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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

AMENDMENT NO. 2

to

COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT

BETWEEN

UNILEVER GLOBAL IP LIMITED

AND

EPA CENTER FOR COMPUTATIONAL TOXICOLOGY AND EXPOSURE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

This "Amendment No. 2" is entered into by and between **UNILEVER GLOBAL IP LIMITED**, a company incorporated in England and Wales (registered under number 12920301) and whose registered office is at Port Sunlight, Wirral, Merseyside, CH62 4ZD, UK ("the Cooperator"), and the Center for Computational Toxicology and Exposure ("CCTE") ("the Center"), of the U.S. Environmental Protection Agency ("EPA") under the authority of Title 15, United States Code § 3710a, *et seq*. (commonly known as the Federal Technology Transfer Act of 1986).

WITNESSETH:

A. WHEREAS, the Cooperator and the EPA CCTE executed a Cooperative Research and Development Agreement (No. 1289-20) effective May 18, 2021 ("Agreement");

B. WHEREAS, the Cooperator and the Center executed an Amendment to the Agreement, effective April 04, 2023, to update the Cooperator's payment schedule.

C. WHEREAS, the Cooperator and the Center want to extend the term of the Agreement an additional three (3) years from the original expiration date of May 18, 2024, to a new expiration date of May 18, 2027, to account for delays in generating several large data sets and the need for further analyses;

D. WHEREAS, the Cooperator and the Center want to update the schedule of the tasks in Statement of Work to reflect the additional three (3) years added to the term of the Agreement; and

E. WHEREAS, the Center views its continued cooperation with the Cooperator to be in furtherance of the public interest.

NOW, THEREFORE, the parties amend the Agreement as follows:

1. Paragraph 2.1, Statement of Work is amended to read: "Cooperative Research and development work performed under this Agreement shall be performed in accordance with the amended Statement of Work ("SOW") attached hereto as Attachment C. The SOW sets forth a "period of performance." The Center and the Cooperator agree to perform the cooperative research and development work and to utilize such personnel, resource, facilities, equipment, skills, know-how, and information as is reasonably necessary."

2. Article 12.2, Duration is amended to read: "This Agreement shall remain in effect for a period of six (6) years from the effective date."

3. All other provisions of the Agreement shall remain in force and effect.

IN WITNESS WHEREOF, the Parties have caused this Amendment No. 2 to be executed by their duly authorized representatives as follows:

U.S. ENVIRONMENTAL PROTECTION AGENCY

By: [redacted] Date: _____

[redacted]

FOR COOPERATOR

By: [redacted] Date: [redacted]

[redacted]

Signed Agreements sent to:

Kathleen Graham
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STATEMENT OF WORK

COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT
WITH THE
CENTER FOR COMPUTATIONAL TOXICOLOGY AND EXPOSURE
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AND
UNILEVER GLOBAL IP LIMITED

Title of Project: Development and Evaluation of New Approach Methods (NAMs) in the Origination of Next Generation Risk Assessments (NGRA)

The Goal:
The goal of this CRADA is to jointly explore the utility of a battery of new approach methods (NAMs), which are non-animal based, for evaluating the safety and hazard of chemicals – establishing Next Generation Risk Assessments (NGRA). One of the primary missions of the CCTE is to develop such methods, including high-throughput screening (HTS), under the long-running ToxCast project. This includes high-throughput toxicokinetics (HTTK), high-throughput transcriptomics methods (HTTr), high-throughput phenotypic profiling (HTPP) and a variety of associated computer modeling approaches predicting chemical mechanism of action, chemical exposure, use and potency. This work supports the EPA Administrator's Directive to reduce mammal studies by 30 percent by 2025 and eliminate all mammal studies by 2035. (https://www.epa.gov/research/efforts-reduce-animal-testing-epa)

Unilever also has a long history of developing and using non-animal methods to evaluate the safety of chemicals in their products, complies with legislation that bans the use of animal testing of cosmetic ingredients and would conduct, commission or pay for animal testing only when required by a government agency. Unilever and CCTE have each developed their own NAMs and have been jointly evaluating and using some common NAMs through a CRADA that has run from 2015-2020. The learnings from this prior CRADA form the foundation for the new proposed efforts to show how new methods and approaches can be brought together to make a safety decision that assures the protection of consumers, workers and the environment rather than predicting the incidence of apical endpoints in animals. There will be several interlinked goals, but all will make use of a large data set to be jointly developed. An additional aspect of this CRADA will be the evaluation of the common chemical set using available computer models developed by both the EPA Duluth Lab and by Unilever to address how (and to what extent) we can use data, derived ostensibly for the purposes of a human health risk assessment, to inform an environmental risk assessment, by considering target and pathway homology.

