NRLs and/or EURLs and imported into the DB. Special focus will be set on substances which are in the process of re-evaluation of MRLs and residue definitions within the frame of Art. 12 / Reg. 396/2005. The excel-based file for the submission of validation data will be further upgraded to allow a wider documentation of the conditions and results of validation experiments (e.g. tracking of data on additional mass-transitions, initial temperature of sample and duration of various analytical steps). Additional aspects regarding the evaluation of results (e.g. calculation of signal ratios, calculations using various types of calibrations).	b) Pesticides DB, c) Pesticide Ranking List (PeRL), d) Analytical Methods DB, e) Tool for the Estimation of the Measurement Uncertainty
Pesticides DB	Generation or collection of further data for the characterization of pesticides (e.g. GC-, LC-amenability, analytical behaviour, GC-MS-spectra, GC-MS/MS-transitions; LC- and GC-high resolution MS-data, solubility in acetonitrile) and import into the DB. This includes the creation of new entries for pesticides and metabolites not yet in the DB. GC-high resolution Orbitrap-MS-data of new compounds will be imported.	a) "Art. 12" activities, b) Pesticide Ranking List (PeRL), c) Method Validation DB, d) Stability of Compounds DB, e) Method Finder List
Stability of Compounds DB	Collection of more data on the stability of pesticides/metabolites and import of this data into the DB. The EURL-SRM is in contact with several labs generating pesticide stability data, but contribution of this data to EURL DataPool depends on the willingness of these labs. Results from stability experiments conducted by EURL-SRM will be imported (MS- and NMR-data).	Pesticides DB
Pesticide Authorizations DB	Data collection and updating as well as import into the DB of information about the authorization of pesticides in the EU and some third countries.	Pesticide Ranking List (PeRL)
Commodities DB	Data collection on commodities and import into the DB.	Validation DB
MRL Residue Definitions DB	Updating of EU MRL residue definitions on regular basis. Updating of Codex MRL residue definitions (once a year after the annual CCPR-meeting); Updating of compound conversion factors within the DB.	a) "Art. 12" activities, b) Pesticide Ranking List (PeRL), c) Pesticides DB, d) Tool for Calculation of Sum
EUPT Registration Tool	The EUPT Registration website (www.eupt-registration.eu) was introduced and will be used for the EUPTs to be conducted in 2019 and 2020. The 4 EURLs will discuss and jointly decide on refine-ments/upgrades/improvements of the website. Modifications will be implemented if needed.	a) EUPT Registration website (www.eupt-registration.eu)
NRL/OfL/User-Network-DB	See 2.7	a) EUPT Registration website b) EUPT-Obliged Labs List c) Invitations to EUPTs d) Surveys

Expected Output: Constant updating of all EURL DataPool-databases (see www.eurl-datapool.eu)
Duration: throughout 2019 and 2020

EURL Method Finder List
(Link: http://www.eurl-pesticides.eu/docs/public/tmplt_article.asp?CntID=629&LabID=100&Lang=EN)
Objectives: Provide network laboratories with an overview and facilitate access to methods that have been developed or validated by the EURLs as regards compounds included in Monitoring Regulations for 2019-2021 and 2020-2022 as well as analytes included in the SANTE working document on monitoring.
Background: The EURL Method Finder List gives an overview of the EURL-methods, -validation reports, and -analytical observation reports released by the EURLs and concerning compounds that are included in the MACP-Regulations and the MACP-WDs.
Description: The list will be periodically updated to include any new methods released.
Expected Output: Updating of list considering MACP-Regulation 2018-2020 and MACP-WD rev. 10(3) (see website: http://www.eurl-pesticides.eu/docs/public/tmplt_article.asp?CntID=629&LabID=100&Lang=EN)
Duration: throughout 2019 and 2020

Sub-activity 2.2 Organisation of workshops

Joint EURL-Workshop for Pesticide Residues in Food & Feed
Objectives: Strengthen collaboration within the lab network, disseminate knowledge, provide up-to-date information, and discuss results of EUPTs
Description: In the second half of 2019 a joint EURL-workshop will be organized in close collaboration with the EURL-FV/CF/AO and will take place in Copenhagen/Denmark. In the second half of 2020 another workshop will be organized. NRLs from all MS will be invited to attend the workshop, with the main objective to facilitate the interaction between them and the EURLs and to discuss the EUPTs and new analytical developments. During the workshop in 2019 an update of the quality control procedures document (SANTE/11813/2017) will be discussed. Each workshop will be held during two days, and will entail technical and scientific communications regarding new activities of the EURLs and other developments in the field of pesticide residues analysis. For the workshop in 2020 the EURL-SRM would like to keep the option for a joint organization with another EURL. At the time being it is difficult to predict with which EURL the workshop would be jointly organized as this mainly depends on the matrix that will be chosen for the PT in 2020.
Expected Output: Report on each workshop within 3 months after workshop
Duration: In H2 2019 and H2 2020

