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2 **Developing Content Relevant Licensure Tests and**

3 **Corresponding Manuals**

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5 **Sept.1, 2006 - Draft Issue Paper: CTAG Process Step #4, Board Consideration**

6

7 **EXECUTIVE SUMMARY**

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9 EPA is anticipating requiring states to adopt and follow a formal test development

10 process. They believe that this approach is necessary and will result in the development

11 of nationally consistent, content relevant licensure tests for the certification and training

12 program. This issue paper documents a flexible process for the development of these

13 licensure tests. The objectives of this approach are:

14

- 15 1. Tests and manual content that reflect knowledge necessary to perform the
- 16 work of a certified pesticide applicator, based on a job analysis
- 17 2. Tests that are good measures for determining who should and should not be a
- 18 certified pesticide applicator
- 19 3. Manuals that are designed to be useful both for learners preparing for tests and
- 20 as a basic educational tool to help new applicators properly handle and apply
- 21 pesticides.
- 22

23 In order for this process to be effective, it needs to occur in unison with the development

24 of the corresponding study material and be flexible since states are at varying degrees of

25 readiness. Appendix A describes the components of test and manual development. It also

26 provides examples of how a state may combine manual and test development into a

27 single overlapping process. These examples demonstrate how a state can improve test

28 and manual development by adapting and building on what it is already in place, rather

29 than having to start over with a new process. There are many challenges and obstacles to

30 implementing such a process that include, but are not limited to, skill and resource

31 deficits. States should, through their state plans, describe the process used to ensure the

32 development of content relevant licensure tests and corresponding study manuals and

33 EPA should do everything possible to facilitate the states' efforts to integrate the process
34 into their certification programs.

35

36 **PERSPECTIVE**

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38 The need for content relevant licensure tests (i.e., validated exams) for applicator
39 certification, is called for under the "Proposed Program Changes" of Goal 3 of the CTAG
40 report, "Pesticide Safety for the 21st Century."

41

42 **Goal 3 reads:**

43

44 Maintain the consistency, integrity and validity of the certification and
45 recertification programs and processes.

46

47 **The proposed change under Goal 3 reads:**

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49 ***Require Use of Validation Process for All Exams.*** Require that all states, tribes,
50 and territories use a validation process for all certified applicator exams and
51 update exams in a timely manner as training materials are revised. Exam
52 validation is a process whereby exams are created to test knowledge in tasks
53 necessary to perform an applicator's job. The process includes setting up an exam
54 committee, conducting a survey of applicators, determining what skills and
55 knowledge are necessary to do an applicator's job, determining the number and
56 types of questions linked to each task area, writing questions, and establishing and
57 using cut scores. EPA will be holding a workshop providing interested states,
58 tribes, and territories with tools on how to use the exam validation process.

59

60 **BACKGROUND**

61

62 In 1999, the National Test Validation Seminar introduced the SLA and PSEP personnel
63 to the concepts of creating professionally sound pesticide-licensure tests. Following the

64 course, programs either did not change their test creation procedures or they adopted just
65 a few components of what was presented because they felt overwhelmed by the process.
66 To a great extent, states felt that the process would be difficult to integrate into their
67 current structure, prohibitively expensive, labor intensive and required a unique set of
68 skills they did not yet have.

69

70 States are very diverse in the processes they use to develop licensure tests and
71 corresponding manuals. It is, however, the rare exception that bases test development on
72 all of the following elements; job analysis, test plan development, good item writing
73 practice, test assembly, item analysis, and standard setting, which collectively, support
74 sound judgments about how test scores get interpreted and used. A process that
75 incorporates these elements permits SLAs to make appropriate, accurate decisions about
76 who does, and who does not, deserve a license.

77

78 Implementing a federal requirement that states follow such a process is an important step
79 that can be taken to ensure that restricted use pesticides are in the hands of competent
80 applicators. In addition, such a standard would improve the consistency of test standards
81 and promote reciprocity among states by reducing the concern that requirements in other
82 states are not “comparable.” Beyond that, however, states with such a process would have
83 the confidence that they have developed high quality tests that achieve the results all are
84 striving for in that competent, engaged individuals are the ones qualifying for a license.
85 This will allow us to assure a concerned public and those individuals who must pass the
86 tests that they are fair and relevant for the work being performed and of the highest
87 quality possible within our given resources.

