

IMPLEMENTATION OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS AND CONTINUING EDUCATION WORKSHOPS

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MODERN METRIC CONVERSION FACTORS*

APPROXIMATE CONVERSIONS TO SI UNITS				
SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
AREA				
in²	square inches	645.2	square millimeters	mm ²
ft²	square feet	0.093	square meters	m ²
yd²	square yard	0.836	square meters	m ²
A	acres	0.405	hectares	ha
mi²	square miles	2.59	square kilometers	km ²
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft³	cubic feet	0.028	cubic meters	m ³
yd³	cubic yards	0.765	cubic meters	m ³
NOTE: volumes greater than 1000 L shall be shown in m ³				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
ILLUMINATION				
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m ²	cd/m ²
FORCE and PRESSURE or STRESS				
lbf	poundforce	4.45	newtons	N
lbf/in²	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS				
SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
AREA				
mm²	square millimeters	0.0016	square inches	in ²
m²	square meters	10.764	square feet	ft ²
m²	square meters	1.195	square yards	yd ²
ha	hectares	2.47	acres	A
km²	square kilometers	0.386	square miles	mi ²
VOLUME				
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m³	cubic meters	35.314	cubic feet	ft ³
m³	cubic meters	1.307	cubic yards	yd ³
MASS				
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
TEMPERATURE (exact degrees)				
°C	Celsius	1.8C+32	Fahrenheit	°F
ILLUMINATION				
lx	lux	0.0929	foot-candles	fc
cd/m²	candela/m ²	0.2919	foot-Lamberts	fl
FORCE and PRESSURE or STRESS				
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in ²

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.

TABLE OF CONTENTS

<u>TEXT SECTION</u>	<u>PAGE</u>
1.0 INTRODUCTION.....	1
2.0 OBJECTIVES.....	1
3.0 BACKGROUND AND SIGNIFICANCE OF WORK.....	1
4.0 PURPOSE.....	2
5.0 IMPLEMENTATION OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS AND TESTING	2
5.1 PREPARATIONS FOR FY2012 CERTIFIED APPLICATOR SCHOOLS	2
5.2 PESTICIDE APPLICATOR CERTIFICATION SCHOOLS	3
5.3 SPECIFIC TOPICS OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS.....	3
5.4 APPLICATOR TESTING AND ACHIEVEMENT OF CERTIFICATION.....	3
5.5 POST-TESTING NOTICE OF CERTIFICATION OF PERSONNEL	4
5.6 POST-TESTING RECORDKEEPING AT OKLAHOMA STATE UNIVERSITY	4
6.0 IMPLEMENTATION OF PESTICIDE APPLICATOR CONTINUING EDUCATION (CEU) WORKSHOPS.....	4
6.1 PESTICIDE APPLICATOR CONTINUING EDUCATION WORKSHOPS	4
6.2 CEU AWARDING AND POST WORKSHOP RECORDKEEPING	5
7.0 SUMMARY AND CONCLUSIONS	5
8.0 REFERENCES.....	9

LIST OF TABLES

<u>TABLE</u>	<u>PAGE</u>
Table 1. 2012 ODOT Herbicide Applicator Continuing Education (CEU) Workshop Schedule and Attendance	6
Table 2. Program Agenda for 2012 ODOT Herbicide Applicator Continuing Education Workshops Conducted as Program OK-12-013	7

1.0 INTRODUCTION

The Oklahoma Department of Transportation (ODOT) uses an integrated roadside vegetation management (IRVM) program to provide cost-effective management for vegetation on roadside right-of-way (1). IRVM involves proper vegetation selection, installation and post-installation management. Generally post-installation vegetation management involves selective mowing and weed control (1). The ability to properly select and apply herbicides for right-of-way weed control is a technical skill that is not traditionally taught in primary or secondary school. This specialized training is not otherwise available to ODOT through any current in-house training, nor through the normal non-contractual services provided by the Oklahoma Cooperative Extension Service.

