# IN THE UNITED STATES DISTRICT COURT NORTHERN DISTRICT OF TEXAS

**DALLAS DIVISION**

**UNITED STATES OF AMERICA,**

**v.**

**GAS PIPE, INC. (7),**

**AMY LYNN, INC. (8), GERALD SHULTS (9),**

**AMY HERRIG (10),**

**RAPIDS CAMP LODGE, INC. (31),**

**RIDGLEA COMPLEX MANAGEMENT, INC. (32),**

**Case No. 3:14-cr-00298-M**

**Defendants.**

**/**

**AMENDED MOTION TO DISMISS**

**COUNTS FOUR THROUGH NINE FOR VAGUENESS\***

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\*Defendants file this amended motion to correct an error on pages 16-17 of the previously filed motion (Doc. 772). This amended motion and the original motion are otherwise substantively identical.

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Pursuant to Federal Rule of Criminal Procedure 12(b) and the Due Process Clause of the Fifth Amendment to the United States Constitution, Defendants Gas Pipe, Inc., Amy Lynn, Inc., Gerald Shults, and Amy Herrig (“Defendants”) move to dismiss Counts Four through Nine of the Indictment. These counts allege violations of the Federal Analogue Act based on substances known as AM-2201, JWH-250, XLR-11, PB-22, 5F-PB-22, FUB-PB-22, and THJ-2201. Each of these

counts should be dismissed because the Analogue Act is unconstitutionally vague as applied to these substances. The grounds supporting this motion are set forth below.

# Introduction

The undersigned respectfully submits that this action and those like it present the first instance in the history of the Republic in which the government has sought to imprison its citizens based on conduct that is both lawful and impossible for the citizenry to know is considered unlawful. The Constitution prohibits the enforcement of statutes drawn in terms so vague that people of common intelligence “must necessarily guess” at its meaning. We must all guess at the application of the Analogue Act because the government provides no notice of what substances it believes are unlawful under the Act. And as to the synthetic cannabinoids at issue in this case, if before guessing one were to confer with professors of chemistry or other skilled forensic chemists, the guess would quite possibly be incorrect.1 For the reasons set forth below, the Analogue Act fails to give adequate

1Experts known to disagree with the government’s analogue determinations regarding at least some of the substances at issue here include: Dr. Michael Croatt, Associate Professor at the University of North Carolina at Greensboro; Dr. Anthony P. DeCaprio, Associate Professor of Chemistry and Biochemistry at Florida International University; Dr. Paul Doering, Distinguished Service Professor Emeritus in the Department of Pharmacotherapy and Translational Research at the University of Florida, College of Pharmacy; Dr. Gregory Dudley, Distinguished Professor and Chair of the Department of Chemistry at West Virginia University; Dr. Mark Erickson, Professor of Chemistry at Hartwick College; Dr. Neil Garg, Professor and Vice Chair of the Department of Chemistry and Biochemistry at the University of California, Los Angeles; Heather Harris, Professor of Forensic

notice to the public of what is proscribed and is void for vagueness as applied to the substances at issue.

# Legal and Factual Background

# The regulation of controlled substance analogues.

Generally, “[t]he Controlled Substances Act [CSA] prohibits a person from dispensing or distributing a controlled substance.” *United States v. MacKay*, 715 F.3d 807, 814 (10th Cir. 2013). The CSA makes it “unlawful for any person, knowingly or intentionally…to manufacture, distribute, or dispense, or possess with intent to manufacture, distribute, or dispense, a controlled substance.” 21 U.S.C. § 841(a)(1) (2012). The Controlled Substances Analogue Enforcement Act of 1986 (the “Analogue Act”) provides that a “controlled substance analogue shall, to the extent intended for human consumption, be treated for the purposes of any Federal law as a controlled substance in schedule I.” 21 U.S.C. § 813 (2012). The Act defines a “controlled substance analogue” as a substance-

1. the chemical structure of which is substantially similar to the chemical structure of a controlled substance in schedule I or II;

Chemistry at Arcadia University; Dr. Michael Hilinski, Assistant Professor of Chemistry at the University of Virginia; Dr. James R. McCarthy (deceased), late Professor of Chemistry and Chemical Biology at Purdue University in Indianapolis; Dr. Joseph Ready, Professor of Biochemistry at the University of Texas Southwestern Medical Center; Dr. Adam R. Renslo, Professor of Pharmaceutical Chemistry at the University of California, San Francisco; Dr. Richmond Sarpong, Professor of Chemistry at the University of California, Berkeley; Dr. Uttam Tambar, Associate Professor of Biomedical Research at the University of Texas Southwestern Medical Center; Dr. Richard E. Taylor, Professor of Chemistry and Biochemistry at the University of Notre Dame; Dr. Guido Verbeck, Associate Professor of Chemistry at the University of North Texas; Joseph P. Bono, forensic chemist formerly employed by DEA’s Office of Forensic Science; Dr. Lindsay Reinhold, forensic chemist and former Chair of the Advisory Committee for the Evaluation of Controlled Substance Analogs; and Dr. Terry Stouch, forensic chemist with more than 35 years’ experience in the discovery of new pharmaceuticals. *See* Exhibits 18-40

1. which has a stimulant, depressant, or hallucinogenic effect on the central nervous system that is substantially similar to or greater than the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance in schedule I or II; or
2. with respect to a particular person, which such person represents or intends to have a stimulant, depressant, or hallucinogenic effect on the central nervous system that is substantially similar to or greater than the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance in schedule I or II.

21 U.S.C. § 802(32)(A) (2012). The first of the three prongs above is read in the conjunctive with the remaining prongs – that is, a “controlled substance analogue” must have a chemical structure substantially similar to a controlled substance and must either have a substantially similar effect on the central nervous system or be represented or intended to have such an effect. *McFadden v. United States*, 135 S. Ct. 2298, 2305 n.2 (2015).

