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- Non-burning, low-salt index
- Low leaching and volatilization
- Reduced thatch build-up

IMPORTANT: Please remember always to read and follow carefully all label directions when applying any chemical.

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With dual-action NUTRALENE™, you can count on quick grass greenup in spring plus sustained release

throughout one growing season. Unlike other controlled-release nitrogens, NUTRALENE is not solely dependent upon soil temperatures, moisture, coating or particle size for its optimum release pattern. Applied in chip or granular form, the dual release of NUTRALENE encourages outstanding growth response—even in early spring or late fall. In hot weather, its reduced leaching characteristics enable uniform, sustained feeding to continue.

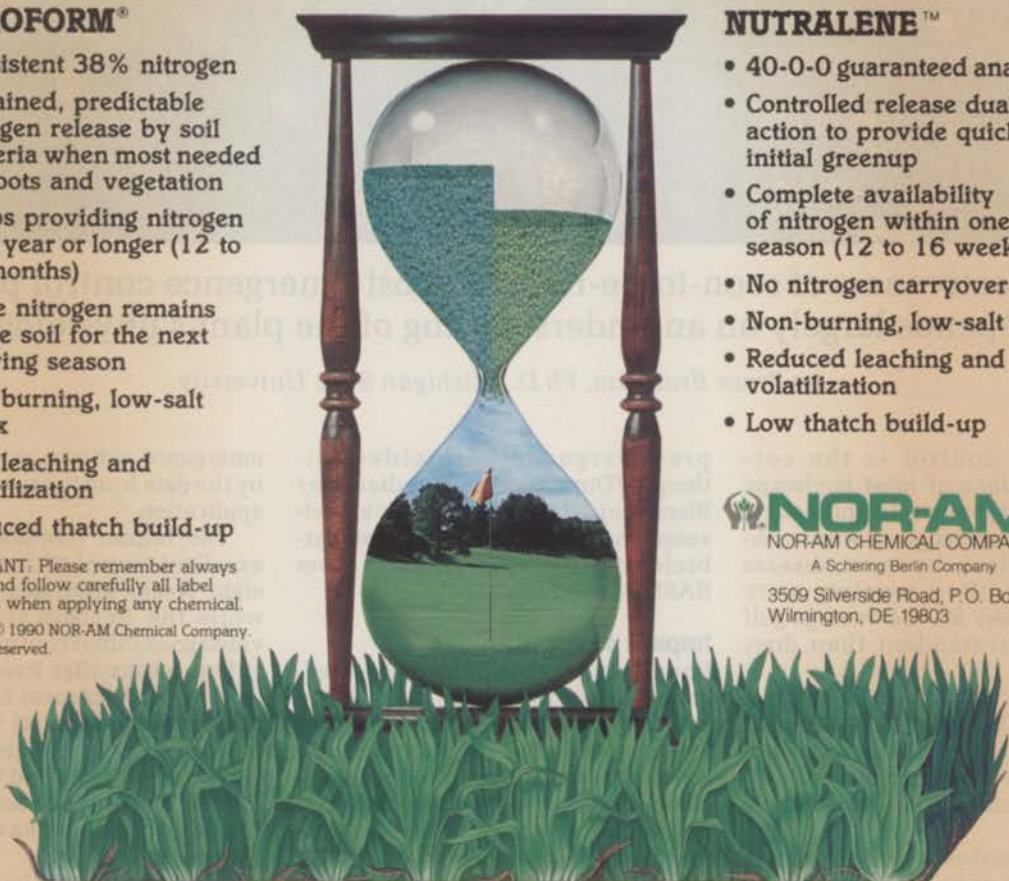
NUTRALENE™

- 40-0-0 guaranteed analysis
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- Non-burning, low-salt index
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POST-EMERGENCE WEED CONTROL IN COOL-SEASON GRASSES

The effectiveness of soon-to-be-released post-emergence control products depends largely on an understanding of the plant's physiology.

by Bruce Branham, Ph.D., Michigan State University

Weed control is the cornerstone of most landscape management. In golf course operations, knowledge of weed control is important; however, disease management often requires more time and money for the average golf course superintendent than does weed control.

