Docket #AMS-SC-19-0042-4666
Establishment of a Domestic Hemp Program

Americans for Safe Access (ASA) is a 501c3 non-profit whose mission is to advance access to medical cannabis for therapeutic use and research. We respectfully submit these comments to the United States Department of Agriculture with a goal to implement a successful domestic hemp program whose products are safe for patients and consumers.

1: Measurement of Uncertainty for Sampling

The IFR addresses the measurement of uncertainty (MU) in laboratory activities by requiring labs to report the MU as part of any hemp test results. However, the IFR does not address or provide an MU to account for the variability that may occur prior to a sample arriving at a laboratory during cutting, bagging, sealing, transporting, handling, and other "pre-laboratory" activities. Multiple commenters suggested the establishment of an additional MU to account for this variability in addition to the MU provided in the IFR applicable to "in-laboratory" activities. Commenters said that sampling uncertainty arises from the processes related to the collection and handling of the actual plant material to be tested, and the omission of sampling uncertainty in the MU will certainly result in inaccurate, incomplete, and otherwise invalid test results due to the nature of the hemp sampling. One potential way to address this, as presented in a comment, would add an additional MU for pre-laboratory activities (a), in addition to the measurement of uncertainty for in-laboratory activities (b), such that a total measurement of uncertainty (c) can be calculated as the square root of the sum of those squared values (a squared plus b squared = c squared). For example, if the in-laboratory measurement of uncertainty (b) is calculated as 0.0300 percent, and the pre-laboratory measurement of uncertainty (a) is estimated to be 0.0400 percent, then the total measurement of uncertainty (c) would be 0.0500 percent. AMS seeks additional information on this topic and alternative proposals on how to compute the MU for sampling. Numerical valuations or calculation formulas submitted with comments should clearly demonstrate how sampling uncertainty might be incorporated into the current THC tolerance threshold established by the IFR.

ASA is in support of adding additional measurement uncertainty criteria to the final calculation. These criteria should be based on sound scientific measurements that will not place undue burden on the hemp farmers. Additional measurement uncertainty arises from the plant itself in that studies have shown that there is a high degree of cannabinoid content variability within the flowers from top to bottom of the plant[1]. This is due to light exposure differences, and the above referenced study authors note up to a 6% difference in Δ9-THC from top to middle and up to another 3% difference from middle to bottom. This type of variability could cause a sample taken from one portion of the plant to pass while another portion could cause the sample to fail. This MU variable is proposed in addition to the pre-laboratory variables as a way to reduce crop failure.

[1] Bernstein, N.; Gorelick, J.; and Koch, S. (2019) Interplay between chemistry and morphology in medical cannabis (*Cannabis Sativa* L.). *Industrial Crops and Products* 129:185-194.

2: Liquid Chromatography Factor, 0.877

The 2018 Farm Bill mandates that all cannabis be tested for THC concentration levels using "post decarboxylation" or similar methods. As explained in the IFR, "post decarboxylation" means testing methodologies for THC concentration levels in hemp, where the total potential delta-9-tetrahydrocannabinol content, derived from the sum of the THC and THCA content, is determined and reported on a dry weight basis. The post decarboxylation value of THC can be calculated by using a chromatograph technique using heat, known as gas chromatography, through which THCA is converted from its acid form to its neutral form, THC. The result of this test calculates total potential THC. The post decarboxylation value of THC can also be calculated by using a high-performance liquid chromatograph technique ("LC or "HPLC"), which keeps the THCA intact, and requires a conversion calculation of THCA to calculate total potential THC. As explained in the IFR, the decarboxylated value is calculated using a conversion formula that sums delta-9-THC (Δ_9-THC) and (87.7) percent of THC-A. Several commenters claim that this formula is inaccurate since it is based on a 100 percent conversion factor, which is nearly impossible to achieve in a laboratory setting. In other words, commenters claim that since the conversion of the THCA to Δ_9-THC is never perfectly complete without loss or degradation of starting material, the molar sum of Δ_9-THC and THCA-A measured by LC is always higher than the total Δ_9-THC measured by GC. To account for this, commenters presented several alternative computation methods, one of which would not multiply the THCA content by 87.7 percent, but rather by 52.62 percent, which is 60 percent of 87.7 percent. Based on comments questioning the accuracy of this figure, AMS seeks additional information from stakeholders regarding the use of this conversion formula. Any alternative factors provided should be clearly quantified and explained.