The *mens rea* from the underlying Section 841 offense carries over to an analogue offense. The government may satisfy the CSA’s *mens rea* requirement in analogue cases by proving that the Defendant knew either (1) “that the substance with which he was dealing is some controlled substance – that is, one actually listed on the federal drug schedules or treated as such by operation of the Analogue Act – regardless of whether he knew the particular identity of the substance;” or

(2) that the substance met the Section 802(32)(A) definition of a controlled substance analogue. *Id.* at 2305. In other words, the government must prove beyond a reasonable doubt that the defendant knew the substance he possessed was either (1) controlled by the CSA or Analogue Act, or (2) had both of the features derived from the definition of a controlled substance analogue. *United States*

*v. Makkar*, 810 F.3d 1139, 1143 (10th Cir. 2015). If the government proceeds under the second of these methods, it must establish the defendant “knew the drug in question had both a similar chemical structure and similar effects to a controlled substance.” *Id.* at 1146.

# The allegations of the indictment

Counts Four through Nine of the Third Superseding Indictment allege the Defendants violated the CSA based on the Analogue Act. Count Four alleges the Defendants conspired to violate CSA Section 841(a)(1) by “knowingly and intentionally manufactur[ing] and distribut[ing] mixtures or substances containing detectable amounts of a Schedule I controlled substance analogue as defined in 21 U.S.C. § 802(32), to wit: AM-2201, JWH-250, XLR-11, PB-22, 5F-PB-22,

FUB-PB-22, and THJ-2201, knowing that the substances were intended for human consumption….” Doc. 672 at 23. Counts Five and Six allege the Defendants violated CSA Section 856(a)(1) by “knowingly and intentionally maintain[ing] a place at the locations set forth below for the purpose of manufacturing and distributing a Schedule I controlled substance analogue [THJ-2201] as defined in 21 U.S.C. § 802(32) knowing that the substances were intended for human consumption….” *Id*. at 24. Finally, Counts Seven through Nine charge the Defendants with violating CSA Section 960 by “intentionally and knowingly import[ing] into the United States a mixture and substance containing detectable amounts of a Schedule I controlled substance analogue [THJ-2201] as defined in 21 U.S.C. § 802(32) knowing that the substances were intended for human consumption….” *Id*. at 25.

For the reasons discussed in the Defendants’ companion Motion to Dismiss for Failure to State an Offense, it is asserted that the Analogue Act allegations in the Indictment omit the essential *mens rea* element in dispute – whether the Defendants knew the substances at issue qualified as analogues. These counts should also be dismissed because the Analogue Act is unconstitutionally vague as applied to the substances at issue.

# Counts Four Through Nine of the Indictment Should be Dismissed Because the Analogue Act is Unconstitutionally Vague as Applied to the Substances in Issue.

This case presents a textbook example of a statute that is unconstitutionally vague as applied.2 While the Analogue Act may pass facial constitutional muster and be capable of constitutional application under other circumstances involving different substances, its application to the substances at issue here violates the Defendants’ Fifth Amendment guarantee of due process of law.

# Consideration of the constitutionality of the Analogue Act as applied is proper on a motion to dismiss.

As a threshold matter, it is established that the Court may consider an as-applied challenge regarding the vagueness of the Analogue Act on a pretrial motion. Federal courts routinely evaluate the constitutionality of the Act as applied to a particular substance, *United States v. Fisher*, 289 F.3d 1329, 1332 (11th Cir. 2002); *United States v. Carlson*, 87 F.3d 440, 443 (11th Cir. 1996); *United States v. Forbes*, 806 F. Supp. 232 (D. Colo. 1992), typically through motions to dismiss. *See*, *e.g*., *United States v. Roberts*, 363 F.3d 118, 121 (2d Cir. 2004) (discussing expert testimony at pretrial hearing on motion to dismiss addressing “whether it was sufficiently clear that” substance was substantially similar to GHB); *United States v. Klecker*, 348 F.3d 69, 70 (4th Cir. 2003) (discussing evidentiary hearing on pretrial motion to dismiss regarding whether substance was an analogue of DET); *Fisher*, 289 F.3d at 1338 (discussing expert testimony on pretrial motion to dismiss regarding

2The Defendants adopt by reference in support of this argument the Memorandum of Amicus Curiae National Association of Criminal Defense Lawyers on this issue submitted in *Hummel v. United States*, Case No. 8:12-mj-1457TGW (M.D. Fla), included in the appendix at Exhibit 54. Exhibits in support of all motions filed by the Defendants this week, including this motion, are filed in the appendix, and will be cited in this motion as “Ex. .” In some instances only the pertinent portions of transcripts are included in the appendix. Complete transcripts of these hearings are available on PACER.

whether substance was substantially similar to GHB and whether it has a substantially similar effect on the central nervous system); *Forbes*, 806 F. Supp. at 239 (holding analogue act unconstitutionally vague as to substance where there was no scientific consensus regarding whether it is substantially similar to a controlled substance). As a district court explained in addressing one such challenge, “[w]hether a criminal statute is unconstitutionally vague is a question of law.” *United States v. Reece*, 2013 WL 3865067, at \*5 (W.D. La. July 24, 2013). Accordingly, a “vagueness challenge to the analogue statute can be decided before trial.” *Id.*

# The applicable law: the public must be provided fair warning of what is prohibited.

The constitutional vagueness doctrine is well established. It “requires that a penal statute define the criminal offense with sufficient definiteness that ordinary people can understand what conduct is prohibited and in a manner that does not encourage arbitrary and discriminatory enforcement.” *Kolender v. Lawson*, 461 U.S. 352, 357 (1983). “Vague laws offend several important values,” including the principle that citizens must be provided fair warning of what the law prohibits and the requirement that there be boundaries on the discretion of law enforcement. *Grayned v. City of Rockford*, 408 U.S. 104, 108 (1972).