Regardless of the type of turf you manage, it is important to understand weed control principles, so that the decisions you make are economical, environmentally sound and produce good results.

No new products for post-emergence weed control in cool-season grasses have been introduced in the past year, although we are still waiting on the EPA to approve three turf herbicides. Two of those products are

pre-emergence herbicides (di-thiopyr/Dimension and proflaminate/Blockade) while the other is a post-emergence grass and broadleaf herbicide (quinclorac/Impact) from BASF Ag products.

Impact of Impact

Impact is an excellent post-emergence grass herbicide with good activity on a number of broadleaf weeds as well. Data in Table 1 shows the effectiveness of this product when compared to other commonly used post-emergence grass herbicides. Impact controls crabgrass effectively at all growth stages and quickly by providing rapid initial burndown of the crabgrass. Impact also has some rapid initial burndown of the crabgrass. Impact also has some pre-

emergence activity as demonstrated by the date from the two- to three-leaf application.

The Impact treatments provided excellent control (99 to 100 percent) at eight weeks after treatment (WAT), while the Acclaim treatment provided good initial control—87 percent at four weeks after treatment, which fell to only 51 percent by eight WAT.

This loss of control with Acclaim indicates that new germination of crabgrass had occurred to reinfest the treated area which occurs because Acclaim does not have pre-emergence activity.

Evidently, Impact had enough pre-emergence activity to provide control for the rest of the growing season. However, applications of Impact applied at the normal time for a pre-

TABLE 1. Effect of Impact on post-emergence crabgrass control in Kentucky bluegrass turf.

Treatment	Rate (lbs AI/A)	% Control	
Growth Stage: 2-3 leaf Appl. date: 6-14-90			
		<u>4 WAT</u>	<u>8 WAT</u>
Impact + BAS 090	0.75 + 1qt/A	100 a	99 ab
Impact + BAS 090	1.0 + 1qt/A	100 a	100 a
Dimension	0.38	90 a-d	94 a-c
Acclaim	0.18	87 a-e	51 d-h
Control		0	0
Growth Stage: 2-3 tillers Application Date: 7-10-90			
		<u>4 WAT</u>	<u>9 WAT</u>
Impact + BAS 090	0.75 + 1qt/A	100 a	97 ab
Impact + BAS 090	1.0 + 1qt/A	100 a	100 a
Acclaim	0.18	96 a-d	77 b-d
Daconate 6	2 + 2	93 b-d	88 a-d
Dimension	0.38	72 ef	82 a-d
Control		0	0

emergence herbicide have not given season-long crabgrass control. Impact has also been shown to provide effective control of broadleaf weed species such as white clover, black medic, field bindweed, spurge, and some veronica (speedwell) species.

Currently available herbicides for post-emergence control are shown in Table 2. Impact is not expected to be available until at least 1992.

Dimension's residual

Dimension is an excellent pre-emergence herbicide. But as the data in Table 1 shows, it also has excellent early post-emergence crabgrass activity. However, Dimension's ability to control crabgrass falls off rapidly after crabgrass starts producing tillers.

Formulations of MSMA provide effective weed control if two applications spaced 10 to 14 days apart are made. This product has fallen out of favor with lawn care operators because of the necessity to make repeat applications and because the potential for turf injury is high.

Acclaim: the standard

Acclaim is still the standard to which other post-emergence crabgrass herbicides are compared.

This product will provide very effective crabgrass control when applied on crabgrass with four tillers or less. As crabgrass grows beyond four tillers, control declines. In addition, crabgrass that is drought stressed is

poor quality turf areas. In this situation, Roundup would be applied to the entire area; a seven-day waiting period should be sufficient to kill all vegetation. The area can then be re-established to a more desirable turf species. Non-selective herbicides are useful for edging around trees to prevent mower damage to the trees and for controlling weeds in the cracks of sidewalks, where it is often combined with a pre-emergence herbicide such as Surflan to provide long-term residual weed control. Non-selective herbicides can also be used to control weeds in mulched planting beds or gardens by directing the spray only on the weeds present.