The Key Outputs:

1. Develop a comprehensive NAMs data set (see below table) across multiple labs and technologies on a minimum of 40 chemicals (the "project chemicals") to be used to evaluate The Next Generation Blueprint of Computational Toxicology at the U.S. Environmental Protection Agency (https://academic.oup.com/toxsci/article/169/2/317/5369737) and the Unilever NGRA Toolbox.
2. Show how the EPA Blueprint of using HTTr and HTPP broad coverage tools, in combination with computational methods, can be complemented by other broad coverage tools such as the Unilever Cell Stress Panel and Pharmacological Target Safety Screen to make an NGRA decision or to direct higher-tier targeted NAMs testing towards an NGRA decision.
3. Use portions of this data set to develop prototype risk assessment dossiers (including read across) to present externally at conferences and across the scientific community, in order to start making the case for regulatory acceptance of specific assays or technologies that support the Blueprint and Toolbox; i.e. develop and publish a set of recommendations for a NAM battery for evaluating the safety of new chemicals.
4. Explore the potential use of human safety data to inform on environmental risk assessment alongside with the application of cross species extrapolation computational tools (e.g. SeqAPASS)

For the purpose of this SOW, NAMs will mean any experimental or computational method or model that does not use whole animals. Examples are in vitro assays, QSAR models, toxicokinetics models, and models of species similarity.

Generic Tasks:

1. Select 40 chemicals and their exposure or 'risk' category (see Chemical Selection)
2. Order chemicals and deliver to all labs
3. Select HTTr and HTPP cell lines (12 each – as far as is practically possible, the same lines for the two technologies). Of these 10 would be from human tissues and 2 from fish cell lines. The human cell lines would be selected from the set already onboarded in the EPA Center, and must be compatible with the HTTr and HTPP assays as currently configured, which would rule out spheroids or suspension cultures. For the fish cell lines to be used, they would have to be shown to culture well and to be compatible with the HTPP cell painting assay.
4. Run the assay set – the initial set of assays will include the Unilever Toolbox set and assays being developed at EPA.
5. Analyze the results of the battery and make recommendations on next steps.
6. Explore the utility of human derived data for inferring toxicological effects in environmental relevant species.
7. Hold annual face-to-face meetings of the Unilever and EPA research teams and disseminate the science externally.
8. EPA issues annual progress reports.

Division of NAMs:

UNILEVER	EPA

HTTr in HepG2, MCF7 and HepaRG	HTTr in 10 human cell types + 2 fish lines
Cell Stress panel in HepG2 and additional cell types as appropriate	HTPP in 10 human cell types + 2 fish lines
Safety Screen panel	Add metabolic capacity to one or more HTTr or HTPP cell system
In silico (QSAR and MIE Atlas) battery	Assays for HTTK (fraction unbound, intrinsic hepatic clearance, absorption blood:plasma ratio)
Cytotoxicity panel	*In vitro* disposition (i.e. true *in vitro* dose over time)
Metabolite determination in selected cases	Metabolite determination in selected cases
Additional Unilever panels if they become available	Additional EPA devtox, neurotox and cardiotox panels if they become available
Unilever SEAC Genes to Pathways (G2P) tool	EPA SeqAPASS analysis

Resources will be set aside to add new assays as they become available. New chemicals will also be added to evaluate certain technologies/assays more deeply. This may include temporal and repeat dosing to reduce uncertainty in the risk assessment decision.

Analysis Approaches:
Each party will use their own analysis and modeling approaches (concentration-response, PK, biological pathways/network, risk assessment, POD determination, uncertainty quantification), but will comprehensively share methodology and results. Every effort possible will be taken to harmonize these approaches as the CRADA develops, so that a ONE TEAM approach is the ultimate output. As part of the approaches, key "gold standard" datasets where known dose response information can be inferred should be developed and utilized to strengthen comparisons of analytical approaches. Any modelling code and associated documentation generated by either party, as part of this CRADA, will be shared.