As to the fair warning requirement, the Supreme Court has held that “a statute which either forbids or requires the doing of an act in terms so vague that men of common intelligence must necessarily guess at its meaning and differ as to its application violates the first essential of due process of law.” *Connally v. General Constr. Co.*, 269 U.S. 385, 391 (1926); *see also United States*

*v. Aguilar*, 515 U.S. 593, 600 (1995) (“Fair warning should be given to the world in language that the common world will understand, of what the law intends to do if a certain line is passed.”); *Grayned*, 408 U.S. at 108 (“It is a basic principle of due process that an enactment is void for

vagueness if its prohibitions are not clearly defined.”). “[B]ecause we assume that man is free to steer between lawful and unlawful conduct, we insist that laws give the person of ordinary intelligence a reasonable opportunity to know what is prohibited, so that he may act accordingly.” *Grayned*, 408 U.S. at 108. A person cannot “be held criminally responsible for conduct which he could not reasonably understand to be proscribed.” *United States v. Harriss*, 347 U.S. 612, 617 (1954).

At the core of the requirement that the discretion of law enforcement must be limited is the concern that “if arbitrary and discriminatory enforcement is to be prevented, laws must provide explicit standards for those who apply them.” *Grayned*, 408 U.S. at 108. “A vague law impermissibly delegates basic policy matters to policemen, judges, and juries for resolution on an ad hoc and subjective basis, with the attendant dangers of arbitrary and discriminatory application.” *Id*. at 108-09. That is, such a statute permits “a standardless sweep [that] allows policemen, prosecutors, and juries to pursue their personal predilections.” *Kolender*, 461 U.S. at 358 (quoting *Smith v. Goguen*, 415 U.S. 566, 575 (1974)).

# The Analogue Act as applied to the substances in issue fails to provide fair warning of what is prohibited.

* + 1. *The lack of notice to the public under the Analogue Act.*

Perhaps the most striking feature of the Analogue Act is that it is not possible for the public to know what substances the United States does and does not consider to be unlawful under the Act. The Act does not delegate authority to any branch or agency of government to determine what molecules are substantially similar to one another either in chemical structure or in pharmacological effect. As is discussed more fully in the Defendants’ motion to compel discovery pursuant to *Brady*

*v. Maryland* and request for an evidentiary hearing (“*Brady* Motion”) – which has been simultaneously filed with this motion – it appears that in practice the government’s litigation positions under the Act are established by the DEA’s Office of Diversion Control. Unfortunately, neither Diversion Control nor any other agency of government informs anyone outside of the government what substances Diversion Control believes are unlawful under the Act. No reason has been given to the public by the government for why the government has declined to notify the public when it determines that a substance shall henceforth be deemed unlawful. As a result, the Defendants had no opportunity to learn that the United States considered AM-2201, JWH-250, XLR-11, PB-22, 5F-PB-22, FUB-PB-22, or THJ-2201 to be unlawful analogues during the time periods charged in Counts Four through Nine of the Indictment.

* + 1. *The inherent subjectivity of the “substantially similar in chemical structure” standard.*

That the criminal code as applied to analogues is a secret is startling and in itself raises a suggestion of lack of constitutional notice. But this would be of less consequence if the secret law were obvious in its application. If there existed an objective methodology by which all persons “of common intelligence” could determine whether a substance does or does not qualify as an analogue, the lack of public notice by the government would pose a different constitutional question. But here, no such objective methodology exists.3

Prong one of the statute proscribes substances if their chemical structure “is substantially similar to the chemical structure” of a listed controlled substance. § 802(32)(A)(i). As explained

3The Defendants adopts by reference in support of this argument the Amicus Curiae Brief of Expert Forensic Scientists on this issue submitted in *McFadden v. United States*, Case No. 14-378 (U.S.), attached as Exhibit 55.

in the Defendants’ companion Motion for a Pretrial *Daubert* Hearing (“*Daubert* Motion”) – which has been simultaneously filed with this motion – the term “substantially similar in chemical structure” is not a term of chemistry, and there exists no objective methodology by which to apply the term. Evaluations of “substantial similarity” are, by their nature, subjective. The most any chemist or member of the public can have about whether two chemical structures are substantially similar or merely similar is an opinion.

The phrase has been variously described as “uninterpretable,” Ex. 41 at 193-94, “essentially nonsense,” *id*. at 82, “essentially meaningless,” Ex. 30 at 1, and “of limited utility to scientists” Ex. 32 at 5. This standard provides neither a quantifiable measure nor any point of reference. How similar must the structures be in order to be “substantially” similar? And substantially similar compared to what? As Professor Doering illustrated, “a Cadillac and an Edsel are substantially similar because they’re both automobiles, but I don’t think you’d want to drive around in an Edsel.” Ex. 41 at 194. As Professor Ready colorfully explained: “We need not delve into the nuances of chemistry to understand the ambiguity inherent to the question of similarity: is an apple similar to a billiards 3-ball?” Ex. 32 at 3. Even the DEA’s experts agree that “reasonable scientists can disagree about whether two substances are substantially similar in structure to each other.” *United States v. Broombaugh*, Case No. 5:14-cr-40005-DDC, doc. 1157, included in the appendix at Exhibit 48, at 146 (testimony of DEA chemist Willenbring). The DEA agrees that it has no “agency-wide opinion” on “what substantially similar means,” nor has there ever been such a definition by DEA. *Broombaugh*, doc. 1158, included in the appendix at Exhibit 49, at 7.

And it is not as if the scientific community has not tried to develop a reliable methodology for making analogue determinations. In her report attached as Exhibit 29, Professor Harris relates

that an expert Advisory Committee of chemists, including representative from the United States Food and Drug Administration Forensic Chemistry Center and the United States Postal Inspection Service, as well as a host of state law enforcement agencies, was assembled specifically to develop a scientific method with accepted criteria to make analogue determinations. *Id*. at 1-2, 5. *See also* Ex. 41 at 48-49 (testimony of Advisory Committee Chair Lindsay Reinhold explaining that the DEA was asked to join the Advisory Committee but repeatedly declined, telling her “that it’s not in their best interest.”). The Advisory Committee was ultimately forced to abandon its efforts because it was “unable to establish criteria that make one compound substantially similar to another.” Ex. 29 at 2.