88

89 **OBSTACLES AND CHALLENGES**

90

91 1) Test development

92

93 The development of content relevant licensure tests can require considerable staff
94 resources and a unique skill set that may include the following:

- 95 • Meeting management and facilitation
- 96 • Survey development and analysis
- 97 • Item writing and analysis
- 98 • Working with test item software
- 99 • Regulation development

100

101 Many states have only one or two professional staff dedicated to the C&T Program.

102 Developing licensure tests is done in addition to their considerable day-to-day workload.

103

104 Depending on the process used in a state, the SLA may need to devote resources in order
105 to develop a high quality test. It is often necessary to travel to meetings in order to
106 facilitate the attendance of content experts. Developing new tests can take considerably
107 more time than revising existing ones. The assigned staff person often does not have the
108 luxury of focusing only on test development, resulting in the process dragging on as other
109 more pressing day-to-day work must be accomplished. This can be frustrating for all
110 involved. The situation may be eased by allowing PSEP (particularly the author of a
111 given manual) to collaborate in test development, as the author is the person who is most
112 familiar with the manual content.

113

114 SLA staff may or may not possess all the skills necessary for a successful development
115 process. They may struggle to find the time and/or funds necessary to develop the
116 deficient skills. The type of training needed to improve deficient skills is rarely offered
117 and often cost prohibitive. However, the state's PSEP program or its Extension
118 colleagues may often be able to fill this need, as Extension personnel often have training
119 in education and assessment.

120

121 2) Manuals

122

123 Considerable time, effort and dollars can be saved in the construction of a quality test
124 when starting with a well-designed manual. A manual grounded in a quality job analysis
125 has all the essential content needed for new pesticide applicators.

126

127 Well-written and designed manuals require specific types of expertise and large amounts
128 of staff time – all of which costs dollars. The payoff for the expense of quality manuals is
129 in outcomes as good manuals use research-based techniques focused on maximizing the
130 ability of pesticide applicators to be good practitioners on the job outside of the learning
131 and testing environments.

132

133 For some, the funds required to produce a single manual that may only be used by very
134 few people preparing for a licensure test over the 5 or 6 years of useful life of a manual
135 (e.g., Forest or Aquatic) is simply not available. To offset this expense, some states create
136 manuals with added value by including broader and more advanced material beyond
137 content relevant for test preparation and basic pesticide use. These manuals become a
138 useful resource for recertification educational programs and as a reference for not only
139 licensed pesticide applicators but other interested people as well. On the downside, this
140 can be confusing and overwhelming for the entry-level applicator so it is critical that the
141 author clearly delineate the content that is aimed at them vs. the broader audience.

142

143 PSEP programs must be given the flexibility and authority to recover their development
144 costs (e.g., via manual sales). This requires a commitment from the SLA to identify the
145 manual as the primary resource in preparing for the test and state CES policies to allow
146 PSEP cost recovery funds on sales of manuals. Currently, states vary tremendously in
147 how manuals are funded and in the level of cost recovery for manual development and
148 post development expenses. Some state PSEPs operate essentially as entrepreneurs in a
149 market environment with the ability to price manuals to what the market will bear to
150 recover costs. Others use ‘training fees’ that directly or indirectly subsidizes manual
151 costs. Still others have significant limitations placed on pricing, use of training fees and
152 the amount of cost recovery they are allowed. This results in the need to seek other
153 sources of funding to subsidize manual costs.

154

155 One option that can offer cost efficiency is to adapt an existing manual from another state
156 or work cooperatively to develop manuals. Multi-state manual development reduces the
157 cost for any one state and creates a bigger pool of content expertise. This is already done
158 with a number of manuals in various states. This approach has its limitations, however.
159 The process described in the CTAG document requires close cooperation and shared
160 vision between the SLA and PSEP programs. This is harder to achieve at the regional or
161 national level because the relationships are more distant and less interdependent.

162

163 While developing regional/national manuals or adopting a manual from another state has
164 worked in some cases, it may actually increase the complexity of manual development in
165 other cases. For example, a state that has adopted the core requirements for manual
166 development described in the Model Document (e.g., learning objectives based on a job
167 analysis that are tied to a licensure test) cannot simply use a manual from a state that has
168 not done so. Adopting the manual from the other state would require “retrofitting” a job
169 analysis and learning objectives to the existing text. This would inevitably require
170 extensive revision and could even result in a longer development period and greater level
171 of project management and oversight.

172

173 One solution is to actively share a category job analysis since the vast majority of the
174 work performed by applicators is identical. States could then use their expert committees
175 to adapt the job analysis to the state’s unique legal, climatic and pest issues. This ensures
176 that the manual addresses the needs within the state and is aligned to the licensure test
177 that the state deems appropriate.

178

179 Job analysis, use of learning objectives, etc. cannot be implemented into all existing
180 category manuals at once. It will take time for this approach to be incorporated into the
181 revision cycle. For example, Nebraska typically revises no more than 2 category manuals
182 each year. Nebraska currently has 19 categories and one general standards manual. At the
183 2/year rate it will take about 10 years to complete the transition. It will also take time for

184 everyone involved (specialists, industry reps, SLAs, applicators) to accept and fully
185 understand this approach and to begin using it effectively.