ASA supports the use of sound scientific testing methods. ISO 17025 Section 7.2.2.1 states "The laboratory shall validate non-standard methods, laboratory-developed methods and standard methods used outside their intended scope or otherwise modified. The validation shall be as extensive as is necessary to meet the needs of the given application or field of application."[2] GC methods that are not capable of achieving a 100% conversion of THCA to THC should be considered invalid and inappropriate for use and therefore not meeting the criteria of ISO 17025 method validation.

International Council on Harmonization guidelines state that "Specificity is the ability to assess unequivocally the analyte in the presence of components which may be expected to be present."[3] GC tests that cannot specify the quantity would not meet validation criteria because they would not be able to unequivocally determine the quantity of THC present.

ASA supports the requirement that hemp testing be done by LC methods in order to be considered a sound scientific method that meets both ISO 17025 and ICH Q2(R1) validation

[2] ISO/IEC 17025:2017(E) 3rd edition. *General requirements for the competence of testing and calibration laboratories*.
[3] International Council on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use (2005). *Validation of Analytical Procedures: Text and Methodology Q2(R1)*.

criteria. This will allow the molar concentration of total THC to be determined through the accurate formula: Total THC = THCA*0.877.

3: Disposal and Remediation of Non-Compliant Plants

The IFR requires non-compliant cannabis plants be disposed of through a DEA-registered reverse-distributor or other law enforcement personnel. Under the IFR, no part of a non-compliant plant may be retained or "remediated" for non-ingestible uses like fiber, seed, or pulp. Many comments on the IFR expressed concern about these disposal requirements. Because of this, in February 2020, AMS issued guidance relaxing the requirements for law enforcement-supervised disposal of non-compliant plants and provided examples of how disposal of non-compliant plants may occur on a farm. (1) AMS is now requesting additional comment on these disposal practices, including the potential for "remediation" of non-compliant plants. Commenters presented several ideas on how remediation might occur including separation of floral material, rendering plant material as "non-consumable", or "non-ingestible", removing THC from non-compliant plants using methods like filtering or other further processing, or allowing States and Tribes the option to establish their own allowable remediation practices. AMS is also requesting input on whether the on-farm disposal methods provided in the guidance issued on February 27, 2020, (plowing under, mulching, disking, mowing, burying, or burning) is adequate. AMS encourages the submission of quantitative and qualitative data to identify and demonstrate alternative disposal and remediation activities that ensure non-compliant plant material does not enter the stream of commerce.

ASA supports allowing States and Tribes the option to establish their own allowable remediation practices, or allowing farms that are not operating under State or Tribal plans to submit a remediation plan to USDA for the removal of THCA/Δ9-THC from extracted materials that would not enter any streams of commerce. There are techniques available that can remove THCA/Δ9-THC from extracts including solid phase extraction[4], column chromatography (small and large scale), and centrifugal partition chromatography. Operators should be required to validate the effectiveness of the extraction method to ensure consistent, accurate, and precise performance of the removal of THCA/Δ9-THC.

By not allowing operators the option to remove THCA/Δ9-THC there could be a significant impact on the financial stability of the farm. Farmers invest time, energy, and resources into having a successful crop and should not be denied the option for remediation as there are scientifically valid methods available.