* + 1. *Diversion Control’s unique approach to analogue determinations under the secret subjective criminal analogue code render the Analogue Act vague as applied to the substances at issue*

The absence of public notice of analogue determinations, coupled with the fact that such secret determinations are based on an unscientific and subjective standard, create a perfect storm of vagueness. The effects of such a storm might be minimized, however, if subjective non-public analogue determinations were based on a very conservative approach – if only the most similar of chemical structures were considered to be substantially similar to one another. But as to some of the substances at issue, Diversion Control has taken such an expansive interpretation of the phrase “substantially similar” that virtually no one outside the captivity of Diversion Control agrees with them. As to other substances, Diversion Control’s analogue determinations are logically impossible to predict from prior determinations of non-analogue status. Where a secret subjective code is applied in a manner that cannot be predicted even by the leading experts in the field, the constitutional requirement of fair notice is unsatisfied.

**XLR-11** – The vagueness violation is clearest as applied to XLR-11, which the government

asserts is substantially similar in structure to JWH-018. The two compounds differ (1) in the replacement of the naphthalene ring system in JWH-018 with a cyclopropane ring in XLR-11; (2) in the electronic structure of the ketone as differentially influenced by the naphthalene vs the cyclopropane; and (3) by the replacement of a hydrogen atom in JWH-018 with a flourine atom in XLR-11. Ex. 20. The nature and significance of these differences in chemical structure are explained in detail in the many expert reports attached to this Motion. Ex. 20, 23, 25, 26, 27, 28, 30,

31, 32a, 33, 34, 35, 36, 37, 38, 39, 40. Suffice it to say that for chemists outside the DEA, the substitution of the tetramethylcyclopropane ring in place of the naphthalene ring was not merely a significant change in structure – it has been described in chemistry literature as “ground-breaking.” Ex. 20 at 7.

No person of ordinary intelligence would have a reasonable opportunity to “know” that XLR-11 is “substantially similar” in chemical structure to JWH-018 despite the substitution of the tetramethylcyclopropyl ring in XLR-11 for the naphthyl ring in JWH-018. The opposite view is uniformly held by the following array of professors of chemistry and forensic chemists: (1) Dr. Michael Croatt, Associate Professor at the University of North Carolina at Greensboro; (2) Dr. Anthony P. DeCaprio, Associate Professor of Chemistry and Biochemistry at Florida International University; (3) Paul Doering, Distinguished Service Professor Emeritus in the Department of Pharmacotherapy and Translational Research at the University of Florida, College of Pharmacy; (4) Dr. Gregory Dudley, Distinguished Professor and Chair of the Department of Chemistry at West Virginia University; (5) Dr. Mark Erickson, Professor of Chemistry at Hartwick College; (6) Dr. Neil Garg, Professor and Vice Chair of the Department of Chemistry and Biochemistry at the University of Califormia, Los Angeles; (7) Heather Harris, Professor of Forensic Chemistry at

Arcadia University; (8) Dr. Michael Hilinski, Assistant Professor of Chemistry at the University of Virginia; (9) Dr. James R. McCarthy (deceased), late Professor of Chemistry and Chemical Biology at Purdue University in Indianapolis; (10) Dr. Joseph Ready, Professor of Biochemistry at the University of Texas Southwestern Medical Center; (11) Dr. Adam R. Renslo, Professor of Pharmaceutical Chemistry at the University of California, San Francisco; (12) Dr. Richmond Sarpong, Professor of Chemistry at the University of California, Berkeley; (13) Dr. Uttam Tambar, Associate Professor of Biomedical Research at the University of Texas Southwestern Medical Center; (14) Dr. Richard E. Taylor, Professor of Chemistry and Biochemistry at the University of Notre Dame; and (15) Dr. Guido Verbeck, Associate Professor of Chemistry at the University of North Texas; (16) Joseph P. Bono, forensic chemist formerly employed by DEA’s Office of Forensic Science; (17) Dr. Lindsay Reinhold, forensic chemist and former Chair of the Advisory Committee for the Evaluation of Controlled Substance Analogs; (18) Dr. Terry Stouch, forensic chemist with more than 35 years’ experience in the discovery of new pharmaceuticals. Ex. 20, 23, 25, 26, 27, 28,

30, 31, 32a, 33, 34, 35, 36, 37, 38, 39, 40; Ex. 41 at 42, 43-44, 47, 52 (Reinhold); Ex. 41 at 57-59,

66 (Stouch); Ex. 41 at 94-95 (Harris); Ex. 41 at 115 (Morris); Ex. 41 at 166-67, 170 (DeCaprio); Ex. 41 at 195 (Doering); Ex. 41 at 205 (Verbeck). Indeed, not only do all of the above experts unanimously hold the same subjective opinion that XLR-11 does not qualify as an analogue, as detailed in the Defendants’ companion *Brady* Motion, this same view is also held by the DEA’s Office of Forensic Science.

Although Diversion Control chemists have testified to their opinions that XLR-11 is substantially similar in chemical structure to JWH-018, as noted in the Defendants’ *Daubert* Motion, the basis for those opinions does not satisfy even one of the criteria for admission under Rule 702

of the Federal Rules of Evidence as elucidated in *Daubert v. Merrell Dow Pharmaceuticals, Inc*., 509 U.S. 579, 593-94 (1993). The Diversion Control chemists are largely conclusory in their analysis4 and fail to give any convincing or even coherent explanation for their position that the substitution of the naphthyl group in JWH-018 with the tetramethylcyclopropyl group in XLR-11 is an insignificant change in structure - a change described by Ms. Reinhold and Dr. Stouch as “half the molecule.” Ex. 41 at 44, 66.