Paraquat, a non-selective contact post-emergence herbicide, does not translocate. It kills only vegetation that it comes in contact with. Thorough spray coverage is required to achieve good control, but because the herbicide does not translocate, it will only kill the green vegetation of the plant. Some plant species can regenerate from the surviving roots and meristems. In addition, paraquat is moderately toxic, with an LD₅₀ of 120 mg/kg.

Roundup is translocated throughout the plant. The LD₅₀ of Roundup is 7200 mg/kg and is classified as almost non-toxic. Both Roundup and paraquat are inactivated once they contact the soil surface, so reseeding operations can begin very shortly after application.

also more difficult to control with Acclaim, although this is generally true of all herbicides.

Few non-selectives

The list of herbicides available for non-selective weed control is a short one. Non-selective herbicides are used to control all vegetation and therefore are not normally used in a turf weed control program. These are, however, useful in a variety of situations.

Non-selective herbicides such as Roundup are used to renovate

TABLE 2. Post-emergence broadleaf weed control herbicides used in turf.

2,4-D	- 2,4-dichlorophenoxy acetic acid
2,4-DP	- 2-(2,4-dichlorophenoxy) propionic acid
MCPA	- 2-methyl-4-chlorophenoxy propionic acid
MCPP	- 2-(2-methyl-4-chlorophenoxy) peopionic acid
dicamba	- 3,6-dichloro-o-anisic acid
triclopyr	- 3,5,6-trichloro-2-pyridinyloxy acetic acid
clopyralid	- 3,6-dichloro-2-pyridine carboxylic acid

Some commonly used broadleaf herbicide mixtures and the ratio of each product in the mix:

2,4-D + MCPP

2 plus 2 (1/1) Fermenta
Lescopar (1/2) Lesco
2,4-D-MCPP (2/1) Cleary's

2,4-D + dicamba

Phenaban 801 (8/1) Gordons
Eight-one selective herbicide (8/1) Lesco
Riverdale 81 selective weed killer (8/1) Riverdale
Riverdale 101 weed killer (10/1) Riverdale

2,4-D + MCPP + dicamba

Three way selective herbicide (1/0.5/0.009) Lesco
Trimec (1/0.5/0.1) Gordons
Trimec Bentgrass Formula (0.3/1/0.13) Gordons
Trexan (1.0/0.53/0.13) (Sierra)
Trexam Bent (0.3/1.0/0.13) (Sierra)

2,4-D + 2,4-DP

Chipco Weedone DPC ester (1/1) Rhone-Poulenc
Chipco Weedone DPC Amine (1/1) Rhone-Poulenc
Turf D + DP (1/1) [ester] Riverdale

2,4-D + 2,4-DP + MCPP

Weedestroy Triamine (1/1/1) Riverdale
Weedestroy Triester (80.7/1.0/0.7) Riverdale

MCPA + MCPP + 2,4-DP

Weedestroy Triamine II (1/1/1) Riverdale

MCPA + MCPP + dicamba

Trimec Encore (1.0/0.46/0.1) [amine] Gordons

2,4-D = 2,4-DP = dicamba

Super Trimec (1.0/1.0/0.25) [ester] Gordons

2,4-D = triclopyr

Turfion D (2/1) [ester] Dow
Turfion II (2.6/1) [amine] Dow

triclopyr + clopyralid

Confront (3/1) [amine] Dow

Broadleaf options

The list of currently available post-emergence broadleaf herbicide combinations has not changed appreciably from last year. In post-emergence broadleaf weed control, manufacturers tend to sell mixtures of two to three herbicides. Thus, when you are applying an herbicide for post-emergence broadleaf weed control, you are usually using at least two different herbicide products.

The only single herbicide product currently sold is MCPP, which has excellent safety on bentgrass and for that reason is used by many golf courses

TABLE 3. Post-emergence grass and sedge control herbicides.