Defined Tasks:

Task 1: Selection of Chemicals
The initial chemical set should be a minimum of 40 chemicals, overlapping where possible with the Unilever 2020+ plans for evaluating the Systemic Toolbox v1. Traits of the chemical set will be:

1. Half 'benign' and half 'toxic' (at a given exposure scenario), where all the chemicals should have existing *in vivo* data or human safety data (e.g. history of safe use or known human toxicity) to establish their risk category.
2. Chemicals should be of interest to both Unilever and EPA
3. A small limited number of chemicals can be repeats of those already tested or already in existing data; new testing will help measure reproducibility of the repeated assays

4. Potentially a few close pairs should be included to test read-across methods
5. Toxic chemicals should include some with specific MOA and some with more general systemic toxicity
6. EPA will provide input in chemical selection and will work with Unilever to determine chemical sourcing to ensure availability to all EPA commissioned laboratories for testing.
7. During selection of the chemical set, consideration should be made to better facilitate cross-species extrapolation approaches.

Center Responsibilities: EPA will advise on chemical selection, purchase, and distribute.

Cooperator Responsibilities: Unilever will take the lead in defining the 40 chemicals with input from EPA.

Deliverables:

- Year 1: (1) Select 40 chemicals; (2) source chemical samples and deliver to labs
- Year 2: No actions
- Year 3: No actions
- Year 4: No actions
- Year 5: No actions
- Year 6: No actions

Monetary and In-kind Expenditure Estimates (cumulative over 6 years):

- Unilever: $25K to purchase and distribute chemicals, 0.2FTE to select chemicals
- EPA: 0.13 FTE to manage chemical procurement and select chemicals

Task 2: Selection of Cell lines for HTTr and HTPP

The selection of the cell lines will be informed by the previous Unilever/EPA CRADA studies along with additional technical insights from both teams which will enable experimental comparisons and aid risk assessment dossier generation. In addition, 1 or 2 environmentally relevant cell lines (e.g. fish) will be included and an appropriate custom HTTr panel based on the whole transcriptome of the selected environmental species will need to be sourced/developed.

Center Responsibilities: EPA will take the lead in determining data driven biological space coverage and inform on pragmatic requirements to enhance similarities across HTPP and HTTr.

Cooperator Responsibilities: Unilever will take the lead to assess results of Unilever compounds across the various cell lines for input into final cell line selection and will also inform on suggestions that will strengthen risk assessment prototype dossiers.

Deliverables:

- Year 1: Select first 6 cell lines
- Year 2: Select second 6 cell lines based on results of first 6. Fish cell lines will be used in year 2.
- Year 3: no actions
- Year 4: No actions

- Year 5: No actions
- Year 6: No actions

Monetary and In-kind Expenditure Estimates (cumulative over 6 years):
- Unilever: 0.5 FTE
- EPA: 0.51 FTE

Task 3: Conduct of the Cell Stress panel, Safety Screen target panel, In Silico Battery and the Cytotoxicity Panel (the NGRA Toolbox)
Cell stress panel data to be generated for 40+ chemicals, consisting of 36 biomarkers representing 9 stress pathways or cell heath endpoints, measured predominantly using high content imaging. Extended safety screen target panel to consisting of 24 GPCRs, 8 ion channels, 7 enzymes, 3 transporters and 18 nuclear receptors.

Center Responsibilities: None

Cooperator Responsibilities: Unilever will conduct in-use scenario relevant exposure models for the series of 40+ chemicals being studied. In addition, Unilever will analyze the same chemicals through their current systemic tox toolbox v1 (including as a minimum computational screens, cytotoxicity, cell stress panel, target screens) and make the results available for mutual sharing.

Deliverables:
- Year 1: Carry out first phase of screening on project chemicals
- Year 2: Finalize screening of project chemicals
- Year 3: No actions
- Year 4: No actions
- Year 5: No actions
- Year 6: No actions

Monetary and In-kind Expenditure Estimates (cumulative over 6 years):
- Unilever: 0.5 FTE
- EPA: No contribution

Task 4: Addition of metabolic capacity to one cell line for use in HTTr and HTPP
Metabolic competency is key to ensuring that any *in vitro* effects observed are representative of those which would be manifested *in vivo*. As such steps will be taken to ensure that metabolism has been considered and where appropriate integrated into all data generation approaches.