Sub-activity 2.3 Organisation of training courses

NRL-Training
Objectives: Provide up-to-date information on methods, provide hands-on training, and discuss individual analytical problems of OfLs.
Description: Two groups of NRL-representatives (from 8 to 10 countries each) will be invited to attend a training in Fellbach. One group will be accommodated in 2019 and the second one in 2020. The training will cover technical aspects as regards the analysis of SRM-pesticides and the exchange of experiences among participants. Special needs and problems of the laboratories selected to participate will be considered in the design of the training program. Additional ad-hoc trainings may be conducted as requested.
Expected Output: Report on training within 3 months after training
Duration: at some point in 2019 and 2020 (to be decided)

Sub-activity 2.4 Visits of NRLs

Visit of two NRLs

Objectives: Provide on-site assistance and support to NRLs phasing difficulties of analytical or organizational nature.

Description: In 2019/20 the NRL-SRM of two selected countries will be visited by representatives from the EURL-SRM. The countries to be visited will be selected giving emphasis on poor EUPT scope, performance or participation over the last years as well as on poor cooperation with the EURL. Prior to the inspection a detailed study of the EUPT results during the last years as well as the current analytical scope of all OfLs will be carried out. In case of bad PT-performances, the possible reasons for bad PT-performance will be discussed during the visit and advices will be given to improve performance and to expand the scope.

Expected Output: Two NRL-Visit Reports

Duration: at some point in 2019/2020 (to be decided)

Sub-activity 2.5 Organisation of webinars

Tutorials

Objectives: Disseminate information of interest to laboratories in a cost-effective way

Description: In 2019 and 2020 the EURL-SRM will organize/publish at least two tutorials, either individually or in collaboration with other EURLs. Tutorials provide the possibility to disseminate information of broad interest to NRLs and OfLs in a cost effective way.

Expected Output: Publication of at least two tutorials in the EURL DataPool- website

Duration: Within 2019 and 2020, to be decided

Sub-activity 2.6 Providing relevant information on national, Union and international research activities to NRLs

Update the "SRM-Pinboard"

Objectives: Promote the concept of sub-contracting analyses of SRM compounds among the laboratories within the Lab-Network. Provide labs interested in subcontracting certain analyses to other labs, and labs interested in getting subcontracted by other labs, a platform and tool that will help them to conveniently find each other.

Background: Within the frame of official controls, SRM analytes are less frequently analyzed compared to MRM analytes. OfLs often complain that limited resources prevent them from establishing suitable methods for the analysis of SRM-analytes or applying such methods in case they are established. Lab-cooperation and subcontracting of analyses can help to reduce the overall number of labs that will have to establish or apply SRMs thus improving overall efficiency and frequency of analysis of SRM compounds.

Description: In 2019 the current on-line tool will be updated. The list of laboratories considered as proficient for the analysis of individual SRM-compounds will be updated as soon as new PT results become officially available or whenever a lab wishes to enter the list or change its status.

Expected Output: H1 of 2019 and H1 2020 (as online-service; see EURL-DataPool Service)

Duration: within 2019 and 2020

Sub-activity 2.7 Updating and publication of the list of NRLs

Lab Network Database (hosted in the EURL DataPool)
Objectives: Permanent updating of lab-specific information of NRLs and OfLs.
Background: Various editing-forms were introduced in EURL DataPool to allow NRLs and OFLs to update specific data about their lab: lab contact data, lab-functions, update of email-addresses of lab-members, lab-tasks within the frame of official controls (import controls, commodity scope, pesticide scope, etc.).
Description: The EURL-SRM will ask all NRLs and OfLs to keep this information up-to-date on several occasions throughout the year. The EURL-SRM will assign new members to the respective "myLab"-area of their laboratories within EURL DataPool. An updated list of NRLs will be made available online.
Expected Output: Updated list of NRLs available in EURL DataPool-website
Duration: Throughout 2019 and 2020

Sub-activity 2.x *(name of Sub-activity)*

Objectives:
Description:
Expected Output:
Duration:

3 TO PROVIDE SCIENTIFIC AND TECHNICAL ASSISTANCE TO THE EUROPEAN COMMISSION AND OTHER ORGANISATIONS

Please, provided activities related to Regulation (EU) 2017/625:
(Number of Sub-activity boxes can be adjusted by EURL)

- *Art. 94.2.f* ***Providing scientific and technical assistance to the Commission within the scope of their mission.***

- *Art. 94.2.h* ***Collaborating within the scope of their mission with laboratories in third countries and with the European Food Safety Authority (EFSA), the European Medicines Agency (EMA) and the European Centre for Disease Prevention and Control (ECDC).***

- *Art. 94.2.i* ***Assisting actively in the diagnosis of outbreaks in Member States of foodborne, zoonotic or animal diseases, or of pests of plants, by carrying out confirmatory diagnosis, characterisation and taxonomic or epizootic studies on pathogen isolates or pest specimens.***

Sub-activity 3.1 Technical and scientific assistance to the Commission

Technical support to DG-SANTE for the evaluation or re-evaluation of pesticides (e.g. within the framework of Art.12 of Reg. 396/2005) - This task includes experimental work

Objectives: Provide assistance and technical support to DG-SANTE and EFSA (on behalf of DG-SANTE) on all aspects related to the (re-)evaluation of pesticides. Where necessary, conduct experiments to assess the analytical behaviour of pesticides.
Background: The evaluation and re-evaluation of pesticide MRLs and residue definitions is of high priority for DG-SANTE. The EURLs are frequently consulted to provide technical support in this respect. This may include the request for reasoned positions as regards LOQs and the analytical feasibility and specificity of residue definitions, the evaluation of background levels and other relevant aspects. *Re-evaluations according to Art.12 of Reg.396/2005 concern ca. 25 pesticides per year, but those may be re-processed multiple times under different requirements, with the EURLs being typically consulted at 3 stages: a) during the completeness check period (by EFSA), b) after the release of the draft reasoned opinion (by EFSA), and c) prior and during the preparation of the regulation draft (by DG-SANTE). Following agreement with DG-SANTE* ***the EURL-SRM is coordinating the positions for all compounds re-evaluated under Art. 12 of Reg. 396/2005 at stages a) and b) and half of the compounds at stage c).*** *Due to the multiple processing of each "Art.12 compound", the total number of compounds to be processed in 2019 and 2020 is difficult to predict. It is however expected to be ca. 100.*
Re-evaluations according to Art. 43 of Reg. 396/2005, assessments for new active substances (NAS) and the evaluation of substances within the framework of a renewal of approval procedure (Art12

Reg. 844/2012/EC) concern a smaller number of pesticides. Ca. 50 compounds are expected to be processed in 2019 and 2020 altogether within this framework. Also here ***the EURL-SRM is coordinating the positions of the EURLs*** *for submission to DG-SANTE or EFSA.*
In most cases the evaluation by the EURLs involves the conduction of analytical experiments to check, the amenability of the compounds and residue definitions to multiresidue methods as well as the general analytical behaviour of the compounds during extraction and chromatographic separation. Where the available validation data is not sufficient, basic validation experiments are conducted and achievable consensus LOQs are estimated, always taking into account the proposed residue definition and the capabilities of OfLs.
Based on the experiences acquired in pesticide evaluations from 2013 to 2018, a considerable number of residue definitions concerns compounds requiring single residue methods or modified multiresidue methods. This is either because of the analytical properties of individual compounds within the residue definitions (parents or metabolites) or because the residue definitions require analysis via a common moiety.
Description: Within 2019 and 2020 ca. 100 pesticides will be expectedly reviewed according to Art. 12 of Reg. 396/2005. Re-evaluation according to Art. 43 of Reg. 396/2005, NAS, and re-evaluations within the renewal of approval *(Art12 Reg. 844/2012/EC)* will expectedly concern another ca. 50 compounds. The EURL will take over the coordinating role in evaluation these compounds as agreed with DG-SANTE. In most cases, the evaluation will expectedly involve the conduction of analytical experiments to check, amenability to multiresidue methods and analytical behaviour in general. In some cases modifications of the QuEChERS method or single residue methods may need to be introduced. Where validation data do not exist or are not sufficient, validation experiments will be conducted to determine achievable LOQs. Necessary standards of pesticides or metabolites will be purchased and should these not be available, they will be requested from applicants. Where analytical standards are not available this will be reported. The expected effort for Art.12 experiments is listed below:

Estimated man-days for experiments (Art. 12):