In contrast, the numerous experts who opine that XLR-11 is not substantially similar in structure to JWH-018 display a wide array of educational backgrounds and professional experience. Their opinions are consistent with one another and with the published data and literature. They explain in common sense terms the basis for their opinions, including reasons that the substitution of the naphthyl ring in JWH-018 with the tetramethylcyclopropyl ring in XLR-11 is a significant change in structure. *See* Ex. 20, 23,25, 26, 27, 28, 30, 31, 32a, 33, 34, 35, 36, 37, 38, 39, and 40. If Professor Croatt, Professor DeCaprio, Professor Doering, Professor Dudley, Professor Erickson, Professor Garg, Professor Harris, Professor Hilinski, Professor McCarthy, Professor Ready, Professor Renslo, Professor Sarpong, Professor Tambar, Professor Taylor, and Professor Verbeck, and chemists Bono, Reinhold, Stouch, and Berrier - nineteen people of highly uncommon intelligence on such matters - hold the opinion that XLR-11 is not an analogue of JWH-018, it

4Diversion Control chemists often justify their determinations of substantial similarity based on the following lone assertion: “Both compounds share the same core indole structure with substitutions at the 1 and 3 positions of the fused bicyclic ring system.” But as Professor Dudley explains: “The 1,3-disubstituted indole core is not an especially distinguishing structural feature in medicinal chemistry”, and is “emphatically too broad to be useful for Analogue determinations.” Ex. 21 at 1,

3. There are more than ten thousand different known compounds that also “share the same core indole structure ... with substitutions at the 1 and 3 positions of the fused bicyclic ring system.” *Id*. at 1.

cannot be said that people of “ordinary intelligence” could have “a reasonable opportunity to know” the opposite. The Analogue Act is unconstitutionally vague as applied to XLR-11.

**JWH-250** – The government asserts that JWH-250 is an analogue of JWH-018. The Defendants assert that the Constitution does not permit a jury to speculate whether they “knew” that JWH-250 is substantially similar in structure to JWH-018. As explained by Professor Dudley, JWH- 250 incorporates a methyl ether functionality, suffers a deletion of the aromatic ring associated with replacing a naphthalene with a benzene, and a one-carbon methylene unit has been inserted between the central ketone carbonyl and the methoxy-benzene ring, creating significant new conformational dynamics and disrupting the electronic communication between the ketone and the aromatic ring. JWH-018 is a diaryl ketone; JWH-250 is an aryl alkyl ketone. Ex. 20 at 8. According to Mr. Bono, Professor Dudley, Professor Harris, Professor Ready, and Professor Tambar, JWH-250 is not substantially similar in structure to JWH-018. Ex. 20, 28, 32b, 35, and 38. This is also the view of the Office of Forensic Science at the DEA. Ex. 4 at R17-0058. And according to a May 6, 2014, sworn affidavit of DEA Task Force Officer Tanisha Washington in support of fourteen warrants and orders for tracking devices in this matter filed before United States Magistrate Judge Paul Stickney, JWH-250 had been determined by DEA *not* to be an analogue because “[a]lthough JWH-250 has the same effect on the central nervous system as scheduled [sic] I controlled substances, the chemical structure is not substantially similar to that of other scheduled controlled substances.” *See, e.g.*, Ex. 5 at GasPipeDTO\_00470141 n. 3. Professor Hilinski disagrees. Ex. 30.5

**5F-PB-22** – The government asserts that 5F-PB-22 is an analogue of AM-2201. This

5Due to budgetary constraints, the Defendants did not obtain the views of the remaining experts cited as to XLR-11 above with regard to JWH-250, 5F-PB-22, FUB-PB-22, PB-22, THJ-2201, or AM- 2201.

presents the constitutional question of whether the Defendants had fair warning “in language that the common world will understand” that 5F-PB-22 is substantially similar in chemical structure to AM-2201 even though their structures differ by the replacement of the bicyclic aromatic naphthalene ring system with a bicyclic aromatic quinoline ring system, and by the insertion of an oxygen atom to create an ester functional group, thereby creating new patterns of chemical activity. Esters can undergo hydrolysis to carboxylic acids and alcohols, while ketones such as JWH-018 cannot. Ex 20 at 9. According to Mr. Bono, Professor Dudley, Professor Harris, Professor Ready, and Professor Tambar, 5F-PB-22 is not substantially similar in structure to AM-2201. Ex. 20, 28, 32c, 35, and 38. Professor Hilinski disagrees. Ex. 30.

**FUB-PB-22** – The government asserts that FUB-PB-22 is an analogue of 5F-PB-22. At issue is whether a person of common intelligence would have to guess whether these two compounds are substantially similar in their chemical structure in light of the differences in their *N*- alkyl- substituent groups. 5F-PB-22 has a 5-fluoropentyl- group attached at the indole nitrogen, while FUB-PB-22 has a 4-fluorobenzyl- group attached at the indole nitrogen. The 5-fluoropentyl- group comprises five carbon units attached in a linear chain; it is relatively thin and flexible in terms of its size, shape, and conformational dynamics. The 4-fluorobenzyl- group, in contrast, comprises seven carbon atoms and one fluorine atom in a pendant ring structure that is larger and more rigid. Ex 20 at 11. According to Mr. Bono, Professor Dudley, Professor Harris, Professor Hilinski, and Professor Tambar, FUB-PB-22 is not substantially similar in structure to 5F-PB-22. Ex. 20, 28, 30, 35, and 38. Professor Ready disagrees. Ex. 32d.

**PB-22** – The government asserts that PB-22 is an analogue of JWH-018. As with the relationship between 5F-PB-22 and AM-2201 discussed above, these two compounds also differ by

the replacement of the bicyclic aromatic naphthalene ring system with a bicyclic aromatic quinoline ring system, and by the insertion of an oxygen atom to create an ester functional group, thus creating new patterns of chemical activity. Quinoline and naphthalene aromatic ring systems are similar in size and shape but different in electronic properties and hydrogen-bonding properties. Naphthalene is an electronically neutral aromatic system, whereas quinoline is an electron-poor aromatic π- system. However, the oxygen atom of PB-22 increases the electron density of the quinoline ring system. The quinoline nitrogen atom also provides additional hydrogen bonding capabilities not found in JWH-018. This difference – the capacity for the nitrogen atom of PB-22 to accept a hydrogen bond – is enhanced by the presence of the oxygen atom. Ex. 20 at 9.