Center Responsibilities: EPA will develop a protocol to run HTTr and HTPP in one cell line in which metabolic activation has been added. This will use a variant of the current 384-well approaches developed by EPA.

Cooperator Responsibilities: Unilever will apply their Metabolism Framework to provide predictive and (where relevant) experimental insights into the metabolism of each of the 40+ chemicals.

Deliverables:

- Year 1: No action
- Year 2&3: Evaluate cell lines with regards to intrinsic metabolic competency and compatibility with in vitro metabolism approaches
- Year 4: Select a cell line and test project chemicals with and without metabolic competency
- Year 5: Develop manuscript to document the results
- Year 6: Present results at one or more meetings

Monetary and In-kind Expenditure Estimates (cumulative over 6 years):

- Unilever: $10K for reagents at EPA and technician support
- EPA: 0.5 FTE to develop metabolically competent system, analyze data and develop publications

Task 5: Run HTTr in 12 cell lines

EPA will perform cell culture and dosing for 40 chemicals. These include both the 10 human cell lines and 2 fish cell lines. Cell lysate will be shipped to BioSpyder to perform further processing and sequencing. EPA staff will process the data to provide results as normalized counts and log2 fold changes. Data (including raw data files) will then be shared with Unilever.

Center Responsibilities: EPA will generate data using a combination of in-house laboratories and contractors.

Cooperator Responsibilities: Unilever will conduct HTTr analysis on the same 40+ chemicals in HepG2, MCF7 and HepaRG. Raw data, normalized counts and log2 fold changes will be shared with EPA.

Deliverables:

- Year 1: (1) Dose cells with project chemicals for first 6 cell lines; (2) have sequencing performed for these 6 cell lines; (3) perform all computational processing for these 6 cell lines
- Year 2: (1) Dose cells with project chemicals for second 6 cell lines; (2) have sequencing performed for these 6 cell lines; (3) perform all computational processing for these 6 cell lines
- Year 3: No action
- Year 4: (1) Dose cells with project chemicals for metabolically competent cell line with and without metabolism; (2) have sequencing performed for these 2 cell lines; (3) perform all computational processing for these 2 cell lines
- Year 5: No action
- Year 6: No action

Monetary and In-kind Expenditure Estimates (cumulative over 6 years):

- Unilever: $1091K for sequencing and $160K for technician support
- EPA: 0.25 FTE

Task 6: Run HTPP in 12 cell lines

EPA will perform cell culture, dosing, and cell painting. These include both the 10 human cell

lines and 2 fish cell lines. Data will be processed to produce concentration-response profiles at multiple levels, and this data will be provided to Unilever.

Center Responsibilities: All Center work and data analysis will be performed by EPA

Cooperator Responsibilities: Unilever will analyze data using their own point of departure modelling approaches and share results

Deliverables:

- Year 1: (1) Dose cells with project chemicals for first 6 cell lines; (2) perform all computational processing for these 6 cell lines
- Year 2: (1) Dose cells with project chemicals for second 6 cell lines; (2) perform all computational processing for these 6 cell lines
- Year 3: No action
- Year 4: (1) Dose cells with project chemicals for metabolically competent cell line with and without metabolism; (2) perform all computational processing for these 2 cell lines
- Year 5: No action
- Year 6: No action

Monetary and In-kind Expenditure Estimates (cumulative over 6 years):

- Unilever: $42K for reagents
- EPA: 0.25 FTE

Task 7: Run assays required for toxicokinetics (TK)

High throughput toxicokinetic modeling requires at a minimum the measurement of fraction unbound in plasma (fup) and intrinsic hepatic clearance (Clint) for each chemical. For chemicals in the CRADA set that do not have this information, EPA will attempt to develop analytical chemistry methods (a prerequisite for these measurements). For chemicals where analytical methods are successful, measurements of fup and Clint will be performed. The resulting data will be incorporated into the EPA HTTK R package to allow toxicokinetics modeling. Additional in vitro measurements (for example, membrane permeability and blood: plasma chemical concentration ratio) are currently being investigated to refine toxicokinetic modeling. If suitable assays are available and refinements of predictions are desired these may also be conducted. The Center tasks (analytical chemistry method development, and in vitro measurements) may be carried out at EPA labs or may be contracted out. All results will be provided to Unilever.