Each year there is some turnover in ODOT roadside vegetation management field staff which necessitates an on-going pesticide applicator training and certification effort for new employees. Also, the vegetation management arena is ever changing. This is due to changes in state and federal rules/regulations, new herbicide product development, new pesticide application equipment, product patent expiration and subsequent generic product offerings, changes in industry product marketing agreements, changes in products being awarded the state competitive bid contract, and lastly, ever emerging and evolving weed problems. This fluidity in the vegetation management profession necessitates an on-going education effort to ODOT herbicide applicators.

The every changing vegetation management scene led the ODOT Director in 1995 to develop ODOT Herbicide Program Policy Directive D-504-1 (2). The Directive amongst several requirements, states that all personnel applying herbicides must be Certified Pesticide Applicators under the requirements administered by the Oklahoma Department of Agriculture, Food and Forestry (ODAFF). The Directive (2) also requires anyone involved in the herbicide application to attend an annual training program pertinent to vegetation management.

2.0 OBJECTIVES

1. To conduct yearly herbicide applicator certification schools that will help prepare new ODOT personnel for subsequent pesticide applicator testing and certification.
2. To provide each of the eight ODOT Field Divisions with yearly herbicide applicator continuing education (CEU) workshops.

3.0 BACKGROUND AND SIGNIFICANCE OF WORK

For the past 26 years, annual pesticide applicator certification schools have been conducted on an "as-needed" basis as a part of the joint roadside vegetation management and training projects between ODOT and Oklahoma State University (OSU). These schools provide timely initial training of ODOT personnel attempting to become Oklahoma Certified Pesticide Applicators.

Under Task 1 in our FY2012 Joint Project Proposal covering *Roadside Vegetation Management Training and Consultation*, we proposed to continue to offer these schools which help prepare ODOT personnel for the rigors of two 100 question exams that must be passed for ODOT personnel to become certified in Oklahoma Category 6 (Right-of-Way). Certification in Category 6 (Right-of-Way) qualifies the applicator for use of pesticides for public road maintenance, power line maintenance, railroad right-of-way, storage tank areas, and other similar areas (3). Certification in Category 5 (Aquatic) qualifies the applicator for treatment of weeds in standing or running water in man-made and/or natural impoundments, streams, etc. (3). Category 6 certification excludes public health activities (e.g. mosquito control) and water in totally closed systems.

ODOT Field Divisions have hosted yearly CEU workshops in Category 6 (Right-of-Way) for the last 26 years. We proposed and were contracted to conduct these continuing education (CEU) workshops under Task 1 in our FY2012 Joint Project Proposal covering *Roadside Vegetation Management Training and Consultation*. These workshops have annually supplied current and vital information to approximately 650 Certified Applicators in ODOT each year. There will continue to be a need for some applicators to also obtain training in Oklahoma Category 5 (Aquatic Pest Control). This is due to the fact that some applicators need to treat aquatic sites located on lands managed by ODOT.

4.0 PURPOSE

The purpose of the Pesticide Applicator Certification schools is to train participants to understand the basics of integrated pest management (IPM) as well as to become Certified Applicators by passing the designated tests. After gaining a fundamental understanding of IPM and becoming a Certified Applicator, the individual is usually ready to be given specific assignments by in-house ODOT mentors. Trainees are prepared to be successful at managing weeds on Oklahoma roadsides. The initial Pesticide Applicator Certification prepares the new Certified Applicators for participation in annual pesticide applicator continuing education (CEU Workshops) so that they can comply with ODOT policy as well as maintain their certification in Oklahoma. Also, the initial training prepares the new applicator for training in the herbicide application equipment calibration workshops offered by the OSU RVM program under Task 4 of the Project 2156 proposal.