186

187 The developers must also be considerate of the expert committee's time commitment in
188 the manual and test development processes. This is especially important when the
189 categories selected tap into the same individuals because of their crossover expertise.
190 Agencies should consider this in their project scheduling to prevent burning out
191 volunteers and/or overloading a particular industry. This can be achieved by selecting
192 categories each year that rely on different subject matter experts.

193

194 On-going communication, sharing, and cooperation between a state's SLA and PSEP
195 programs is critical for the success of effective license tests and manuals. Prior to the
196 initiation of a development project, the programs must agree on a plan to move through
197 the process so that both can meet their obligations. There must be open communication
198 and active sharing of materials in order for the process to be successful. SLA and PSEP
199 programs must work together from a common job analysis and reach agreement on the
200 scope and wording of learning objectives. Test items must align with learning objectives
201 in order to avoid the situation where learners are told by PSEP they must obtain one set
202 of knowledge and skills only to find themselves tested on a different set by the SLA.

203

204 **Q & A**

205

206 1) With all the challenges facing C&T and PSEP programs, why should I take the time
207 to look at this in more detail?

208

209 Answer: Creating content relevant licensure tests and quality manuals is central to
210 meeting the increased demand for accountability of C&T and PSEP programs. Over
211 the last 10 years, the research literature has evolved, providing new and more
212 efficient ways of constructing tests. At the same time, a few SLA and PSEP programs
213 have developed procedures that match the components of sound test and manual
214 construction to the specific needs and capabilities of their pesticide certification and

215 education programs. The model document in the appendix shares these procedures in
216 order to help states start where they are today.

217

218 2) The test development process presented in the past was complex, requiring a fair
219 amount of expertise and was so time and resource intensive that I was overwhelmed
220 and never used it. Is this any different?

221

222 Answer: Yes! This approach breaks down test and manual development into a set of
223 'core requirements' to produce defensible tests and integrated, quality manuals. These
224 methods are more flexible and practical than those in the past. States can modify their
225 existing test and manual development process over time at their own pace based on
226 available resources, needs and funding.

227

228 3) Aren't we suppose to develop "validated" tests?

229

230 Answer: The goal is to create a defensible test that yields scores that support sound
231 decisions about who should and should not be a certified pesticide applicator. There is
232 no single best method to reach this goal. The key is developing tests in steps that
233 support a strong inferential chain extending from job analysis to a final test where
234 scores are reflective of job knowledge and skills. This approach creates defensible
235 tests, which for the purposes of pesticide certification programs, should be the
236 standard necessary.

237

238 4) Tell me why this is such a good thing and, if you can, give real-life examples of how
239 states are receiving less criticism from environmental groups, better cooperation from
240 industry, reduced incidents of violations and fewer complaints from candidates
241 indicating that they think the tests are unfair, redundant, or irrelevant.

242

243 Answer: The benefits to SLAs that adopt professionally accepted test development
244 practices do not easily reduce to a single metric. Rather, rewards are in the form of

245 strengthened claims about the testing program that they can make to individual test
246 takers, the regulated community, and their state's citizens:

247

- 248 • There is an evidentiary basis for exam content. Every item relates to an important
249 job knowledge or skill described by a detailed test plan and based on a job analysis.
- 250 • Test scores differentiate between test takers who possess a requisite level of job
251 knowledge and those who are not. Tests do not discriminate on any other basis.
- 252 • Test takers who receive a passing score demonstrate that they know how to perform
253 their job so as to avoid causing harm to the public or the environment.

254

255 The value of implementing a professional test development practice is that it permits
256 SLAs to strike a critical balance between public protection and individual rights.
257 Professional licensure programs can rightly claim fair treatment of the individual
258 while simultaneously safeguarding the public welfare.

259

260 **RECOMMENDATIONS**

261

262 It is recommended that CTAG support the requirement that all states describe to EPA,
263 through their state plans, the process they use or intend to use to ensure the development
264 of content relevant licensure tests and corresponding study manuals. In addition, CTAG
265 should approve the model document, found in the appendices, that EPA can use to gauge
266 state plans against and which states can use to develop their process for test and manual
267 development. Two important components of this model document are that states have
268 flexibility in developing a process that takes into account their needs, resource and
269 expertise levels and that the most optimum results are realized when staff from the state
270 lead agency and pesticide education programs work cooperatively to develop tests and
271 manuals. EPA should do everything possible to assist states in gaining and retaining the
272 necessary monetary and professional skills to improve and maintain each state's ability to
273 implement a sustained development process.

274

275 **APPENDICES**

276 A Model Process for Developing Effective, Integrated Pesticide Training Manuals and

277 Licensure Tests.

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