Type of compound	Expected No. of compounds	Lab activities involved				
		NONE	SOME	EXTENSIVE	VERY EXTENSIVE	Sum (Working days)
Estimated man-days for 10 compounds (avg)		*0*	*15*	*25*	*80*	
requiring NO Lab Activities	50					0
requiring SOME Lab Activities*	20		30			30
requiring EXTENSIVE Lab Activities**	20			50		50
requiring VERY EXTENSIVE Lab Activities***	10				100	100
					SUM	**180**

* e.g. for analytes requiring minor modifications of MRM-methods with few matrix groups being involved
** e.g. for analytes requiring minor modifications of MRM-methods with many matrix groups being involved OR non-MRM amenable analytes (parent or metabolites) with few matrix groups being involved
*** e.g. for challenging non-MRM-amenable analytes (parent or metabolites), with many matrix groups being involved

Expected Output: EURL-Evaluation Reports under Article 12 of Regulation (EC) No 396/2005 during completeness check period, comments on draft reasoned opinions, comments on regulation drafts, comments on RAR for compounds under renewal, comments on DAR for NAS, comments on EFSA review reports based on Art. 43 of Reg. 396/2005, communication via e-mail. Timing as requested by the deadlines given
Duration: throughout 2019 and 2020 as requested

Support DG-SANTE on aspects related to monitoring activities

Objectives: Provide technical assistance to DG-SANTE in drafting the MACP regulation and the monitoring working document and in providing an overview of the available methods.

Description: Technical assistance will be provided to DG-SANTE where this is requested. This may involve the following: a) checking amenability of compounds to multiresidue methods and the availability of analytical standards in the market, b) participation in discussion meetings (e.g. in Brussels); c) preparation of a new Pesticide Ranking List (PeRL) following collection and evaluation of the necessary data; d) revision of documents; e) Communication with DG-SANTE and other stakeholders; f) update of the Method Finder List; g) a survey among all NRLs and OfLs in the network in order to find out which compounds of the working document are routinely covered by the OfLs.

Expected Output: Review of draft documents, technical comments through various channels of communication, updated version of method finder list, generation of a new pesticide ranking list (PeRL, if requested), new survey report on compounds and residue definitions routinely covered by laboratories within the network.

Duration: throughout the years as requested

Revision of QA/QC-Document:

Objectives: Provide laboratories involved in official controls performance criteria to assess their methods and a guidance on how to properly conduct pesticide analysis.

Background: The guidance document ("Method Validation and Quality Control Procedures for Pesticide Residues Analysis in Food and Feed") on analytical quality control is updated on a biannual basis. Following agreement by the EURLs this activity is coordinated by EURL-FV in collaboration with Tuija Pihlström (Sweden) and is assisted of an Advisory Group consisting of experienced experts. The next version of the document is due towards the end of 2019, but consultations within the AQC advisory group and with NRLs already started in 2018 and will continue in 2019.

Description: Jointly with the other EURLs and the members of the AQC-Advisory Group and the NRLs the EURL-SRM will contribute in the revision of the document SANTE/11813/2017. The activity will involve participation in coordination meetings of the AQC- Advisory Group as well as discussion with the NRLs and a technical approval during the joint workshop in Denmark in 2019. For the next revision due in 2021, at least one coordination meeting of the AQC-Advisory Group will be also held in 2020 with the EURL-SRM participating.

Expected Output: Localization of topics, where revision may be needed. Revision work within working groups to be decided. The revision work will materialize in a new version technically approved version of the document.

Duration: during 2019 and 2020, dates/periods not yet defined

Sub-activity 3.2 *Collaboration with European and international organisations (EFSA, CEN, ISO, …) and Third Countries (h)*

Technical and scientific support to EFSA

Objectives: Provide technical assistance to EFSA in order to facilitate the (re-)evaluation of pesticides, the drafting of reasoned opinions, the monitoring coordination and any other aspect requested.

Description: The technical support to EFSA may include the following activities:

a) Assistance for the (re-)evaluation of pesticides according to Art12 and Art43 of Reg. 396/2005 and *Art12 Reg. 844/2012/EC* (see Sub-activity 3.1);

b) Assistance as regards its activities relating to pesticide monitoring such as the revision of documents the provision of information on analytical aspects, the classification of residue definitions and the assistance in the interpretation or results. This activity may include participation in one or more meetings of the Networking Group on Pesticide Monitoring (in Parma)

Expected Output: Opinions, revisions communicated via e-mail or personally

Duration: as requested

Collaboration with Standardization bodies
Objectives: Pursue the standardization of methods
Description: This activity will include active involvement in the activities of the pesticide residue group of the CEN (European Standardization Body) and DIN (German Standardization Body) as well as of the German group for the establishment of official methods.
Expected Output: Revisions, evaluation of validation data, participation in meetings
Duration: as requested

Sub-activity 3.3 Participation in symposiums, workshops and seminars for the dissemination of scientific information.