4: Negligence

The 2018 Farm Bill establishes criteria to define certain negligent acts, including failing to provide a legal description of land where hemp is produced, not obtaining a license to produce hemp, or growing non-compliant plants. With regard to the production of non-compliant cannabis plants, the IFR states that "hemp producers do not commit a negligent violation if they produce plants that exceed the acceptable hemp THC level and use reasonable efforts to grow hemp and the plant

[4] Gallo-Molina, AC; et al. (2019) Extraction, isolation and purification of tetrahydrocannabinol from the *Cannabis sativa* L. plant using super critical fluid extraction and solid phase extraction. *Journal of Supercritical Fluids* 146:208-216.

does not have a THC concentration of more than 0.5 percent on a dry weight basis." Commenters to the IFR suggested AMS increase the negligence threshold from 0.5 percent to 1.0 percent. AMS seeks additional stakeholder comments specific to this suggestion. Comments should include quantitative and qualitative data if available.

ASA is in support of raising the negligence threshold to 1.0%. The reasoning for this ties back to our comments regarding measurement uncertainty. The plant itself produces cannabinoids in varying concentrations at different heights due to light exposure hitting the top of the plant at a higher intensity than at the bottom of the plant. A higher negligence threshold will allow for a higher degree of measurement uncertainty, and along with allowing for the remediation of extracts that do not meet the threshold requirements, farmers will be able to be more successful with the outcome of their crops.

5: Interstate Commerce

The 2018 Farm Bill and IFR indicate that no State or Indian Tribe may prohibit the transportation or shipment of legally produced hemp across State or Tribal boundaries. Based on comments to the IFR, we are seeking additional input on whether the IFR is sufficient, or if additional regulatory requirements are needed, to facilitate domestic interstate commerce and transactions, particularly the potential need for national, comprehensive, documentation requirements. Commenters presented several proposals on the kinds of documentation that should be required to accompany raw hemp during transport from a farm to a processing and/or a drying facility. For example, commenters suggested that producers be required to include certain documentation such as copies of the laboratory testing report(s), hemp grower license, invoice/bill of lading, and contact information of buyer and seller. AMS is requesting comments on whether documentation of this nature should be required to accompany all shipments of hemp throughout the U.S.

ASA supports the use of proper documentation accompanying shipments of raw hemp from the fields to a drying and/or processing facility. Documents should include a bill of lading which indicates the buyer/seller and the transportation company if it is a separate entity. The documentation should also clearly identify the product as hemp and not cannabis, in the event that transportation is done through a state which does not recognize cannabis as a legal product.

6: 15-Day Harvest Window

The IFR requires that within 15 days prior to the anticipated harvest of cannabis plants, a producer shall have an approved Federal, State, or local law enforcement agency or other USDA-designated person collect samples from plants for the purpose of determining THC concentration. This requirement was established to ensure accuracy in THC testing, since THC concentration in cannabis increases the longer the plant is left in the ground. AMS received a significant number of comments on the 15-day requirement during the initial comment period. Commenters to the IFR suggested AMS increase the 15-day window to 30 days. AMS is seeking additional comments on this suggestion as well as explanations on why a 30-day window may be more appropriate. Any quantitative and qualitative data provided by stakeholders should be specific and clarify alternative recommended time frames.

ASA supports the expansion of the harvest window from 15 days to 30 days. At this time there are not enough laboratories that meet the DEA license requirements to adequately get testing done to meet the time window. Laboratory bottlenecks should not be the cause of a crop failure due to the amount of time it takes to turn around a test sample.

At the time of submission of previous comments there were only 42 USDA approved testing laboratories. That number has now increased to 67 labs (as of October 6, 2020), as shown in the table below. At this time there are 35 approved Tribal plans, 23 approved State plans, 2 approved Territory plans, and 37 other plans from Tribes, States, and Territories that are at varying stages of the review and approval process. Many of the locations that have approved plans do not have testing laboratories nearby, therefore samples will have to be shipped across the country, via plane or boat for locations such as the US Virgin Islands and Puerto Rico. This type of shipping could cause delays in the arrival of samples to the laboratory that add additional time outside of how quickly the laboratory can turn around a sample and report the results.

