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UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

UNITED STATES OF AMERICA, Plaintiff, vs. REDACTED DEFENDANT No. 1, et al. Defendants.	**Case No. CR-05-00167 WHA** **POST HEARING BRIEF IN SUPPORT OF MOTION TO EXCLUDE DRUG IDENTIFICATION TESTIMONY** **Date: December 6, 2006** **Time: 8:00 a.m.** **Dept: Hon. James Alsup** **EXCLUDABLE TIME: 18 U.S.C. § 3161(h)(1)(F)**

Defendant, Edgar Diaz, through undersigned counsel, and on behalf of all defendants, respectfully submits this post hearing brief in support of motions [docs. 637, 634], pursuant to Federal Rules of Evidence Sections 104(a), 403, 702, 703 and the Fifth, Sixth, and Eighth Amendments to the United States Constitution, to exclude all drug identification testimony and evidence to be offered by the government. The grounds for the motions are: (1) there is no reliable scientific basis for this proposed testimony, and thus the testimony is inadmissible under *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993) and *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 119 S.Ct. 1167, 143 L.Ed.2d 238 (1999); (2) the testimony is inadmissible under the 2000 amendments to Rule 702 in that (a) the testimony is not based upon sufficient facts or data, (b) the testimony is not the product of reliable principles and methods, and (c) the drug identification examiners who performed the analysis in this case

have not applied the principles and methods of their profession reliably to the facts of the case; (3) the government's destruction of, or failure to provide, documents and deprives the Court of the evidence necessary to fulfill its gatekeeping function under *Daubert* and Rules 104(a) and 702; (5) the government's destruction of, or failure to provide, evidence violates the defendants' rights under the Fifth Amendment (due process) and Sixth Amendment (confrontation, fair trial), and, as to defendants Fort and Diaz, the Eighth Amendment guarantee of heightened evidentiary reliability in a death penalty case.

All of these issues are throughly briefed in defendants' motions, and in the replies [doc. 709, 716]. The purpose of the present brief is to summarize some of the voluminous testimonial and documentary evidence that the Court has heard at the hearing and to emphasize certain key legal issues which have arisen during that hearing.[1] By emphasizing these issues, the defendants do not waive or downplay any of the issues previously briefed, either in defendant's motion or in the motion of codefendant Johnson [doc. 634].

The brief will be organized around the issues set forth in the Court's Order of September 26, 2006 [doc. 798], and in its Order of November 11, 2006 [doc. 1020]. The issues set forth in the Court's Order of September 26, 2006 [doc. 798] are: (1) whether the Crime Lab's methods can or have been tested ? (2) the known or potential rate of error of those methods; (3) whether the methods have been subjected to peer review; (4) whether there are standards controlling the techniques' operation; and (5) the general acceptance of the methods within the relevant community. [doc. 798]. The questions set forth in the Order of November 22, 2006 are: (6) when multiple packages of suspected marijuana are received as a single "exhibit" by the SFPD Crime Lab, Ms. Madden testified that samples from all of the packages are subjected to microscopic examination. The Duquenois-Levine color test, however, is only applied to a sample from one of the packages. The parties should address whether this procedure is deficient. (7) the parties should address whether a procedure similar to the one described above is also used for suspected

[1] Defendants' ability to summarize the testimonial evidence is greatly hampered by the unavailability of a transcript of any of the *Daubert* hearing. Cf., California Penal Code Section 190.9 (defendant in a capital case is entitled to daily transcript of all proceedings.). Therefore, for the most part this brief will focus on the documentary evidence.

cocaine, or whether that practice is restricted to suspected marijuana samples; (8) the parties should address the fact that Figure 1 in Government Exhibit 23 shows crystals that appear to be different than those Ms. Madden is used to seeing when gold chloride is applied to cocaine. [doc. 1020.

(1) Whether the Crime Lab's methods can or have been tested ?

"Ordinarily, a key question to be answered in determining whether a theory or technique is scientific knowledge that will assist the trier of fact will be whether it can be (and has been) tested. 'Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified; indeed, this methodology is what distinguishes science from other fields of human inquiry." *Daubert v. Merrell Dow Pharmaceutical*, 509 U.S. 579, 593 (1993)

One hypothesis being put forward by the government in this case is that impure street grade quality suspected cocaine can be uniquely identified through the SFPD's use of the cobalt thiocyanate color test in combination with "confirmatory" gold chloride and platinic chloride crystal tests. Another hypothesis championed by the government is that marijuana can be uniquely identified through the SFPD's microscopic observation of " cystolithic" and "clothing" hairs in combination with a "confirmatory" Duquenois-Levine color test .

"There is no reason why these [hypotheses] cannot be tested under the *Daubert-Kumho* standards-using sound research methods yielding meaningful data on error rates. The problem is that they have never been tested in the field in general, or in this case in particular." *United States v. Green*, 405 F. Supp. 2d 104 (D. Mass. 2006)(excluding firearm evidence).

As helpfully explained in defense exhibit 7, tab 31, *Fitness for Purposes of Mass Spectrometric Methods of Substance Identification* (2005),

> Confirmation presumes the presence of substance Y in a sample based on initial tests or prior information. The presence of Y is then "confirmed' by further tests (in this case MS).
>
> Identification does not make *a priori* presumptions based on initial tests or other information. Results on the sample after a number of tests are compared with reference data on all other substances that may come into consideration.
>
> Moreover, it must be realized that a "positive" confirmation test thus obtained is *not* an unambiguous identification of Y. It only shows that the test result is *not against* the presumption. Other substances may be able to give results that are the same or indistinguishable from those of Y. Therefore, unambiguous identification of Y is achieved if all other (relevant) substances can be excluded,

> so that Y remains the *only* possible candidate....Obviously, the term "relevant" is important in this context. *With tens of thousands of substances known to society, it is clearly unfeasible to consider them all. Yet, even if one focuses only on those that have some relevance to the field of analysis (e.g., forensic toxicology, doping, environmental pollution, drugs and driving), data on thousands of substances per field is necessary.* (emphasis added)

The government's own literature recognizes that the issue of uniqueness (specificity/selectivity) must be addressed in documented validation studies. See, Government Exhibit 7, *Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG) Recommendations*, p. Id. at 25 ("Method validation is required to demonstrate that methods are suitable for their intended purpose. For qualitative analysis, the parameters that need to be checked are selectivity, limit of detection and reproducibility...Minimum acceptability criteria should be described along with means for demonstrating compliance. Validation documentation is required. Laboratories adopting methods validated elsewhere should verify these methods and establish their own limits of detection and reproducibility"); Defense Exhibit 7, Tab 5 American Society of Testing Materials, *Standard Practice for Identification of Seized Drugs*, E2329-04 (same); Defense Exhibit 7, Tab 5 American Society of Testing Materials, *Standard Practice for Quality Assurance of Laboratories Performing Seized-Drug Analysis*, E2327-04 (same).