5.0 IMPLEMENTATION OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS AND TESTING

5.1 PREPARATIONS FOR FY2012 CERTIFIED APPLICATOR SCHOOLS

Division and Maintenance Engineers were contacted by phone and email in spring and summer of 2011 to estimate i) the number of participants for fall 2011 certification schools as well as ii) determine suitability of propose specific training dates and locations of training. At the same time, ODAFF was contacted to determine the availability of personnel to administer the Oklahoma Certified Pesticide Applicator core and category specific exams. Upon obtaining this information from all parties, the dates, times and locations of the three certification schools were set and the necessary information was provided in an August 25, 2011 memo sent by email to ODOT Division and Maintenance Engineers and ODAFF.

Additionally, in that email the Division and Maintenance leaders were asked to secure the three training documents for their participants using the order form for Pesticide Applicator Certification Manuals from Oklahoma State University Central Mailing Services via the internet at: <http://pested.okstate.edu/order.pdf> (verified 22 April 2012). The specific training materials to be acquired by the Divisions for their personal were i) *Applying Pesticides Correctly* (Revised 2008), ii) the *Category 6: Right-of-Way Study Guide* (Revised 2009) and iii) the *Oklahoma Pesticide Laws & Rules* (Revised 2008).

5.2 PESTICIDE APPLICATOR CERTIFICATION SCHOOLS

Three (3) Pesticide Applicator Certification Schools were presented to Oklahoma Department of Transportation (ODOT) employees in 2011 (Fed FY2012). The Fed FY 2012 certification schools were conducted on October 4-6 at ODOT Division 4 Headquarters (Perry), November 1-3 at ODOT Division 1 Headquarters (Muskogee) and November 15-17 at ODOT Division 5 Headquarters (Clinton). The hosting Divisions were Division 1, 4 and 5. Thirty, fifteen and twenty-one ODOT employees [66 total] participated in the three schools, respectively, compared to 51 participants in Fed FY2011 [4].

The first and second day of each of the three schools were conducted from 8:45 a.m. to 3:30 p.m. The schools were held using a classroom-style set up. Presentation of information was via an oral lecture using Smart Board peripheral display technology, Microsoft Power Point visual aids, and printed handouts were also provided. Participants were encouraged to ask questions during the lecture. A question and answer segment was provided immediately following each topic lecture. Our instructors for the schools were Extension Associates Mr. Craig Evans, M.S. and Mr. Douglas Montgomery, M.S.

5.3 SPECIFIC TOPICS OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS

Topics included in each of the three ODOT Certified Applicator Schools were: integrated pest management (IPM), IPM terminology, state and federal rules and regulations, pest identification, mechanical and cultural pest management strategies, understanding pesticide labels and material safety data sheets (MSDS), personal protective equipment (PPE), pesticide selection, pesticide application techniques, spray system technologies, environmental protection, application recordkeeping, proper pesticide storage and disposal and how to obtain pesticide applicator continuing education. These topics were drawn from the three key training manuals that Division and/or Maintenance Engineers had acquired for their employees in advance of the training. The training included and was consistent with the presentation of information in the i) *Applying Pesticides Correctly* (Revised 2008), ii) the *Category 6: Right-of-Way Study Guide* (Revised 2009) and iii) the *Oklahoma Pesticide Laws & Rules* (Revised 2008). OSU personnel also handed out copies of supplemental information that would be useful to ODOT personnel as they assumed their roll in ODOT vegetation management activities following initial certification as Oklahoma Pesticide Applicators.

5.4 APPLICATOR TESTING AND ACHIEVEMENT OF CERTIFICATION

On the third day of each of three FY2012 schools, pesticide applicator testing was conducted from 9:00 a.m. - 12:00 p.m. by representatives of the Oklahoma Department of Agriculture, Food and Forestry (ODAFF). ODOT personnel first took the core exam; a 100 question multiple choice written exam. ODAFF representatives then scored the participants core exam. Personnel that passed the core exam were next allowed to take the

100 question multiple choice written category specific exam. The category specific exam of most interest to ODOT was the Category 6 (Right-of-Way) exam although in some years there are ODOT personnel that also take the Category 5 (Aquatic Weed Control) exam.