Center Responsibilities: EPA will manage the production of the TK data

Cooperator Responsibilities: None

Deliverables:

- Year 1: (1) survey existing toxicokinetics (TK) data for project chemicals to see which have existing data; (2) send remaining chemicals to analytical labs to develop analytical methods
- Year 2: (1) Carry out TK Center measurements for all chemicals with acceptable analytic methods; (2) process data into the EPA HTTK package

- Year 3: (1) Identify and make machine-readable any in vivo TK data for the 40 chemicals in the scientific literature. Perform a statistical evaluation of the in vitro-in vivo extrapolation (IVIVE) predictions using the available data; (2) Evaluate performance of available QSAR models to predict TK parameters; incorporate acceptable predictions to perform HTTK-IVIVE
- Year 4: Incorporation of HTTK data with data from other Tasks for use in planned case study manuscript(s)
- Year 5: Conduct analyses for manuscript(s) as needed.
- Year 6: No action

Monetary and In-kind Expenditure Estimates (cumulative over 6 years):

- Unilever: $264K for contract work to run HTTK-related assays
- EPA: 0.5 FTE

Task 8: Run in vitro disposition measurements

This task will use analytic methods to determine how much of a chemical partitions into the different components of the in vitro system including cells, cell culture vessels, and media.

Center Responsibilities: The Tox21 partners have a collaborative project to assess the in vitro disposition of chemicals. Using the methods worked out in the Tox21 cross-partner project, the in vitro disposition will be carried out on 40 chemicals in select cell lines (no more than 2). This work will be performed in the EPA laboratories in CCTE.

Cooperator Responsibilities: Unilever will apply their True Dose Framework to provide predictive and (where relevant) experimental insights into the partitioning of each of the 40+ chemicals within the *in vitro* NAMs being used.

Deliverables:

- Year 1: No action
- Year 2: (1) Develop protocol to determine in vitro disposition; (2) perform proof-of-principle experiments to determine feasibility of the approach
- Year 3: (1) Carry out preliminary analyses on first batch of data on the project chemicals; (2) Develop joint publication plan
- Year 4: (1) Carry out analyses of complete dataset; (2) Identify additional analyses to support in vitro disposition application in NAMs; (3) Make public presentations at one or more meetings.
- Year 5: Develop one or more manuscripts based on datasets; (2) make public presentations at one or more meetings
- Year 6: Conduct analyses as needed to incorporate data into downstream case study manuscript(s)

Monetary and In-kind Expenditure Estimates (cumulative over 6 years):

- Unilever: $45K for instrument costs, analytical supplies, and technician support
- EPA: 0.83 FTE

Task 9: Metabolite determination

This task will use non-targeted analytic methods to detect and identify metabolites of a selected set of the project chemicals.

Center Responsibilities: EPA labs will incubate individual chemicals with rodent and human hepatocytes and S9 Fraction and analyze these samples for hepatic clearance and metabolite production using non-targeted analysis.

Cooperator Responsibilities: Unilever will provide their expertise to consult on the method development for metabolite determination.

Deliverables:

- Year 1: No action
- Year 2: (1) Develop protocol and workflow to evaluate in vitro predict possible metabolite formations; (2) Perform proof-of-principle experiments to determine feasibility of the approach
- Year 3: (1) Continue method and workflow development for in vitro metabolite ID work; (2) Carry out analyses on targeted set of project chemicals
- Year 4: (1) Complete instrumental analyses of targeted chemical set; (2) Perform data evaluations; (3) Make public presentations at one or more meetings; (4) Develop one or more manuscripts based on the data sets; (5) Develop joint publication plan.
- Year 5: (1) Develop one or more manuscripts based on the data sets;
- Year 6: (1) Develop one or more manuscripts based on the datasets; (2) Make public presentations at one or more meetings.

Monetary and In-kind Expenditure Estimates (cumulative over 6 years):

- Unilever: $165K for analytical supplies, machine support and technician support
- EPA: 1.5 FTE

Task 10: Analysis of combined human- health focused data set

NAMs data generated by both parties will be evaluated and modelled with the aim of being able to derive exposure-based safety risk assessments. Data will be analyzed both as individual sets and as combined multi-variate datasets with the aim of providing a weight of evidence approach to understanding perturbed pathways and defining margins of safety towards safety decisions. Raw data, derived data and modelling approaches will be shared.

Center Responsibilities: EPA will use methods within their Alternatives Roadmap to develop decision making approaches using the data being generated on the project chemicals.