Table 1: USDA Approved Labs

State	# Labs
Arizona	1
California	7
Colorado	2
Florida	4
Georgia	3
Indiana	2
Kentucky	3
Maryland	1
Michigan	3
Minnesota	1
Mississippi	2
Missouri	1
New Jersey	2
New York	2
North Carolina	5
North Dakota	1
Ohio	1
Oklahoma	1
Pennsylvania	3
South Carolina	2

Tennessee	1
Texas	8
Utah	3
Vermont	1
Virginia	2
Washington	1
Wisconsin	4
Total	**67**

7: Hemp Seedlings, Microgreens, and Clones

The 2018 Farm Bill and IFR established statutory and regulatory criteria for commercial hemp production, including sampling and testing of cannabis flower material from mature cannabis plants regardless of the intended final use of the plant. Based on comments submitted in response to the IFR, AMS now seeks additional information from stakeholders regarding agricultural operations that grow cannabis plants, but not to maturity, and without mature flowers. These facilities include seedling, seed, clone, microgreen, and other types of operations that do not grow hemp plants for harvesting mature hemp flowers, and are therefore unable to meet the sampling and testing requirements as described in the IFR. AMS is considering the inclusion of specific regulatory provisions to still require licensing but not subject licensees to the same sampling and testing criteria as required of traditional hemp growers that sell mature hemp into the stream of commerce. AMS is also requesting additional input on research associated with the THC concentration of immature hemp plants, and any other additional justification on why these types of facilities should not be subject to sampling and testing requirements.

ASA supports the use of nursery programs to supply seedlings, clones, microgreens, or seeds to licensed growers. As suppliers to the hemp industry these nurseries should be licensed in order to track the supply chain and ensure that nurseries are operating as intended and not growing plants beyond the initial vegetative phase. These types of operations are critical in ensuring a diverse array of plants that contain varying amounts of additional cannabinoids and terpenes such as THCV, CBG, CBC, myrcene, and pinene that also have medicinal value.

These types of breeding programs can then be used to supply not only hemp to CBD producers but could also provide clinical research products to approved researchers to further advances in our understanding of cannabinoids, terpenes, and the Entourage Effect.

8: Hemp Breeding and Research

The 2018 Farm Bill and IFR identify the legal requirement to dispose of non-compliant cannabis plants produced at commercial hemp farming facilities. The IFR does not speak to the requirements for hemp breeding and research facilities, many of which are operated by States and land-grant research institutions. These types of facilities are engaged in a wide range of research efforts to develop new hemp cultivars. USDA encourages this type of research and wants to establish a

regulatory framework for researchers that is flexible and not burdensome. Based on comments submitted to the IFR on the need for regulatory clarity for these types of facilities, AMS requests input on how the final rule might regulate breeding and/or research facilities. AMS is considering establishing certain regulatory provisions for researchers and research facilities. Specifically, AMS is requesting input on whether employees of research facilities should be required to obtain a license, and whether these types of facilities should have certain disposal protocols for non-compliant plants. AMS is also considering an exemption for researchers and research facilities from the sampling and testing requirements required of traditional hemp growers who sell hemp into the stream of commerce.

ASA supports the establishment of nursery and research facility licenses to ensure that we continue to expand on the number of cultivars available to growers. DEA and FDA are currently developing rules and regulations that will apply to research facilities, and we believe that USDA should follow a similar protocol that works together with DEA and FDA while not placing undue burden on researchers.

The US lags behind many other countries with respect to research on the medical value of the cannabinoids, terpenes, and combinations thereof. By continuing to limit the number of researchers that are able to evaluate the medical benefits and pharmacokinetic pathways to effectiveness we will continue to fall behind. There is a virtually limitless number of combinations that can be made from the various cannabinoids and terpenes and we should allow researchers access to all of these in order to develop medicines that will help patients.