Reviewing the government's literature and testimony in this case, there is very little that can be pointed to that would justify a rational conclusion that the hypotheses the government is relying upon has been adequately tested by documented validation studies. Mr. Mudge did not testify at all as to any testing or validation studies he had done or was aware of, and Ms. Madden said that at most she had tested a dozen or perhaps a hundred substances to see if any of them produced the same results she observed for known samples of marijuana and cocaine. Mr. Norris had never heard of validation studies being done by the lab.

The government's literature fares no better. Most of it is irrelevant to the issue of selectivity, consisting of a CV (Exhibit 1), photographs (Exhibits 2-8), laboratory protocols (Exhibits 9, 15, 18, 22, 24, 25), retesting data (Exhibits 12 and 31) and a single proficiency test involving powder (not rock) cocaine (Exhibit 32). The proficiency test, as well as the retesting data (Exhibits 12 and 31) address the issue of reproducibility, not the issue of selectivity, and in

any event the testing procedure used by 90 % of the 491 laboratories in that proficiency test utilized GS/MS, and only seven laboratories (including SFPD) used only color and /or microcrystal tests, which is a devastating rebuttal of Mudge's assertion that everybody he knows does cocaine testing the same way as San Francisco.

The only articles that document any sort of testing are clearly insufficient to satisfy the testing requirement of *Daubert* or the validation requirements set forth by the forensic drug testing community itself. Exhibit 17, *The Identification of Cocaine and Novocaine* , involved only the testing of cocaine and novocaine with several reagents, not the testing of any other substances. Interestingly, the study says that the "reagents giving crystals are underlined" on page 327 for cocaine and p. 328 for novocaine, and yet gold chloride is *not* underlined on either page. "Platinum chloride" (is this the same as the "platinic chloride" used by SFPD ?) Is underlined on both pages, but Fulton says that "[i]f only a very small drop of reagent is added [to a sample of novocaine] with a stirring rod there is immediate crystallization in bushy feathered crystals, irregular plates, etc., the precipitate having considerable resemblance to that of cocaine." (Id. At p. 336). It is thus not at all clear that this study shows that cocaine crystals can be distinguished from novocaine crystals, let alone that they can be distinguished from the "thousands" (Defense Exhibit 7, tab 31) or "millions" (Madden's testimony) of chemicals that are present in the environment.

Similarity, Exhibit 20, *the Cocaine Diastereoisomers*, only conducted crystal testing on a few synthetically made (not street grade) samples of the cocaine diastereoisomers. The photograph at page 16 of the article, showing a gold chloride crystal of cocaine looks nothing like the photograph of the gold chloride/cocaine crystal offered by the government (Government Exhibit 7), or the photograph of the gold chloride/cocaine crystal in the Appendix of the SFPD's SOP (Defense Exhibit 7, Tab 18, p. 62) which is apparently used, contrary to accepted protocols, as the sole standard by which the laboratory judges a positive result.[2] This article concludes,

[2] There was no evidence at the hearing as to the conditions under which the photograph in the SOP was produced, although the evidence was clear that comparisons were made solely based on the photograph, not on a concomitantly prepared known sample

consistently with Dr. Whitehurst's testimony, that "[t]he principle disadvantages of this technique are that the presence of other compounds in the sample can distort the microcrystalline precipitate and that the technique requires a certain degree of expertise on the part of the chemist." (Id. at p. 26)

The only other government article that addresses the issue of cocaine testing, Exhibit 23, *Further Studies on Spot Tests and Microcrystal Tests for Identification of Cocaine* (2003) , produced crystals for only nine laboratory grade substances in addition to laboratory grade pure cocaine and frankly admits:

> To date we are not aware of any chemical that produces a false positive relative to cocaine provided that the correct set of tests is performed properly. Yet, the current list of chemicals is extensive, and not all of chemicals have been compared to cocaine.; also, new chemicals are continuously being synthesized. Further, because a number of variables discussed above [3]could prevent an analyst from reaching an accurate conclusion, the use of a more analytical procedure should be considered.

.The "bible" (Mudge's testimony) of drug analysis, Clarke , Isolation and identification of Drugs (1969), Government's Exhibit 19, states at p. 135: "The microcrystal test is a 'matching' test, identification being achieved by comparing the microscopic appearance of the crystals formed when the test solution is mixed with a certain reagent with those formed when the same reagent is mixed with a solution of a known substance." At page 137 Clarke states:

> When definite crystals have been formed, their form and habit (i.e.. The positions which they occupy relative to one another-rosettes, sheaves, and so on) should be noted. They may also be sketched or photographed for the purposes of record. It may be mentioned here that certain crystals are unstable and disappear in an hour or two. They may then be compared with the descriptions given for crystals formed from the various compounds decribed in the monographs in Part 2. *It must, however be emphasized that descriptions of of crystals, or for that matter drawings or photographs, can only enable a tentatve identification to be made. Final identification must depend on the comparison of the crystals formed from the unknown with those prepared from an authhenic sample of the drug and the same reagent.*

See also, Defense Exhibit 7, Tab 23, United Nations Division of Narcotic Drugs, Recommended Methods for Testing Cocaine, p. 18 ("Standard cocaine should be analyzed concomitantly").

[3] The variables are discussed as follows:

> Reaching an accurate conclusion using microcrystal tests will depend on the level of experience of the analyst, the proper use of standards and controls, the presence of adulterant and/or diluent in the seized samples, the reaction pH, the temperature and humidity, and the concentration of the reagent and of the chemical.