Even those few citizens equipped with expertise in chemistry will likely be misled if they also possess a modicum of logic. The DEA determined that CB-13 was not substantially similar in chemical structure to JWH-018 and therefore did not qualify as an analogue. Ex. 41 at 221-22. As explained by Professor Dudley, “[t]he structural disparity between PB-22 and JWH-018 is greater than the structural disparity between CB-13 and JWH-018.” Ex. 20 at 9. Armed with these two premises, a member of the public lacks sufficient notice that the government will nevertheless assert that PB-22 is an analogue of JWH-018. According to Mr. Bono, Professor Dudley, Professor Harris, Professor Ready, and Professor Tambar, PB-22 is not substantially similar in structure to JWH-018. Ex. 20, 28, 32e, 35, and 38. Professor Hilinski disagrees. Ex. 30.

**THJ-2201** – The government asserts that THJ-2201 is an analogue of AM-2201. The government’s claim presents this Court with the question of whether the common person would reasonably understand that the replacement of an indole ring system with a indazole ring system is an insignificant change in chemical structure. The indole is an electron-rich aromatic π-system,

whereas the electronic structure of the indazole is less electron-rich by virtue of the second nitrogen atom. Ex. 20 at 10.

And as with PB-22, there is the matter of logical inferences to be drawn from other DEA determinations. The DEA determined that Fubimina was not substantially similar in chemical structure to JWH-018 and therefore did not qualify as an analogue. *See United States v. Broombaugh*, Case No. 5:14-cr-40005-DDC, doc. 1051 at 43. THJ-2201 is an isomer of Fubimina. Ex. 20 at 10. As Professor Dudley explains, “To a first approximation, the differences between JWH-018 (or AM-2201) and Fubimina are analogous to the differences between JWH-018 (or AM- 2201 and THJ-2201).” *Id*. The Defendants respectfully submit that the public lacked “fair warning” that the DEA would take wholly inconsistent positions in its analogue determinations. According to Mr. Bono, Professor Dudley, Professor Harris, and Professor Tambar, THJ-2201 is not substantially similar in structure to AM-2201. Ex. 20, 28, 35, and 38. Professors Ready and Hilinski disagree. Ex. 30, 32f.

**AM-2201** – The government asserts that AM-2201 is an analogue of JWH-018. These two compounds are the most similar of the various alleged analogues, differing by the addition of a flourine atom to AM-2201. Nevertheless, according to Professor Tambar, AM-2201 cannot be determined to be substantially similar in structure to JWH-018 because “[f]lourine atoms have been incorporated into chemical structures to drastically impact the pharmacological, chemical, and physical properties of substances.” Ex. 35 at 4. Thus, Professor Tambar explains that “[a]lthough a non-expert may view these two chemical substances to be substantially similar, the replacement of the hydrogen atom by a fluorine atom can lead to significant changes in the pharmacological effects of two substances,” including changes in “the solubility, bioavailability, and metabolic

stability of a chemical substance.” *Id.* at 4. Professors Dudley, Harris, Hilinski, Ready, and Tambar hold the subjective view that these two compounds are substantially similar in their structure. Ex. 20, 28, 32g, and 35.

Admittedly, the strength of the vagueness challenge as applied to various substances increases as the reasonableness of the substantial similarity determination decreases. Perhaps a Court could conclude that because a minority of chemistry experts believe AM-2201 does not qualify as an analogue, the Act can constitutionally be applied in a prosecution for that substance. This Court must decide the location of the Constitutional line, but by any reckoning that line is crossed where an array of experts such as those assembled here comes to unanimous consensus.

# The current legal landscape regarding the constitutionality of the Analogue Act

The District Court for the District of Colorado has held the Analogue Act unconstitutionally vague as applied to a non-cannabinoid substance, reasoning that “unlike the meaning of cocaine base or the boundaries of a military reservation, a defendant cannot determine in advance of his contemplated conduct whether [the substance at issue] is or is not substantially similar to a controlled substance.” *Forbes*, 806 F. Supp. 232 at 237. Several Circuit Courts of Appeals have rejected vagueness challenges where, unlike here, the substances alleged to be analogues metabolized into the controlled substance after human ingestion. *Roberts*, 363 F.3d at 124-125; *United States v. Washam*, 312 F.3d 926, 931-33 (8th Cir. 2002). The Eleventh Circuit upheld the Analogue Act against a vagueness challenge where there was “no disagreement in the scientific evidence” regarding substantial similarity in chemical structure. *Carlson*, 87 F. 3d at 443 n.3.

The constitutionality of the Analogue Act as applied to cannabinoids has been litigated in

a number of recent district court cases6 and addressed in two Circuit Court of Appeals opinions, *United States v. Carlson*, 810 F.3d 544 (8th Cir. 2016), *Makkar*, 810 F. 3d at 1142. While the cited district court cases have rejected the proposition that the Analogue Act is vague as applied to alleged synthetic cannabinoids, as is discussed below, these holdings have in large part been without significant analysis. Moreover, the Tenth Circuit Court of Appeals has called that conclusion into question following a recent Supreme Court decision.

* + 1. *Initial district court litigation regarding vagueness*

The first court to address a vagueness motion regarding synthetic cannabinoids was the district court in *Fedida*. *United States v. Fedida*, 942 F. Supp. 2d 1270, 1273-80 (M.D. Fla. 2013). While that court expressed its serious doubts regarding whether the testimony of the government’s expert witnesses in that case was even reliable enough to be admitted under *Daubert* and Federal Rule of Evidence 702, *id*. at 1280-81, it nonetheless held the Analogue Act was not impermissibly vague as to the substances at issue in that case based on a holding a reasonable layperson who examined the chemical structure of those substances “could plausibly conclude that such substances are substantially similar,” which the district court stated is “all that is required.” *Id*. at 1279.