Because of these limitless combinations, we support an exemption for researchers and research facilities from the sampling and testing requirements placed on traditional hemp growers. These products are intended to be used during the course of research and should be prohibited from entering any stream of commerce.

9: Sampling Methodology—Flower vs. Whole Plant

Because THC is concentrated in the flower material of hemp plants, the IFR requires that hemp samples or “cuttings” be collected from the flowers of hemp plants. Comments received on this topic suggested that samples should be collected from not only the flower material of the plant, but from a composite sample of the entire hemp plant, including flowers, stems, stalks, and potentially seeds. AMS is considering the inclusion of sampling provisions that allow for “whole-plant” sampling, as well as a specific requirement for the length of a sample (*ie*. “two inches” or “20 centimeters”), and is requesting input on these specific topics. AMS is also requesting input on specific requirements for “milling” or preparation of a hemp sample prior to laboratory analysis. One comment suggested AMS revise regulations conform more closely to the practices recommended by AOAC, particularly those methods pertaining to grinding specifications (2018.11 (2)) and moisture content (930.04 (3)), or consider the protocols developed by the Division of Regulatory Services within the University of Kentucky's College of Agriculture, Food and Environment, specifically SOP#HMP-LB-001 (4) (Procedures for Receiving, Preparing and Releasing Hemp Samples), and SOP#HMP-LB-002 (5) (Procedures for Measuring Δ-9 THC Content in Industrial Hemp by Gas Chromatography with Flame Ionization Detection).

ASA supports sampling of flower material and does not support sampling of the whole plant. Studies have shown that the concentration of cannabinoids is significantly decreased outside of the flowers[5], therefore if sampling includes the stems and stalks this could drive the total THC down by way of dilution. Additionally, stems and stalks are not traditionally used when making *Cannabis* extracts and as such should not be included in the sampling requirements. However, fan leaves and sugar leaves are sometimes used when making *Cannabis* extracts and if they are to be used for making *Cannabis* extracts they should be included in the sampling requirements.

10: Sampling Methodology—Homogenous Composition, Frequency, and Volume

The IFR requires that sampling be conducted to ensure a representative sample of each lot. As part of this requirement, the number of samples collected must be sufficient so that, at a confidence level of 95 percent, no more than one percent of the plants in the lot would exceed the acceptable hemp THC level. The sampling requirements in the IFR do not take into account differences between varietals or different end uses of hemp plants.

Many commenters explained that the sampling requirements imposed by the IFR are expensive, burdensome, and nearly impossible to meet by State Departments of Agriculture and Tribal governments. Based on this input, AMS is considering several changes to the sampling requirements; these changes would modify the number of samples required to be collected, and/or provide for the States and Tribes to establish sampling requirements based on end-use.

AMS is considering establishing a specific number of plants to be sampled from every lot, regardless of the lot size, and is requesting input on how to establish these requirements. Specifically, AMS is requesting input on how to potentially establish a fixed sliding scale (for example, a lot of fewer than 10 acres requires a sample of five plants; a lot of between 10 and 20 acres requires six plants; etc.,) rather than leaving those calculations to each State and Tribe.

AMS is also considering establishment of different sampling and testing requirements for hemp based on end use (*i.e.,* risk-based.) AMS further seeks stakeholder comment on potential risk-based methods for hemp lot sampling for differing varietals intended for fiber, grain, seed, or biomass for extract. Methodology discussed should show quantitative and qualitative data and estimate potential risk levels (*i.e.,* the expected likelihood of growing non-compliant hemp) for different varietals based on the plant's intended end use.

ASA supports the use of representative sampling that does not cap the number of plants to be sampled. A sampling strategy cannot be considered representative if it does not expose each plant in the crop to potential sampling through statistical means. By only taking samples from a set number of plants, regardless of lot size, the confidence interval would not be able to be maintained.

[5] Richins, R.D., et al. (2018) Accumulation of bioactive metabolites in cultivated medical *Cannabis*. *PLoS ONE* **13**(7):e0201119.