These same variables are acknowledged throughout all of the literature cited by both parties and by the testimony of Dr. Whitehurst. The only dissenter is Ms. Madden, who testified that none of these variables had any effect and that all of her crystal tests always produced the exact same crystals. This testimony is incredible and should be rejected.

The forensic science community is apparently well ahead of this researcher, as the government's sole proficiency test, Exhibit 32, indicates that by 2001 90 % of 491 laboratories had already abandoned reliance on the cocaine testing methods used by the SFPD. Moreover, as in exhibit 20, the photograph at page 4 of Exhibit 23, showing a gold chloride crystal of cocaine looks nothing like the photograph of the gold chloride/cocaine crystal offered by the government (Government Exhibit 7), or the photograph of the gold chloride/cocaine crystal in the Appendix of the SFPD's SOP (Defense Exhibit 7, Tab 18, p. 62). Indeed, Ms. Madden testified that she would not identify the photograph at page in Exhibit 23 as cocaine, indicating quite clearly that cocaine crystals are not uniformly reproducible as she testified.

The government's marijuana articles (Exhibits 26-30) only prove that false positives have been documented with respect to the Duquenois-Levine test and that the number of non-marijuana samples that have been microscopically examined for the presence of cystolithic and clothing hairs is relatively small. Exhibit 26, Nakamura, *Forensic Aspects of Cystolith Hairs of Cannabis and Other Plants* lists 60 "representative species that bear cystolith hairs or hairs accompanied by independent calcified growth in the leaf, *most of which are similar in structure to those of Cannabis.*" (p. 15). Although none of these plants produced a positive Duquenois-Levine test[4], the author cautions that "no attempt was made to prepare a comprehensive listing

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[4] The author's testing methods are different from and more extensive than SFPD's marijuana protocol in three essential respects, and thus do not speak directly to the reliability of SFPD's deficient protocol. First,"the presence of calcium carbonate on the hairs was confirmed by adding dilute HCL to the slide and observing effervescence under the microscope. " (p. 5) This same procedure is recommended by the U.S. Treasury Department's *Methods of Analysis*, Government Exhibit 25, which also states that " a comparison with a known standard is most desirable." SFPD follows neither procedure.

Second, "[p]hotomacrography was conducted through a 16 mm Zeiss Luminar lens [and] all pints were enlarged to a final 60 x magnification for all specimens to provide a size comparison of the hairs." (Exhibit, p. 25). SFPD uses no photo comparison or measurement techniques at all.

Lastly, the author called a positive Duquenois-Levine test only when he saw "blue to violet colors." The U.S. Treasury Department's *Methods of Analysis* states that a positive test is achieved when a "violet" color is transferred to the chloroform layer. SFPD's more current protocols (Defense exhibit 7, Tabs 18-21 concur that a "violet' color is necessary for a positive result. However, the 1995 protocol (Tab 17) says that a positive test is "purple" and all of the lab reports in this case except one document "purple", not violet. This deviation from the generally accepted protocol for Duquenois-Levine testings indicates both that existing studies cannot be used to validate SFPD's flawed methodology and that testimony based on that methodology is itself inadmissible under Rule 702 because it is not based upon sufficient facts or data, is the

because of the sheer magnitude of examining 31,874 dicotyledons...") Id. at p. 15. A similar caution is stated in the author's follow-up article, Exhibit 27, p. 500. As pointed out in Defense Exhibit 7, Tab 43, at page 458,

> It is usually concluded by forensic analysts that the microscopic test, combined with a Duquenois-Levine color test, is therefore specific for marijuana. Applying the four criteria discussed before...we clearly see that specificity has not been established.
>
> 1. The plant sampling used by Nakamura was not representative of all flowering plants. First, Nakamura used taxonomic references which were apparently very out of date, in that they mentioned only 31, 874 species of dicots. (At that time, 2000,000 to 500,000 species were recognized). Second, Nakumura considered only the dicots, and not the monocots (some of which are commonly mixed in samples of presumed marijuana) including at least 50, 000 species).
>
> 2. The Duquenois-Levine color test has subsequently been shown to be quite non-specific.
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> 3. Nakumura cautions the analyst to depend "not only on the presence of cystolith hairs, but on its association with the...nonglandular hairs...and if present, the fruits and hulls, the glandular hairs and the flowering tops...." These additional features have never been proven to be specific for marijuana nor claimed to be by Nakamura. For example it has been reported that manny plants have glandular hairs "which particularly if they are crushed and fragmented, may be confused with the glandular hairs of marijuana. Included among these plants are lavender, oregano, and other members of the Labiatae (mint) family and tobacco, all of which are commonly misidentified as marijuana.
>
> 4. ...If ...one takes the time to learn which plant famalies have cystolith hairs, stalking glandular hairs, and sessile hairs...the results are remarkable. Families cited as having having species with cystolith hairs, 24; with stalked glandular hair, 90; with both cystolith and stalked glandular hair, 16; with sessile hair-glands, 80; with all three hair types, 13; with filiment hairs, 18. Families cited by Nakamura as having species with cystoliths specifically resembling those of Cannabis, 13; the number of those families also containing species with stalked grandular hairs, 11.

The authors of this article, one of whom is Dr. Dwight Fullerton, Assistant Professor of Medicinal Chemistry at the College of Pharmacy, University of Minnesota goes on to review the many findings of false positives for the Duquenois-Levine color test and concludes at page 464 that "the Duquenois -Levine color test is not specific for marijuana, and if it is to be used at all, it should be used with a specific time limitation[5] and with a visible spectrophotometer to reduce

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product of unreliable principles and methods, and dose not come from a witness who has applied the principles and methods reliably to the facts of the case.

[5] The authors review scientific publications which indicate that the observed colors and intensities for the Duquenois-Levine test are time dependent and that using a fixed time longer or shorter than twenty minutes to observe the test results increased the number of positive tests with compounds which were not cannabinoids." (Id. at p. 463). The SFPD protocols state that the analyst

the number of non-Cannabis samples giving positive tests."

In *Daubert v. Merrell Dow Pharmaceuticals*, 43 F.3d 1311, 1315-1316 (9th Cir. 1995), the Ninth Circuit declared:

> Something doesn't become "scientific knowledge" just because it's uttered by a scientist; nor can an expert's self-serving assertions that his conclusions were "derived by the scientific method" be deemed conclusive, else the Supreme Court's opinion could have ended with footnote 2. As we read the Supreme Court's teaching in Daubert, therefore, though we are largely untrained in science and certainly no match for any of the witnesses whose testimony we are reviewing, it is our responsibility to determine whether those experts' proposed testimony amounts to "scientific knowledge", constitutes "good science," and was "derived by the scientific method."