Common Name	Trade Name	Manufacturer
MSMA	Daconate 6	Fermenta
	Drexar 530	Drexel
	MSMA 6.6	Drexel
DSMA	DSMA Liquid	Riverdale
	DSMA Liquid	Drexel
	Methar 30	W. A. Cleary
AMA	Broadside, DSMA 81%	Vertac
	Super Methar	W. A. Cleary
fenoxaprop	Acclaim	Hoechst-Roussel
bentazon (sedges only)	Basagran	BASF

Esters and amines

Ester and amine control products have different herbicidal properties which are important to know. Amines are soluble in water; esters are oil-soluble. Esters are generally better herbicides than the corresponding amine product. Esters tend to penetrate into the leaf more effectively than do amines.

The reason that esters are not used exclusively is that they are slightly volatile. This volatility can result in non-target injury to susceptible plants in the landscape. Amines, on the other hand, are non-volatile but not as good as herbicides as the esters.

Thus, you use an amine to avoid the risk of injury that comes when you use an ester. Amines should always be used in the spring when plant material is breaking dormancy, actively growing, and very susceptible to these broadleaf herbicides. Esters can and should be used in the summer when weeds are starting to harden off and are less susceptible to the herbicide, and in the fall when non-target plants are hardening off for the winter and are much less susceptible to injury from volatile broadleaf herbicides.

Effectiveness principles

The factors affecting post-emergence weed control are:

- spray deposition;
- absorption;
- translocation.

Spray deposition and retention are very important factors in getting good post-emergence weed control. Several factors are important in deter-

mining spray intention, including spray volume, surface tension of the spray solution, the angle of the leaf and the composition of the cuticle.

Higher sprayer volumes tend to generate larger spray droplets which often may not be retained on leaves. Low spray volumes produce smaller droplets which are more readily retained by plant leaves. However, production of smaller droplets increases the likelihood of the spray drifting onto non-target plants.

Spray solutions with high surface tensions, such as water, may bounce off the leaf surface at impact. Spray solutions that have very low surface tensions may run off the leaf surface and result in little spray retention. Thus, an intermediate surface tension is desirable.

Leaf movement

Nyctinasty is the folding movement of leaves with decreasing light intensity and unfolding with increasing light intensity. Nyctinasty could result in decreased weed control from early morning or late evening applications due to a decrease in spray retention by weed species showing this kind of leaf movement.

Another factor which affects spray retention is the composition of the cuticle. The cuticle refers to a layer of wax, cutin and pectin deposited on the leaf surface. The more lipophilic

TABLE 4. Difficult to Control Broadleaf Weeds

Weed Problem	Herbicide	Comments
Wild violets (viola spp.)	Turflon	Very difficult to control; usually requires follow-up application 1 to 4 weeks after first application.
	Turflon D	
	Turflon II	
	Weedone DPC Super Trimec	
Creeping speedwell (veronica filiformis)	Dacthal 75 WP	Dacthal is an effective control, as are other products listed. There are 12 other speedwell species and difficulty of control varies. These are beginning to become serious turf weed pests.
	Dacthal 6F	
	Turflon D	
	Super Trimec Weedone DPC	
Ground ivy (Glechoma hederacea)	Turflon D	Very difficult to control in summer.
	Super Trimec	
	Weedone DPC	
Spurge (supina)	Same as above plus Dacthal, PreM, Team	Can control with spring Euphorbia applications of preemergence herbicides.
Oxalis (stricta)	Same as above except Dacthal	Can control with spring Oxalis applications of preemergence herbicides.
Prostrate knotweed (Polygonum aviculare)	Same as ground ivy	Difficult to control in summer.

(i.e. waxier) the leaf surface, the more difficult it is to retain water droplets.

Caution with surfactants

Some applicators always add a wetting agent to a herbicide to improve performance. However, this practice is not advised since unexpected results often occur. For starters, most herbicide manufacturers have some kind of wetting agent in their formulation and you don't need to add one.