The United Nations Office on Drugs and Crime (UNODC) has published “Guidelines on Representative Drug Sampling”[6] which identifies sampling best practices and different ways to calculate the number of representative samples which should be collected. Sampling scheme #3 lists: $n = \sqrt{N}/2$ as a widely accepted method, with a disadvantage being that the number of samples taken may be excessive for larger populations. The most common disadvantage of each sampling method tends to be higher numbers of samples for larger populations, which at this time is unavoidable in order to ensure products reaching commercial streams meet the requirements.

In order to help farmers with the cost of testing and the loss of product due to sampling, ASA supports testing end use products for compliance rather than solely the raw flowers and leaves. ASA urges USDA to work with FDA to develop a pathway for finished products that are not raw flowers to enter commercial streams in order to ensure that the finished products meet standards set by both USDA and FDA.

11: Sampling Agents

The IFR requires that all hemp production must be sampled and tested for THC concentration levels, and that samples must be collected by a USDA-approved sampling agent or a Federal, State, or local law enforcement agent authorized by USDA to collect samples. Currently, sampling agents are required to complete a basic training module offered by AMS. AMS is now soliciting comment on the potential need for more rigorous training and/or certification requirements for sampling agents. For example, AMS is interested in whether sampling agents should be required to complete an online training module administered by AMS and pass an examination. Or, alternatively, whether States and Tribes should be able to develop and require the completion of specific training programs for sampling agents under their respective State or Tribal hemp programs. AMS is specifically requesting input on the content of sampling agent training, the frequency with which training should occur, and whether AMS should maintain a national list of trained sampling agents on the AMS website. The comments should clearly explain why additional requirements may be necessary and suggest what those additional requirements may entail.

ASA supports the development of AMS training standards that sampling agents must take and then pass an exam to become qualified. We also support the development of an approval system whereby providers of AMS training must be approved by AMS in order to provide consistent training to each sampling agent.

Currently, California is one of the only states that requires cannabis laboratory personnel to perform sampling on all products intended for sale within both the medical and adult-use cannabis markets. This indicates that States may not be prepared to develop this type of a program and administer it in the timeframe needed. One of the other challenges with leaving this type of activity to States and Tribes is that each may do it differently as has been evidenced

[6] United Nations Office on Drugs and Crime (2009). Guidelines on Representative Drug Sampling. New York.

by the high degree of variability in cannabis regulations from state to state. Hemp sampling is something that should be consistent no matter the location of sampling in order to ensure that each crop sampled the same way.

12. DEA Laboratory Registration

The IFR requires that laboratory testing of hemp for the purpose of determining compliance under the U.S. Domestic Hemp Product Program be conducted by laboratories appropriately registered with the Drug Enforcement Administration (DEA).

On February 27, 2020, USDA announced guidance (6) delaying the requirement to use laboratories registered with DEA for testing (7 CFR 990.3(a)(3)(i) and 990.26(e)). Under this guidance, testing can be conducted by labs that are not yet DEA-registered until the final rule is published, or Oct. 31, 2021, whichever comes first. This change was intended to allow additional time to increase DEA-registered analytical lab capacity. AMS is now requesting additional input on whether the DEA laboratory registration requirement should be permanently removed, and if so, how lab disposal requirements of non-compliant hemp samples will adhere to the requirements of the Controlled Substances Act.

ASA supports the removal of the DEA laboratory registration requirement. State-licensed cannabis testing labs have developed and validated methods for testing plant material, extracts, and infused products. ASA urges USDA to require that laboratories perform method validations consistent with ICH guidelines as they are more stringent than ISO 17025 method validation requirements and will further bolster confidence in testing results.

Cannabis testing labs currently dispose of extracts using EPA-registered waste disposal providers who are licensed to dispose of Schedule I substances. These same providers will be able to dispose of hemp extracts that are both passing and failing without any additional requirements.

We thank you for reviewing these comments. Questions regarding comments or references may be directed to:

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