Judge Kozinski's Ninth Circuit opinion in *Daubert* notes that a gatekeeping court must decide in part whether "... scientists have derived their findings through the scientific method or whether their testimony is based on scientifically valid principles...." *Daubert*, supra, 43 F.3d at 1316. In its gatekeeping role, the court should view reliability as follows:

> This means that the expert's bald assurance of validity is not enough. Rather, the party presenting the expert must show that the expert's findings are based on sound science, and this will require some objective, independent validation of the expert's methodology.

Ibid.

In this case, the government's studies might charitably be described as a promising *start* to proving that the specific protocols used by the SFPD can uniquely identify cocaine and marijuana to the exclusion of all other substances. But the many flaws in those protocols and the absence of adequate validation supporting them weighs heavily in favor of a finding that the testability factor of *Daubert* has not been satisfied.

(2) the known or potential rate of error of the methods

For reasons already discussed, the single proficiency test introduced by the government (Government Exhibit 32) cannot carry the government's burden of showing an acceptable error

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should start noting the color development "about 10 seconds after adding the Duquenois reagent and concentrated hydrochloric acid." Clearly, for the reasons discussed at pages 460-464 of Exhibit 7, Tab 43, SFPD's use of this test is unreliable and therefore inadmissible.

rate for the SFPD's procedures. First, and most importantly, as already indicated , 90 % of the 491 participants in that 2001 test utilized GC/MS, which is decidedly not the procedure used by the SFPD for cocaine testing. Second, the test was for powder, not rock cocaine. Third, the test itself states that it is "not intended to be an overview of the quality of work performed in the profession and cannot be interpreted as such."

Aside from this test, there is very little the government can point to in order to show an acceptable error rate. Mr. Norris attempted to institute a blind proficiency testing program, but as he testified the program was too short-lived to generate any reliable error rate numbers. The fact that Mr. Mudge and Ms. Madden had never heard of anybody disagreeing with their results is not surprising in light of the almost total lack of independent defense challenge to this testimony. In any event, Mr. Norris testified that there were reports of inconsistent test results.

Finally, the retesting data (Exhibits 12 and 31) cannot be used to establish an acceptable error rate because all they indicate is that the lab retested a certain number of unknown substances and all the results were consistent. What is not known is what was in the unknown to begin with. Without that information, estimating an error rate becomes impossible.

(3) whether the methods have been subjected to peer review

The documentary evidence before the court indicates that the general, but not the specific methodology employed by the SFPD has been subjected to peer review. That peer review has resulted in a near unanimous general consensus that the type of methodology employed by the SFPD has never been, and is not now, reliable enough to identify either cocaine or marijuana, as documented in point 6, below.

As Dr. Whitehurst testified, the specific methodology employed in this case cannot be peer reviewed because SFPD's protocols are too vague to show what was actually done and the conclusory and cryptic work product does not fill in the gaps in any way. Destruction of some of the samples only compounds the problems, as argued at length in defendant's motions and replies.

The Ninth Circuit's opinion in *Daubert* deals specifically with the subject of peer review, which, for the purposes of the current hearing would include the "reviewability" of results. As

the Ninth Circuit pointed out, peer review increases the likelihood that substantive flaws in methodology will be detected, and that basic errors will be exposed. *Id.* at 1318, and fn.7. Once the party proffering scientific testimony makes an initial showing that it was derived from the scientific method, the opposing party could, under Rule 702, show either that the proffered expert employed unsound methodology or failed to otherwise follow a sound protocol. *Id*. at 1319, fn.10.

The weight of the evidence presented to this Court favors the view that something more than the conclusory notation of the performance of a given type of drug identification test is necessary to assure reviewability, and thus reliability. Both former SFPD Forensic Division Supervisor Norris, and Dr. Whitehurst testified that forensic laboratory science is guided by the scientific method, which includes the need for reviewability of test results to help assure the validity of those same results.

Does the forensic science literature support the notion that there should be concern about ensuring the reviewability of test results in the forensic sciences? The answer is clearly yes. This is true even in certain areas of the forensic sciences that have been thought to be proven reliable - for example, fingerprint identification. See, *eg*., Cole, *More Than Zero: Accounting for Error in Latent Fingerprint Identification*, 95 J.Crim.L. and Criminology, 985 (2005).

Reviewability of results has helped uncover where dubious methodologies led to the creation and use of faulty scientific theories, some of which had been accepted. Indeed, after scrutiny from the scientific community, the FBI decided to no longer engage in comparative bullet lead analysis (CBLA), a technique that ostensibly allowed the forensic science community to compare the constituent elements of an unknown lead bullet to bullets from a seized box of bullets, or even to compare the unknown bullet to batches made by specific bullet manufacturers. CBLA turned out to be premised on faulty science. See Piller, *FBI Abandons Controversial Bullet-Matching Technique* (LA Times, September 2, 2005).

Where reviewability was possible (even in 'well accepted' forensic sciences), errors could be detected in the documentation, which permitted those errors to be reported and analyzed. See, for example, Stacey, *A Report on Erroneous Fingerprint Individualization in the Madrid Train*

Bombing Case. 54 Journal of Forensic Identification 706 (2004). During the course of the current drug identification hearing, questions were asked about whether any of the experts was aware of specific erroneous results of drug identification color tests, or microscopic botanical identification, or even crystalline tests. As Dr. Whitehurst testified, in the absence of reviewable results the results cannot be conformed and useful error rates cannot be established.

The testimony before the Court, and literature introduced by the parties, demonstrates the authoritative weight of the Scientific Working Group for the Analysis of Seized Drugs [SWGDRUG]. The 2006 edition of the SWGDRUG Recommendations for Laboratories (Government Exhibit 15) provides definitions of reviewable data (at p.16), and describes casework documentation (an aspect of quality assurance in a laboratory) as follows: "Documentation shall contain sufficient information to allow a peer to evaluate case notes and interpret the data." [Government's Exhibit 15, at p.23, Standard 9.1.1.] SWGDRUG goes on to state:

> Analytical documentation should include procedures, standards, blanks, observations, test results, and supporting documentation including charts, graphs, and spectra generated during an analysis.