The *Fedida* court misapprehended the constitutional vagueness standard by one hundred and eighty degrees. If the district court were correct that “all that is required” to satisfy due process is

6*See*, *e.g*., *United States v. Bradley*, 2017 WL 6542756, at \*\*14-15 (W.D. Va. Dec. 21, 2017); *United States v. Reulet*, 2016 WL 7386443, at \*\*2-4 (D. Kan. Dec. 21, 2016); *United States v. Williams*, 2016 WL 4006826, at \*\*4-5 (W.D. Mo. June 29, 2016); *United States v. Hawkins*, 2016 WL 1390005, at \*\*4-5 (W.D. Mo. Apr. 7, 2016); *United States v. Awad*, 2016 WL 492146, at \*\*1-4 (D. Minn. Jan 19, 2016); *United States v. McMillin*, 2015 WL 778866, at \*\*4-8 (W.D. Mo. Feb. 24, 2015); *United States v. Browning*, 2014 WL 4996400, at \*\*5-8 (W.D. Mo. Oct. 7, 2014); *United States v. Long*, 15 F. Supp. 3d 936, 941-44 (D.S.D. 2014); *United States v. Nasir*, 2013 WL 5373625, \*\*2-5 (E.D. Ky. Sept. 25, 2013); *United States v. Reece*, 2013 WL 3865067, \*\*6-17 (W.D.

La. July 24, 2013); *United States v. Fedida*, 942 F. Supp. 2d 1270, 1273-80 (M.D. Fla. 2013).

that a person “could plausibly conclude” that certain conduct violates the law, the protection provided by the vagueness doctrine would be eviscerated. Instead of the rule articulated by the Supreme Court that statutes are unconstitutionally vague if people of common intelligence must guess at their meaning, the rule announced in *Fedida* is that statutes must be upheld so long as it remains “plausible” that people of common intelligence might guess their meaning correctly. Properly understood, the pertinent question is not merely whether one could “plausibly conclude” that a substance is substantially similar in chemical structure to a listed substance, but whether reasonable people could think that they are not, and are thus left to purely guess whether their conduct is unlawful. While the *Fedida* court stated that the “differing opinions of experts on the issue of substantial similarity does not” render the statute vague, *id*. at 1279 n. 6, it appears to have overlooked the principle stated by the Supreme Court that due process is violated where reasonable people interpreting a statute could “differ as to its application.” *Connally*, 269 U.S. at 391; *see also United States v. Guagliardo,* 278 F.3d 868, 872 (9th Cir. 2002) (term’s vagueness violated due process where “[r]easonable minds can differ greatly about” its scope). This is an application of the principle that “[n]o one may be required at peril of life, liberty or property to speculate as to the meaning of penal statutes.” *City of Chicago v. Morales*, 527 U.S. 41, 58 (1999) (quoting *Lanzetta*

*v. New Jersey*, 306 U.S. 451, 453 (1939)). Accordingly, a person “cannot be held to answer charges

based upon penal statutes whose mandates are so uncertain that they will reasonably admit of different constructions.” *Connally*, 269 U.S. at 393. Thus, if reasonable people could differ with the opinion that a synthetic substance is substantially similar to a controlled substance, then the Analogue Statute is unconstitutionally vague as to that substance. Given that numerous individuals who are not only reasonable, but well-credentialed scientists who are highly qualified to opine on

the matter, have concluded that the substances at issue are not substantially similar in structure to a controlled substance, the premise that someone might plausibly conclude otherwise is not enough to save the Analogue Statute from vagueness as applied to those substances.

Several district court cases subsequent to *Fedida* adopted its flawed holding. *See*, *e.g*. *United States v. Hawkins*, 2016 WL 1390005, at \*5 (W.D. Mo. Apr. 7, 2016); *United States v. McMillin*, 2015 WL 778866, at \*\*4-8 (W.D. Mo. Feb. 24, 2015); *United States v. Browning*, 2014 WL 4996400, at \*7 (W.D. Mo. Oct. 7, 2014), or employed the same logic, *United States v. Long*, 15 F. Supp. 3d 936, 942 (D.S.D. 2014) (rejecting vagueness challenge because drawings of chemical structure of the substance at issue “appear to be similar enough for a reasonable observer to conclude that [it] could be considered an analog of” a controlled substance).

Other district courts that rejected vagueness challenges regarding synthetic cannabinoids were not presented with or did not address the issue raised here, *United States v. Nasir*, 2013 WL 5373625, at \*2-5 (E.D. Ky. Sept. 25, 2013); *Reece*, 2013 WL 3865067, at \*\*6-17; *i.e*., that the complete lack of scientific consensus about whether a chemical qualifies as an analogue – indeed as to XLR-11, the scientific consensus outside the halls of Diversion Control that it does not – makes it impossible for a citizen to know whether their conduct is unlawful.

* + 1. *Appellate litigation*

In *Makkar*, the Tenth Circuit noted the similarities between the Analogue Act and the residual clause of the Armed Career Criminal Act (ACCA), which the Supreme Court recently invalidated on vagueness grounds in *Johnson v. United States*, 135 S. Ct. 2551 (2015). 810 F. 3d at 1142. *Makkar* explained that the relationship between the Analogue Act and the Controlled

Substances Act parallels the relationship between the different sections of the ACCA.7 *Id.* at 1142-43. It stated that the Supreme Court’s decision in *Johnson* that the residual clause of the ACCA is unconstitutionally vague raised the question of whether the Analogue Act is similarly vague. *Id*. at 1143. The *Makkar* court noted that the narrow construction the Supreme Court gave the Analogue Act in *McFadden* “may go some way to alleviating potential concerns about the vagueness of its terms.” *Id*. at 1142. While the *Makkar* court was not required to decide the question of whether the Analogue Act is unconstitutional, however, the court stated that it remains to be seen “whether this construction will suffice to save the Analogue Act from the same fate as the ACCA’s residual clause.” *Id*. at 1143. The court explained:

It’s an open question, after all, what exactly it means for chemicals to have a “substantially similar” chemical structure - or effect. And whether terms like those will admit of fair application and afford citizens fair notice, or whether we will find ourselves wading incrementally, in one as-applied challenge after another, deeper into an analytical swamp much as we did with the ACCA’s residual clause litigation.