Participation in International Workshops
Objectives: Present results of EURL-activities, interact with the community and collect information, in order to stay updated about the developments in the field
Description: This activity may involve participation in various international conferences and workshops upon invitation, e.g. at the EPRW 2020 in Granada (Spain)
Expected Output: Oral presentations and posters
Duration: within 2019 and 2020

Sub-activity 3.x *(name of Sub-activity)*

Objectives:
Description:
Expected Output:
Duration:

4 REAGENTS AND REFERENCE COLLECTIONS

Please, provided activities related to Regulation (EU) 2017/625:
(Number of Sub-activity boxes can be adjusted by EURL)

- *Art. 94.2.*j ***Coordinating or performing tests for the verification of the quality of reagents and lots of reagents used for the diagnosis of foodborne, zoonotic or animal diseases and pests of plants.***

- *Art. 94.2.k* ***Where relevant for their area of competence, establishing and maintaining:***
  - ***i. reference collections of pests of plants and/or reference strains of pathogenic agents;***
  - ***ii. reference collections of materials intended to come into contact with food used to calibrate analytical equipment and provide samples thereof to national reference laboratories;***
  - ***iii. up-to-date lists of available reference substances and reagents and of manufacturers and suppliers of such substances and reagents.***

Sub-activity 4.1 Up to date lists of available reference substances and reagents and of manufacturers and suppliers of such substances and reagents

List of Suppliers of Isotopically Labeled Internal Standards
Objectives: Facilitate the retrieval of isotope labelled standards by the laboratories and thus promote the use of isotope labelled internal standards
Description: A list with manufacturers of isotopically labeled internal standards for selected compounds will be updated at the EURL Website. The list will cover the compounds analyzed by the QuPPe methodology, compounds within the MACP regulation and working document as well as compounds for which methods have been published by the EURL.
Background: Isotopically Labeled Internal Standards (ILISs) are analogues of the native compounds in which one or more atoms are exchanged by stable isotope analogues such as (^{13}C, ^{15}N, ^{2}H, ^{18}O). They have nearly identical chemical and physical properties to the unlabeled analyte. So far available, these ILISs are added directly to the test portion at the beginning of the procedure to compensate for any factors having an influence on the recovery-rates such as volume-deviations, analyte losses during partitioning, as well as matrix-effects during measurement. This can help to simplify analytical procedures by obviating the need for high recoveries or extensive cleanup procedures. ILISs furthermore help to reduce variability of measurement. The quantification of QuPPe-analytes is in most cases performed with the help of isotopically labelled analogues of the target analytes.
Expected Output: List of isotopically labelled internal standards updated in the website within 2020
Duration: Within 2019 and 2020

List of suppliers of Analytical Standards

Objectives: Facilitate the retrieval of analytical standards of compounds that were identified in recent past as not being available in the market
Description: The EURL-SRM will seek the collaboration with the other 3 EURLs on pesticides for the construction of a common list stating the commercial sources of analytical standards for compounds identified at some point in the recent past (e.g. if this is stated in the MRL-Website) that they are not available in the market. The websites of various manufacturers/suppliers for these analytical standards will be periodically checked for updating the list of analytical standards. The PestiPedia platform will be upgraded to allow users to indicate whether they have difficulties localizing certain standards or internal standards and to communicate problems (e.g. poor purity) with certain standards.
Expected Output: PestiPedia Tool will be upgraded within 2019 and the list of analytical standards will be updated within 2019 and 2020 an made available in the website
Duration: throughout 2020

Sub-activity 4.2 *(name of Sub-activity)*

Objectives:
Description:
Expected Output:
Duration:

Sub-activity 4.3 *(name of Sub-activity)*

Objectives:
Description:
Expected Output:
Duration:

Sub-activity 4.x *(name of Sub-activity)*

Objectives:
Description:
Expected Output:
Duration:

5 REQUIREMENTS RELATED TO OTHER LEGISLATION

Please specify applicable legislation:
(Number of Sub-activity boxes can be adjusted)

Sub-activity 5.1 *(name of Sub-activity)*

Objectives: Description: Expected Output: Duration:

Sub-activity 5.x *(name of Sub-activity)*

Objectives: Description: Expected Output: Duration:

REMARKS

(if necessary)