[Exhibit 15 at p.24.]

The Government relied in part on E.G.C. Clarke as providing the basis for validating microcrystal tests. However, even Clarke noted that: "It must, however, be emphasized that descriptions of crystals, or for that matter drawings or photographs, can only enable a tentative identification to be made." [Government's Exhibit 19, *Clarke's Isolation and Identification of Drugs*, Volume I, p.137.] Clarke's observation, of course, assumes documentation sufficient to ensure reviewability.

Government's Exhibit 23, Swiatko, *et al., Further Studies on Spot Tests and Microcrystal Tests for Identification of Cocaine,* 48 Journal of Forensic Sciences (2003) indicated: "The use of photomicrographs or drawings of the crystals for comparing the unknown sample to standards would be valuable and would address one of the criticisms raised against microcrystal tests

regarding limits of documentation as compared to that of modern instrumentation." (Exhibit 23 at p.5.)

The lack of reviewability, as both Dr. Whitehurst and Mr. Norris indicated, renders it impossible to tell whether what might otherwise be a reliable methodology was misapplied in the case at bar ["... any step that renders the analysis unreliable... renders the expert's testimony inadmissible. This is true whether this step completely changes a reliable methodology or merely misapplies that methodology." *In re Paoli R.R. Yard PCB Litigation*, 35 F.3d 717, 745 (3d Cir. 1994)].

(4) whether there are standards controlling the techniques' operation

There are national and international standards controlling the techniques' operation, as indicated in numerous exhibits presented by both sides. The problem is that these standards are not being followed by the SFPD, and that the lab does not have clear and enforceable protocols of its own, but instead relies on personal preference. These deficiencies are amply documented at the hearing, throughout this brief, and in prior pleadings submitted to the court. To briefly summarize the major departures from scientific protocol: (1) there are no documented validation studies for the methods used to test marijuana and cocaine; (2) there is inadequate casework documentation for either technique; (3) important evidence has been destroyed; (4) the laboratory was unaccreditated during most of the testing in this case, having achieved accreditation only on February 25, 2005 (Defense exhibit 18) (5) the SFPD's protocols lack sufficient detail, fail to inform the exercise of discretion, and fail to ensure the precision of notetaking; and (6) the cocaine and marijuana testing methodologies do not conform to accepted standards, as specified in this brief and in numerous other pleadings filed with the Court. Singly or in combination, these deficiencies render the government's drug testing testimony inadmissible under Rule 702, *Daubert*, and the other constitutional and evidentiary provisions cited in this and other pleadings

(5) The general acceptance of the methods within the relevant community.

The government's own evidence strongly shows that the particular drug testing methods utilized by the SFPD are not generally accepted in the relevant scientific community for the

purpose of uniquely identifying marijuana or cocaine.

Regarding cocaine testing, the "bible" of drug analysis states:

> The microcrystal test is unsuitable as a primary method of identification of an unknown compound, as it does not lend itself to form the basis of an identification scheme. It's real value is as a means of final identification to confirm provisional diagnosis made from chromatographic or spectrophotometric evidence...

(Clarke , Isolation and Identification of Drugs (1969), Government Exhibit 19, p. 135)

Again, Mr. Clarke writes:

> As has been said above, the microcrystal test is of little use in the general search for an unknown drug. Its value comes later, particularly in differentiating between compounds of very similar constitution, where the field has been considerably narrowed by chromatographic or spectrophotometric screening.

The addition of the cobalt thiocyanate test color test does not change the equation, for as former government chemist Charles Fulton points out in Modern Microcrystal Tests for Drugs, Defense exhibit 1,

> No color test for cocaine is known to the writer that is worth the trouble of making it, This even applies to the blue precipitate with cobalt thiocyanate (color precipitation test), used by some foe distinguishing cocaine from procaine or as indication of cocaine in the presence of procaine; too many other local anesthetics are now on the market besides these two.

See also, Defense Exhibit 7, Tab 14 (documenting false positives with this test); Tab 23, UN Recommended Methods for Testing Cocaine, p. 16 ("It must be stressed that positive results for color tests are only presumptive indicattins of the possible presence of cocaine . The color tests for cocaine are especially prone to produce false positives."); Id. at 18 ("The warning given for color and odor test apply equally to the microcrystal test.");

A final piece of irrefutable evidence on the lack of general acceptance of SFPD's cocaine testing methodology is the single cocaine proficiency test introduced by the government as Exhibit 32. As indicated above, that 2001 proficiency test indicates that 90 % of the 491 laboratories in that test utilized GS/MS, and only seven laboratories (including SFPD) used only color and /or microcrystal tests. In sum, as indicated in Clarke, writing in 1969, microcrystal tests, even in combination with useless color tests, have "fallen into disfavor and been very largely replaced by instrumental methods." (Government's Exhibit 19, p. 135).

Regarding marijuana testing, Clarke is again helpful, as in his 1969 book he recommends paper, thin layer, and gas chromotography, but says nothing about microscopic examination or the Duquenos-Levine color test. (Defense exhibit 7, Tab 16, p. 136.). In the 1975 Supplement to the book, he does recommend the modified Duquenois Test, indicating that the correct color is "pink/mauve" but he says it should be used in combination with the Fast Blue B test, not microscopic examination. (Id. 1975 Supplement, p. 912).