Passing the core exam and category specific exam was required in order to become a Certified Pesticide Applicator in Oklahoma. Of the 66 participants in the three certification schools, 66 people tested for certification and 62 passed both the core and Category 6 (Right-of-Way) exam to become Oklahoma Certified Pesticide Applicators in Category 6. Thus, the FY2012 ODOT Certified Applicator School participants had an overall 93% pass rate in taking the certification exams compared with an overall pass rate of 86% for participants in FY2011 (4).

5.5 POST-TESTING NOTICE OF CERTIFICATION OF PERSONNEL

Following the testing of ODOT employees, ODAFF provided the test scores and notification of achievement of certification in the Right-of-Way category to OSU RVM program Extension Associate Mr. Craig Evans. Mr. Evans then sent the information on these 66 individuals to their respective ODOT Division Headquarters, to the ODOT Maintenance Division headquarters in Oklahoma City and to the ODOT Planning and Research Division.

5.6 POST-TESTING RECORDKEEPING AT OKLAHOMA STATE UNIVERSITY

Upon receiving the results of testing and certification from ODAFF for ODOT participants at the three certification schools, Ms. Stephanie Larimer, Senior Secretary, and Mr. Craig Evans, Extension Associate in our program, entered the applicator names, ODOT employee number, employee Certified Applicator number, Division of employment, date of testing, testing score and categories of certification into our certified pesticide applicator database. This database is maintained under the Task 2 Objective: *Maintain Pesticide Applicator Training Records for ODOT Certified Pesticide Applicators*, as a part of the Joint Project 2156: *Roadside Vegetation Management Training & Consultation*. Several times per year, ODOT administrative personnel request verification of applicator certification status and the number of CEUs earned by applicators participating in past OSU CEU programs.

6.0 IMPLEMENTATION OF PESTICIDE APPLICATOR CONTINUING EDUCATION (CEU) WORKSHOPS

6.1 PESTICIDE APPLICATOR CONTINUING EDUCATION WORKSHOPS

Fourteen Pesticide Applicator Continuing Education (CEU) Workshops were conducted in FY2012. The locations, dates and attendance at each of the workshops are shown in Table 1. The workshops were approved by ODAFF as program OK-12-013 and awarded up to four pesticide applicator continuing education units (CEUs) in Category 6 (Right-of-way) and Category 10 (Demonstration and Research) as well as up to one CEU in Category 5 (Aquatic). The training agenda for the CEU programs is shown in Table 2.

Participant numbers were high enough that two workshops were required in each Division with the exception of Division 2 and 6, in which only a single workshop was offered. A total of 610 Certified Pesticide Applicators were trained in the FY2012 CEU workshops as compared to a total of 605 individuals in FY2011 (4). This represents a 0.08% increase in attendance from 2011. It is believed that some of this increase is in response to ODOT's

efforts to refill employee losses from FY2011 due to reduction in work force from retirements and migration of trained ODOT employees into oil-field industry positions.

6.2 CEU AWARDING AND POST WORKSHOP RECORDKEEPING

Attendance records of participants in the ODAFF approved CEU programs were supplied to ODAFF so that attendees could be awarded CEUs by ODAFF. Attendance records were also supplied to ODOT Division and Maintenance Engineers, the Maintenance Division Headquarters and the Planning and Research Division. Our records of attendance maintained under Task 2 of Joint Project 2156 were updated to reflect the participation of the 610 applicators in the 2012 CEU workshops.