*Id*.

In *Carlson*, the Eighth Circuit rejected a constitutional vagueness challenge to the Analogue Act on the theory that the Supreme Court determined in *McFadden* that the statute is not unconstitutionally vague. 810 F.3d at 550-51 (citing *McFadden*, 135 S. Ct. at 2307). The *Carlson* court appears to have misread *McFadden*. The issue of vagueness was not before the Court in

7As the *Makkar* court explained:

Much as here, one part of that statute lists certain specific violent felonies and imposes special punishments for their commission. Meanwhile, another part of that statute - what’s called its residual clause extends the statute’s punishments to other, unspecified offenses that can claim similarity to listed ones.

810 F. 3d at 1142.

*McFadden*. In the passage from *McFadden* the *Carlson* court cited, the Supreme Court rejected the defendant’s argument that his interpretation of the statute must be adopted so as not to render the Analogue Act unconstitutionally vague. *McFadden*, 135 S. Ct. at 2307. The Court noted that a scienter requirement in a statute, among other functions, alleviates vagueness concerns, stating that the scienter requirement it adopted did not render the statute vague. *Id*. The Court stated that the other vagueness concerns the defendant raised regarding the Analogue Act, and specifically, “that the substantial similarity test for defining analogues is itself indeterminate,” would not be alleviated by the scienter requirement the defendant proposed. *Id*. That is, the Court specifically recognized that vagueness concerns might exist with regard to the Analogue Act, but did not address them.

While it may be initially comforting that a defendant cannot be convicted of an Analogue Act offense unless they “know” the substance at issue qualifies as an analogue, that comfort fades swiftly upon recognition that here the supposed object of “knowledge” is the purely subjective and unscientific question of “substantial similarity” in chemical structure. Because all that may be had regarding these assessments is opinion rather than knowledge, any finding that a defendant “knew” the substance qualified as an analogue is inherently fictional. And as applied to substances such as XLR-11, where outside experts are nearly unanimous in their opinion that it does not qualify as an analogue, allowing juries to nevertheless speculate and potentially decide that a defendant “knew” the opposite is a game of roulette that cannot be permitted under the due process clause of the Fifth Amendment.

* + 1. *Post-*Carlson *and* Makkar *district court litigation*

More recently, several district courts have relied on holdings of *Carlson* and other prior cases that the Analogue Act is not unconstitutionally vague, with little analysis. *United States v. Bradley*, 2017 WL 6542756, at \*\*14-15 (W.D. Va. Dec. 21, 2017); *Hawkins*, 2016 WL 1390005, at \*\*4-5.

It appears only one district court has discussed the concerns raised by *Makkar. United States v. Reulet*, 2016 WL 7386443, at \*\*3-4 (D. Kan. Dec. 21, 2016). While the district court in *Reulet* rejected the argument that the Analogue Act is vague as applied, it did so with little discussion, relying primarily on pre-*Johnson* cases holding the Analogue Act is not vague. *Id.* at \*3. It further stated that the concern raised in *Johnson* was the application of an “imprecise standard” to a “judge-imagined abstraction,” as opposed to “real-world facts.” *Id.* at \*4 (quoting *Johnson*, 135 S. Ct. at 2557). Implicitly acknowledging that the Analogue Act sets forth an “imprecise standard,” the district court in *Reule*t dismissed the possibility that this imprecision results in the statute’s vagueness, because the jury would be applying that standard “to the real-world facts of the evidence presented in this case.” *Id*.

The *Reulet* court, however, read *Johnson* overly narrowly. As *Johnson* explains, the reason the indeterminacy of the residual clause of ACCA resulted in that clause’s vagueness was that its indeterminacy “produces more unpredictability and arbitrariness than the Due Process Clause tolerates.” 135 S. Ct. at 2558. Precisely the same is true of the Analogue Act’s “substantially similar” standard. Moreover, as to the specific substances at issue in this case, as discussed below, the “real-world facts” the *Reulet* court relied on to save the Analogue Act from vagueness include a complete lack of scientific consensus regarding both the meaning of the term “substantially similar” as used in the Analogue Act and whether the substances at issue in this case meet that

standard. The “real world facts” therefore fail to save the Analogue Act from being vague as applied to those substances.

Accordingly, whether the Analogue Act is vague as applied to the synthetic cannabinoids at issue in this case is, as the *Makkar* court stated, very much an “open question.” 810 F. 3d at 1143. There is no binding precedent in this District or Circuit on the issue.

# III. Conclusion

A person of ordinary intelligence during the relevant time period faced with the chemical structures of the substances at issue here would have been left to “guess” whether they were a controlled substance analogue. And as to many, if not most, of these substances, any person who elected before guessing to consult with expert chemists such as those listed above or those at the DEA’s Office of Forensic Science would end up guessing incorrectly – assuming the dubious proposition that Diversion Control’s prong one determinations are correct. The Analogue Act is therefore unconstitutionally vague as applied to the substances at issue. Accordingly, the Defendants respectfully request that the Court grant this motion and dismiss Counts Four through Nine of the Indictment.

Dated: February 26, 2018

Respectfully submitted,

/s/ *James E. Felman*

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# CERTIFICATE OF CONFERENCE

On February 20, 2018, I conferred with Chad Meacham, counsel for the government assigned to this case, who indicated that the government is opposed to this motion.

/s/ *James E. Felman*

James E. Felman

# CERTIFICATE OF SERVICE

This is to certify that on February 26, 2018, a true and correct copy of the above and foregoing motion was filed with the Court’s electronic filing system which will send a notice of filing to all counsel of record and every party.

/s/ *James E. Felman*

James E. Felman