Defendants maintain that the particular combination of marijuana and cocaine testing procedures employed by SFPD., with its minimalist approach, its total lack of documentation of microscopic or other testing results, its failure to conduct or document any validity testing, its failure to follow proper protocol with respect to color tests, its testing of only a single portion of an item, its lack of peer review for all but one of the samples tested in this case, and its lack of blind proficiency testing is scientifically deficient and not accepted by the forensic or broader scientific community.[6] See, Defense Exhibit 7, Tab 24, *United Nations Division of Narcotics Drugs Recommended Methods for Testing Cannabis*[7], p. 2-3 ("When possible, three entirely different analytical techniques should be used, for example; color test and any two of the available chromatography techniques (TLC, GLC or HPLC). The analysis of cannabis represents a special problem to the forensic chemist. Because cannabis and cannabis resin are plant material it is mandatory that the analyst includes macroscopic and/or microscopic examination of the material as part of the testing protocol. The choice of the two other techniques or more, is left to the discretion of the forensic chemist." (emphasis added); Defense Exhibit 7, Tab 25, United Nations Division of Narcotics Drugs, *Recommended Guidelines for Quality Assurance and Good*

[6] The Court severely restricted the testimony of Dr. Frederick Whitehurst, a distingusihed forensic analytical chemist who could have given the Court a valid opinion on whether the community of analytical chemists accept the techniques employed b y the SFPD. The fact that Dr. Whitehurst had not conducted drug analysis should not have disqualified him from testifying. See, *United States v. Mitchell*, 365 . 3d 215 (3d Cir. 2004); *United States v. Valesquez*, 94 F. 3d 844 (3d. Cir. 1995)

[7] The importance of the UN *Recommended Methods* is highlighted in the *Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG) Recommendations* submitted by the government as Exhibit 15: " The following references and documents shall be available and accessible to analysts:...laboratory manuals of the United Nations Drug Control Programs..." Mr. Mudge, the laboratory director, testified that he had never heard of this document.

Laboratory Practices, p. 23 ("Before an analytical procedure can be used to analyze submitted specimens, it must be fully validated in terms of sensitivity (limits of detection), specificity (freedom from interferences). and reproducibility (ability to provide consistent results."*) ;* Id. at p. 25 *(*"Before a specimen can be reported positive for one or more drugs of abuse, it should be subjected to two independent tests using separate aliquots of the specimen. If feasible, the two tests should involve different analytical techniques. Specific criteria fro what constitutes a positive test should be established and clearly stated in the SOP manual. The criteria should include requirements for acceptable results and quality control samples. Also, before any specimen can be reported positive, the test results should be throughly reviewed by at least two individuals who are familiar with the analytical methods. The review should include examination of the test results, acceptability of all quality control results, proper and complete documentation of sample handling (chain of custody), correct calculation of quantitative measurements and absence of clerical error;") Id. at 29 (recommending "undeclared or "blind" proficiency testing."

See also, Government Exhibit 7, *Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG) Recommendations*, p. 15-16 ("When a category A technique [instrumentation such as mass spectrometry] is not used, then at least three different validated methods shall be employed...Two of the three methods shall be based on uncorrelated techniques from Category B (includes thin layer chromatography and for cannabis only, macroscopic examination and microscopic examination.)...*A minimum of two separate samplings should be used in these three tests...All Category B techniques shall have reviewable data*...Cannabis exhibits tend to have characteristics that are visually recognizable. Macroscopic and microscopic examinations will be considered, exceptionally, as uncorrelated techniques from Category B *when observations include documented details of botanical features*...Examples of reviewable data are:...recording of *detailed descriptions* of morphological characteristics for cannibus (only)." (emphasis added); Id. at p. 24 ("Laboratories shall have documented policies establishing protocols for technical and administrative review."); Id. at 25 ("Method validation is required to demonstrate that methods are suitable for their intended purpose. For qualitative analysis, the parameters that need to be checked are selectivity, limit of detection and

reproducibilty...Minimum acceptability criteria should be described along with means for demonstrating compliance. Validation documentation is required. Laboratories adopting methods validated elsewhere should verify these methods and establish their own limits of detection and reproducibility"; Defense Exhibit 7, Tab 5 American Society of Testing Materials, *Standard Practice for Identification of Seized Drugs*, E2329-04 (same); Defense Exhibit 7, Tab 5 American Society of Testing Materials, *Standard Practice for Quality Assurance of Laboratories Performing Seized-Drug Analysis*, E2327-04 ("Analysts shall take measures to be assured that identifications are correct and relate to the right submission. This is best established by the use of at least two appropriate techniques based on different principles and two independent samplings. Documentation must contain sufficient information to allow a peer to evaluate the notes and interpret data); Defense Exhibit 7, Tab 8, UN Rapid Testing Methods of Drugs of Abuse, p. 99 ("Colours formed by the test reagents should be compared with a colour reference chart if possible because colour evaluation by individuals is a subjective judgement and can lead to misinterpretation of results."); Defense Exhibit 7, Tab 9, SWGGUN Quality Assurance/ Validation of Analytical Methods, p. 33 ("Since the results of color tests are detected visually, care must be taken that the analyst be throughly tested for the visual ability to detect very slight color changes."). .

As Dr. Whitehurst testified, and as even a cursory review of the work product in this case will show, SFPD.'s cryptic and conclusory reports do not meet the documentation requirements of these guidelines. In any event, for the items that the lab tested, there is no documentation of validation, no indication of taking "two independent samplings", and no indication of any technical peer review of the work product in this case.[8] For any and all of these reasons, even the

[8] Mr. Norris testified that the only peer review typically conducted in drug cases was a review of the paper work, not a review of the testing results or a retesting of the item. Defense Exhibit 7, Tab 36 contains the sixty five conclusory drug reports disclosed by the government. Thirty five of these "reports" are computer-generated nine line reports with an entry for "marijuana" or "cocaine base", but with no indication of what tests were preformed or of any indication that any peer review was conducted . Twelve of these computer- generated reports have the word "destroyed" typed or written on the form. Twenty of the remaining reports have the statement "If this box is checked, this case was used as part of the laboratory's commitment to quality control". In only two of the twenty reprts is this box checked, and the two reports are actually duplicates of each other (N

results for the tested items are inadmissible. See, Rule 702 (1) and (2)(expert testimony is admissible only if the testimony is the product of reliable principles and methods, *and* the witness has applied the principles and methods reliably to the facts of the case.. Cf., *United States v. Monterio*, 407 F. Supp. 2d 351, 373-374 (D. Mass. 2006)(even if the general methodology of tookmark identification passes muster under *Daubert*, the testimony of an expert must still be excluded under Rule 702 if witness has not complied with the documentation and peer review standards of his own profession.)(examiner's case note of a "positive ID" was insufficient documentation because the examiner "did not make any sketches or take any photographs".). Accord, *United States v. Green*, 405 F. Supp. 2d 104, 120 (D. Mass. 2006)(firearm examiner's testimony excluded under Rule 702 and *Daubert* in part because "the absence of notes and photographs in the initial examination makes it difficult, if not impossible, for another expert to reproduce what [the government's expert] did... Reproducibility is an essential component of scientific reliability."); *Rameriz v. State*, 810 So. 2d 836, 847 (Fla. 2001)(tookmark examiner's testimony inadmissible under Frye because "[t]here is no objective criteria that must be met, there are no photographs, no comparisons of methodology to review and the final deduction is in the eyes of the beholder, i.e., the identification is a match because the witness says it is a match."); *People v. Gomez*, 596 P. 2d 1192 (Colo. 1979)(trial court properly excluded color and microcrystal drug test results where duplicative testing consumed the sample and the analyst took no photographs of the color or microcrystal test results).