7.0 SUMMARY AND CONCLUSIONS

Three pesticide applicator certification schools were conducted in fall of 2011 to train a total of 66 participants. Sixty-six of the attendees at these workshops took the ODAFF administered certification exams. Sixty-two participants passed both the Core and Category 6 (Right-of-Way) exam to become Oklahoma Certified Pesticide Applicators in Category 6 (a 93 percent pass rate). Division and Maintenance Engineers as well as ODOT Maintenance Division Headquarters and the State Planning and Research Division were furnished with applicator contact information and certification status/information. Certified applicator information was used to update the pesticide applicator records maintained by OSU for ODOT.

Fourteen Pesticide Applicator Continuing Education (CEU) Workshops were conducted across 8 ODOT Field Divisions in February and March of 2012. A total of 610 Certified Applicators received continuing education training. Records of participation in ODAFF approved CEU programs by ODOT personnel were furnished to ODAFF as well as the ODOT Field Divisions, the Maintenance Division Headquarters and the Planning and Research Division. Participation in CEU workshops resulted in granting of CEUs to ODOT participants in the workshops. ODOT participants also gained knowledge on various Integrated Pest Management and Integrated Vegetation Management products, topics and techniques. This increase or maintained operational knowledge of attendees and should insure continued effective vegetation management skills. This training is believed to be essential in delivery of cost-effective vegetation management on Oklahoma roadsides.

As of the close of March 2012, the OSU-RVM program maintained records of pesticide applicator certification status and educational session participation for 865 ODOT Certified Pesticide Applicators. These records will be carried forward into Federal FY2013 under the terms of the current Joint 2156 ODOT/OSU Project.

Table 1. 2012 ODOT Herbicide Applicator Continuing Education (CEU) Workshop Schedule and Attendance.

CEU Workshop Dates	Day of Week	ODOT Division	Location	Attendance by Division
February 7	Tuesday	Div. 5	Clinton HQ	Div. 5 - 102
February 7	Wednesday	Div. 5	Clinton HQ	
February 9	Thursday	Div. 6	Woodward – High Plains Technology Center	Div. 6 - 39
February 15	Wednesday	Div. 4	Perry HQ	Div. 4 - 79
February 16	Thursday	Div. 4	Perry HQ	
February 22	Wednesday	Div. 8	Tulsa HQ	Div. 8 - 80
February 23	Thursday	Div. 8	Tulsa HQ	
March 13	Tuesday	Div. 3	Ada HQ	Div. 3 - 71
March 14	Wednesday	Div. 3	Ada HQ	
March 15	Thursday	Div. 2	Antlers HQ	Div. 2 - 65
March 21	Wednesday	Div. 1	Muskogee HQ	Div. 1 - 96
March 22	Thursday	Div. 1	Muskogee HQ	
March 28	Wednesday	Div. 7	Duncan HQ	Div. 7 - 78
March 29	Thursday	Div. 7	Duncan HQ	
Total¹				610

¹ Total attendance represents the total number of ODOT employees who attended that were also Certified Oklahoma Pesticide Applicators.

Table 2. Agenda for the 2012 26th Annual Oklahoma Department of Transportation Herbicide Applicator Continuing Education Workshops.