Cooperator Responsibilities: Unilever will use their NGRA framework and associated decision-making tools to develop decision making approaches and communications based on the use of NAMs data developed within this CRADA

Deliverables:

- Year 1: (1) Develop protocols for sharing data including formats and methods for data transfer; (2) develop general analysis strategies to be carried out separately and jointly; (3) Share preexisting data (e.g. on HTS, HTTK, chemical properties, etc.)

- Year 2: (1) Carry out preliminary analyses on first batch of data on the project chemicals; (2) Develop joint publication plan; (3) make public presentations at one or more meetings.
- Year 3: (1) Carry out preliminary analyses on second set of data; (2) develop one or more manuscripts based on the data sets; (3) Make public presentations at one or more meetings.
- Year 4: (1) Carry out analyses of complete dataset; (2) develop one or more manuscripts based on the data sets; (3) Make public presentations at one or more meetings.
- Year 5: Develop additional manuscripts combining project data with other datasets.
- Year 6: Make public presentations at one or more meetings.

Monetary and In-kind Expenditure Estimates (cumulative over 6 years):

- Unilever: 2 FTE
- EPA: 1.5 FTE

Task 11: Cross-species extrapolation

Understand the conservation and relevance of targets and toxicity pathways, identified through HTTP and HTTr screening using human and fish cell lines, across environmentally relevant species to inform on the environmental susceptibility space and ultimately directing Environmental Risk Assessment (ERA). This will be achieved using a suite of bioinformatics tools encompassing genomics, phylogenetics and PBK approaches.

Center Responsibilities: The EPA will analyze HTTr and HTTP data generated from 10 human cell lines and 2 fish cell lines and provide inhouse informatics approaches (e.g. SeqAPASS) to identify target homology between human and other environmentally relevant (notably fish) species.

Cooperator Responsibilities: Unilever will provide inhouse informatics approaches (e.g. Genes 2 Pathways (G2P) tool) to identify pathway homology between human cell lines and other environmentally relevant (notable fish) species. Unilever will also estimate internal exposure in fish using TK/ PBPK models.

Monetary and In-kind Expenditure Estimates (cumulative over 6 years):

- Unilever: $255K to support Postdoc at EPA; 0.4 FTE
- EPA: 0.4 FTE

Deliverables

- Year 1: (1) Comparison of available in vitro / transcriptomics data with available *in vivo* endpoint data to assess if they are protective. (2) A conceptual integration of output from SeqAPASS and G2P tools.
- Year 2: (1) Defined PODs derived from HTTr and HTPP data (human cell lines) and their relevance to environmentally relevant (notably fish) species. (2) Develop case examples demonstrating utility of SeqAPASS and G2P data integration for extrapolating HTTr and HTPP results beyond the model organisms in the assays. Compare results from bioinformatic tools to results collected comparing fish and human.
- Year 3: Develop and submit manuscript describing results generated from the conceptual integration of results from SeqAPASS and G2P tools with case examples demonstrating the utility of these data for integration in risk assessment.

- Year 4: (1) Benchmarked PODs derived from human cell with those in fish cell lines (2) Margins of Safety (MoS) derived for fish using PODs, qIVIVE and PBPK modelling.
- Year 5: (1) Carry out analyses of complete dataset; (2) develop a manuscript based on the data set
- Year 6: Make public presentations at one or more meetings.

In-kind Expenditures

Unilever will contribute 3.6 FTE in-kind / over the six-year period of this agreement
Estimated total in-kind personnel resource from Unilever, equivalent contributions: $457,200.

EPA will contribute 6.37 FTE in-kind / over the six-year period of this agreement
Estimated total in-kind personnel resource from EPA, equivalent contributions: $1,005,594 .

Summary of Center Resources
Center resources: The Center will carry out experimental work on HTTr, HTPP, toxicokinetics and in vitro disposition. It will further carry out computational data processing and modeling using data from the project chemicals. EPA facilities will be used for appropriate experimental work. EPA will manage external contracts as needed, for instance in processing and sequencing of HTTr samples, and maintenance and development of SeqAPASS.

Cooperator resources: Provision of technical assistance via scientist-to-scientist discussions on a regular basis by video-conferencing/TC and visits to SEAC and the EPA, data analyses and supporting research, e.g. through the Unilever in-use scenario relevant exposure models and toolbox assay set data generation (including use of facilities, personnel and supplies), as needed.