(6) When multiple packages of suspected marijuana are received as a single "exhibit" by the SFPD. Crime Lab, Ms. Madden testified that samples from all of the packages are subjected to microscopic examination. The Duquenois-Levine color test, however, is only applied to a sample from one of the packages. The parties should address whether this procedure is deficient.

The SFPD. lab's selective and under inclusive marijuana testing procedure is clearly deficient in regard to untested packages of suspected marijuana, since even the lab's own more recent SOPs maintain that marijuana cannot be identified in the absence of microscopic

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000378 and N000397)

examination and testing using the Duquenois- Levine color test . Compare, Government Exhibit 9, 1995 SOP at 29 ("Microscopic analysis (M) is sufficient to characterize and identify marijuana") with Defense Exhibit 7, Tab 18, 9/30/04 SOP, p. 13 ("The specificity of the Duquenos-Levine reaction that causes a color change and subsequent of the color is high enough that in combination with stereomicroscopy used to identify specific morphological characteristics...these two tests serve as confirmation of marijuana."); Tab 19, 1/04/05 SOP, p. 13 (same); Tab 20, 2/7/05 SOP, p. 13 (same); Tab 21, 6/23/05 SOP, p. 13 (same).

As indicated above, for a variety of reasons, defendants maintain that the particular combination of marijuana and cocaine testing procedures employed by SFPD., with its minimalist approach, its total lack of documentation of microscopic or other testing results, its failure to conduct or document any validity testing, its failure to follow proper protocol with respect to color tests, its testing of only a single portion of an item, its lack of peer review for all but one of the samples tested in this case, and its lack of blind proficiency testing is scientifically deficient and not accepted by the forensic or broader scientific community. But even if the Court were to overlook all of the flaws in the *tested* items, it still would not justify allowing the government experts to testify that *untested* items also contained a drug. Such an approach is flawed scientifically . See, Government Exhibit 7, *Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG) Recommendations,* p. 9-13 ("If an inference about the whole population is to be drawn from a sample, then the plan [for sampling a multiple unit population consisting of items which are similar in relewvant visual chracteristics] shall be statistically based and limits of the inference shall be documented....SWGGUN recommends that each unit comprising the sample shall be analyzed to meet the SWGDRUG minimum recommendations for forensic drug identification, if statistical inferences are to be made about the whole population."; Defense Exhibit 7, Tab 24, *United Nations Division of Narcotics Drugs Recommended Methods for Testing Cannabis,* p. 18-19 (In cases consisting of more than one package, "the analyst should examine the contents of all packages by eye, *and* possibly by simple colour test or TLC to determine...if all packages contain suspect cannabis or cannabis-containing material....If the material in all the packages is found by visual examination to be the same then

the analyst may adopt one of two approaches: 91) the contents of a number of packages may be combined and the combined bulk material may then be homogenized; (2) alternatively, chemical testing may be applied to a number of the packages.")

Such an approach is also flawed legally. Courts have endorsed statistically based drug-quantity extrapolations predicated on random test samples in circumstances where the government was able to demonstrate an "adequate basis in fact for the extrapolation and that the quantity was determined in a manner consistent with the accepted standards of [reasonable] reliability." *United States v. McCutchen*, 992 F.2d 22, 23 (3d Cir.1993); *United States v. Pirre*, 927 F.2d 694, 697 (2d Cir.1991) ("It is sufficient for the government to show that its method of estimating the total [amount of drugs] is grounded in fact and is carried out in a manner consistent with accepted standards of reliability."). "For example, sufficient indicia of reliability may be found where a preponderance of the evidence demonstrates that (1) a proper 'random' selection procedure was employed; (2) the chemical testing method conformed with an accepted methodology; (3) the tested and untested samples were sufficiently similar in physical appearance; and (4) the tested and untested samples were contemporaneously seized at the search scene." *United States v. Scalia*, 993 F. 2d 984, 998 (1st Cir. 1993). Here, none of these requirements can be met so any attempt to extrapolate the identity of multiple bags of marijuana from the testing of a single bag must be rejected as too unreliable under *Daubert* and rule 702. See also, *People v Games* (1981, 3d Dist) 94 Ill App 3d 130, 49 Ill Dec 666, 418 NE2d 520 marijuana (chemist looked at two bags of suspected marijuana, weighed them individually, and subjected the contents of one bag to chemical analysis which revealed cannabis. "What inference can be drawn concerning the composition of the bag not tested? The answer is none at all in the absence of expert opinion testimony. And in this case, there was none. It is difficult not to speculate that the second bag contained cannabis. But that is not enough. The verdict must be based on evidence and not upon guess, speculation or conjecture."(conviction reversed); *State v Clark* (1989, Fla App.) 538 So 2d 500, review den (Fla) 545 So 2d 1369 (The state's chemist did not test and weigh enough of the contents of the capsules found in the defendants' possession to meet the statutory quantity requirement for the more serious offense. The court held that the

state must test a sample from each capsule to determine whether the quantity of the controlled substance exceeds the statutory amount.); *Campbell v State* (1990, Fla App) 563 So 2d 202 (Ruling that testing one or two capsules randomly selected out of a group of capsules was insufficient to prove that all the capsules contained heroin); *People v Ayala* (1981, 1st Dist) 96 Ill App 3d 880, 52 Ill Dec 446, 422 NE2d 127(The state's chemist conducted a conclusive test for heroin on one of two bags of a powdery substance found in the defendant's possession. The court held that the testing of only one bag was insufficient to prove that both bags contained heroin. Further, the court stated that an inference that both bags contained heroin arising from preliminary testing of the contents of both bags which indicated the presence of heroin in both bags was insufficient to constitute proof beyond a reasonable doubt that both bags did, in fact, contain heroin.)