Time	Topic	Presenter
8:45 – 9:00 am	Registration	
9:00 – 9:15 am	Opening Comments by ODOT and OSU	
9:15 – 9:45 am (30 min)	Johnsongrass Management and Control Options for ODOT Roadsides	Mr. Doug Montgomery, Extension Associate, Oklahoma State University.
	This presentation will provide current information addressing johnsongrass control. Options for control, treatment combinations, treatment rates, treatment timing, weed control spectrums, and treatment costs will be discussed.	
9:45 – 10:05 am (20 min)	Drift Control Additives for Broadcast ODOT Tank Mixes	Mr. Craig Evans, Extension Associate, Oklahoma State University.
	This presentation will identify the need and requirement by ODOT for use of drift control additives when making broadcast herbicide applications.	
10:05 – 10:25 am	Break	
10:25 – 10:55 am (30 min)	Broadleaf Weed Control Options for ODOT Roadsides	Mr. Doug Montgomery, Extension Associate, Oklahoma State University.
	This presentation will discuss the current broadleaf weed control options of today. Treatment combinations, treatment rates, treatment timing, weed control spectrums, special considerations around agronomic crops and treatment costs will be covered.	
10:55 – 11:30 am (35 min)	2011 ODOT Herbicide Survey Results and 2012 Recommendations	Mr. Craig Evans, Extension Associate, Oklahoma State University.
	This program will review results from the 2011 Herbicide Program Survey and provide new vegetation management recommendations for ODOT Vegetation Management in 2012.	
11:30 am -12:30 pm	Lunch	
12:30 – 1:30 pm (60 min)	Working Under National Pollutant Discharge Elimination System	Mr. Kevin Bloss, State Maintenance Engineer; Ms. Dawn Sullivan, Environmental Division Engineer; Ms. Michele Dolan, Storm Water Manager; and Mr. Craig Evans, Extension Associate, Oklahoma State University.
	This presentation will provide ODOT Right-of-Way and Aquatic applicators an improved understanding of the goals of the National Pollution Discharge Elimination System. Presentations will focus on the ODOT “Blue Line” concept and maintaining untreated buffer zones (restricted from herbicide application) in certain designated areas.	

Continued on next page

Table 2. (Continued from previous page) Agenda for the 2012 26th Annual Oklahoma Department of Transportation Herbicide Applicator Continuing Education Workshops.

Time	Topic	Presenter
1:30 – 2:00 pm (30 min)	Managing Roadside Weeds Growing on Back-slopes and Along Rights-of-Way Fence-lines	Doug Montgomery, Extension Associate, Oklahoma State University.
This presentation will address the vegetation management considerations and options for controlling weeds and brush growing adjacent to or on rights-of-way easements.		
2:00 – 2:20 pm	Break	
2:20 – 2:45 pm (25 min)	Aquatic Herbicide use for Brush Control Under and Around ODOT Bridges	Mr. Craig Evans, Extension Associate, Oklahoma State University.
This presentation will address the special circumstances and provisions that applicators need to be aware of prior to herbicide application in these settings.		
2:45 – 3:15 pm (30 min)	Research Update on the Development of Herbicide Treatment Combinations for Cross-over Prevention Cable-barrier Systems	Mr. Doug Montgomery, Extension Associate, Oklahoma State University.
This presentation will discuss results from current OSU RVM research on the development of long-term residual weed control treatments and special considerations for cross-over prevention cable-barrier systems.		

8.0 REFERENCES

1. Montgomery, D.P., D.L. Martin and C.C. Evans. 2009. Section 1.0 Introduction. Roadside Vegetation Management Guidelines. 4th Edition. Oklahoma State University. Dept. of Horticulture & Landscape Architecture. 258 Pages. Available on-line at: <http://www.okladot.state.ok.us/hqdiv/p-r-div/spr-rip/library/2156-2157/fhwa-ok0902.pdf>. (Verified 7 March 2012).
2. ODOT Director. 1995. Herbicide Program Policy Directive D-504-1. Montgomery, D.P., D.L. Martin and C.C. Evans. 2009. Section 4.6 ODOT Herbicide Program Policy. Pages 34-36. Roadside Vegetation Management Guidelines. 4th Edition. Oklahoma State University. Dept. of Horticulture & Landscape Architecture. 258 Pages. Available on-line at: <http://www.okladot.state.ok.us/hqdiv/p-r-div/spr-rip/library/2156-2157/fhwa-ok0902.pdf>. (Verified 20 December 2010).
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4. Martin, D.L., C.C. Evans and D.P. Montgomery. 2012. Implementation of Pesticide Applicator Certification Schools and Continuing Education Workshops. Annual Report For Federal FY2011 For ODOT SPR Item Number 2156. Dept. of Horticulture & Landscape Architecture. Oklahoma State University. 8 pages.