(7) Whether a procedure similar to the one described above is also used for suspected cocaine, or whether that practice is restricted to suspected marijuana samples

Most of the alleged rock cocaine samples submitted for testing in this case were multi-rock samples. See, Defense Exhibit 7, Tab 39, column 6. The record does not indicate whether the selective sampling procedure described above were utilized with respect to these multi-rock samples, but the lab's SOPs imply that it was. See, Government Exhibit 9, 1995 SOP at p. 13-14 ("When all else is qual, it is generally best to analyze the largest sample. When the appearance of the evidence or its packaging suggests that more than one type of drug may be present, each different type of drug should be analyzed unless the analyst is specifically informed that it is not needed."); Defense Exhibit 7, 9/30/2004 SOP, Tab 18, p. 13 ("If the samples within a group are similar in appearance, only one needs to be tested"); Tab 19, 1/04/05 SOP, p. 14 (same); Tab 20, 2/7/05 SOP, p. 14 (same); Tab 21, 6/23/05 SOP, p. 13 (same) . If the SFPD. reads these guidelines as excusing testing of each rock submitted because all rocks are "similar in appearance", then the methodology is fatally flawed for the untested rocks. See, *People v. Jones*, 174 Ill. 2d 427, 221 Ill. Dec. 192, 675 N.E.2d 99 (1996)(Chemist who selected for chemical analysis two out of five packets of white rocky substance seized from defendant failed to test

sufficient number of packets to prove beyond a reasonable doubt that defendant possessed one gram or more of cocaine, thus making trial court's finding that remaining three packets contained cocaine rather than look-alike substance pure conjecture and warranting reduced conviction and sentence for possession with intent to deliver cocaine, where total weight of five packets was 1.4 grams but two packets tested weighed 0.59 grams.); *Mellon v. State*, 85 S.W.3d 442 (Tex. App. 2002)(Evidence was insufficient to prove that defendant possessed at least four grams of cocaine, including adulterants or dilutant, in drug prosecution; police officer who seized substance testified he observed 35 to 40 rocks of substance that appeared to be rock cocaine that he later field tested as cocaine, but state's chemist testified that he tested no more than two of the individual items in baggie, weight of tested items was not in record, and although chemist's tests identified some of baggie's contents as crack cocaine, state did not prove that baggie contained only crack cocaine.). See also, *Ross v State* (1988, Fla App 528 So 2d 1237, review den (Fla) 537 So 2d 569 (The state's chemist tested two of 92 packets of white powder and found that they contained cocaine. Although the total weight of all 92 packets was more than the 28 grams required for conviction of the offense charged, the court held that testing of two randomly selected packets was inadequate to prove that all of the packets contained cocaine. It concluded that the fact that two packets contained cocaine gave no assurance that all of the packets contained the same substance.)

(8) The significance of the fact that Figure 1 in Government Exhibit 23 shows crystals that appear to be different than those Ms. Madden is used to seeing when gold chloride is applied to cocaine.

As indicated by Judge Gertner in *United States v. Green*, 405 F. Supp. 2d 104, 120 (D. Mass. 2006), "[reproducibility is an essential component of scientific reliability." The fact that Figure 1 in Government Exhibit 23 shows crystals that appear to be different than those Ms. Madden is used to seeing when gold chloride is applied to cocaine is a sure sign that microcrystal testing of mixed unknown substances is not reproducible and is therefore not scientifically reliable.

The government's own literature shows the many variables that can effect this test. Government's Exhibit 23, at page 4 states:

> Reaching an accurate conclusion using microcrystal tests will depend on the level of experience of the analyst, the proper use of standards and controls, the presence of adulterant and/or diluent in the seized samples, the reaction pH, the temperature and humidity, and the concentration of the reagent and of the chemical.

The "bible" of drug testing analysis, Government Exhibit 19, states at page 138:

> Difficulties on obtaining an exact match between the crystals of the unknown and those of the control may arise from a number of causes. Impurities in the test solution may lead to the formation of deformed and irregular crystals, but this may usually be overcome by using material eluted from paper or thin-layer chromatograms. Polymorphism is occasionally a source of trouble. Under different conditions of temperature , pH etc., a compound may crystallize in entirely different forms. This may usually be obviated by ensuring that the test crystals and those of the control are prepared under identical conditions. Finally, the difficulty most commonly encountered arises from the fact that the appearance of the crystals may depend very much on the concentration of the solution from which they are formed. A substance which may form a mass of irregular plates from a concentrated solution may crystallize as beautiful regular rosettes from a more dilute one. The answer to this problem is to use test and control solutions of approximately the same concentration. There is some slight difficulty here, as the concentration of the test solution will usually be a matter of guess work, but if the control drop appears to be more crowded with crystals than the test drop the former may be repeated with a more dilute solution.

These nuances seem to have escaped the SFPD. crime laboratory. Ms. Madden testified that all of her cocaine crystals always formed in exactly the same way no matter what the conditions. The laboratory does not generally use paper or thin layer chromatography to separate out adulterants. The laboratory uses no concomitant controls prepared under identical conditions, but instead uses a "control" photograph (Defense Exhibit 7, tab 18, page 62) which was prepared under unknown conditions and which looks nothing at all like the gold chloride/cocaine crystals depicted on page 20 of Government Exhibit 20, on page 2 of exhibit 23, or in Defense exhibit 7, tabs 10-13.

In the end, the solution to the many problems with microcrystal tests identified by Clarke and others is clearly set forth in the "bible" of drug analysis:

> The microcrystal test is unsuitable as a primary method of identification of an unknown compound, as it does not lend itself to form the basis of an identification scheme. It's real value is as a means of final identification to confirm provisional diagnosis made from chromatographic or spectrophotometric evidence...

(Government Exhibit 19, p. 135)

CONCLUSION

For the above-stated reasons, and for all of the reasons stated in their motions [doc. 634 637,] and their replies [709, 716, 718] defendants respectfully request that this motion to exclude the government's drug identification witnesses be granted.

Dated: November 29, 2006

Respectfully submitted,

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