The label will tell you under what conditions to add a surfactant. For instance, the Acclaim label suggests adding a wetting agent when the crabgrass is under drought stress. Based on the above discussion, one can see that always adding a wetting agent to Acclaim could result in unacceptable injury to the turf by increasing the absorption of the herbicide to phytotoxic levels under non-drought conditions. Thus, always follow label recommendations. **LM**

Dr. Branham is an associate professor in the Crop and Soil Sciences Department at Michigan State University.

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PRICING FOR PROFIT II

Break out your calculators! In Part II, the author explains different methods of pricing based on targeted return on investment.

by Travis Phillips, Ph.D.,
Mississippi State University

The "targeted return on investment" approach to pricing provides a means for allocating overhead. It is based on beginning with pricing to meet a targeted return on investment (ROI).

The procedure provides an estimate that covers all costs including overhead plus the pre-selected return on equity. The procedure has been widely supported by the Association of Landscape Contractors of America (ALCA). Broader and more varied applications are presented by Tucker in his book "Pricing for Higher Profits." Although the procedure is no cure-all, it does provide a framework for using already available accounting data.

Projecting income

In order to get a specific price based on ROI, the income statement for the year ahead must first be projected. This is necessary in order to arrive at the price based on conditions when the service will be performed.

For a business engaged only in landscape construction, landscape maintenance, or retail nursery sales, departmental accounting is probably not worthwhile. However, since many horticulturally-related businesses offer all these products and services, I shall assume a three-activity firm.

The basis for projecting the income statement is the previous year's income statement, being sure to consider coming trends. If the previous year was abnormal, adjustments will be necessary.

Table 1 reflects the income statements for contracting and merchan-

dising. The contracting department (landscape construction) was chosen for detailed illustration purposes. However, the same analysis was applied to the service department (main-

tenance) and merchandising (garden center).

Begin the process of projecting the next year's income statement based on a targeted ROI by re-classifying items on the income statement for the previous year. The data in Table 2 are the classified cost items for the contracting department as shown in Table 1.

Direct and overhead costs

Two major classifications are direct costs (those costs which are a direct function of the product or service) and overhead costs (those which do not vary with the volume of sales).

The overhead category is further divided into variable and fixed costs. Variable overhead costs fall between direct and overhead fixed. These costs vary somewhat in direct relationship to the volume of sales. If possible, this group of costs should perhaps be charged directly to the product or activity.

The data in Table 3 represent re-grouped data from Table 2. Costs of goods have been shifted from the accounting format to an item of direct costs.

Consider net worth

The next item of information needed is an estimate of the owner's equity—or net worth—for the next year.

Suppose balance sheet values have been assigned to the three departments the same way as the departmental income statements. Then, each department gets its pro rata share of equity based on book value of equity.

TABLE 1

Past year's income statement, by departments

Item	Department			Total
	Contract	Service	Merchandise	
Sales	\$292,011	\$90,849	\$175,702	\$558,562
Beginning invent.	32,273	5,691	32,608	64,881
Purchases	95,841		91,142	192,674
Ending inventory	36,250	5,691	31,034	67,284
Cost of goods	91,861		92,716	190,271
Gross Profit	200,147	85,158	82,986	82,986
Expenses				
Contracting Supp.	5,757			5,757
Vehicles	14,227	14,227	1,000	29,454
Equipment rental	2,303			2,303
Salaries	109,605	51,054	46,610	202,269
Advertising	1,964		4,583	6,547
Repairs	1,341	1,340		2,681
Rent	7,174	1,000	4,026	12,200
Taxes-payroll	9,126	4,250	3,464	16,840
Taxes-property	1,332	184	743	2,259
Depreciation	10,355	7,141	357	17,853
Utilities	4,384	877	12,274	17,535
Dues & subscript.	474		475	949
Buying expenses	85		85	170
Credit card disc.	262		786	1,048
Pro. fees	5,444	158	286	5,888
Insurance	8,264	3,849	3,138	15,251
Office supplies	2,587	892	1,706	5,185
Net interest	3,051	1,052	2,012	6,115
Miscellaneous	554	191	364	1,109
Total expenses	188,289	86,215	76,909	351,413
Profit	11,289	(1,057)	6,077	16,878

TABLE 2

CONTRACTING DEPT. : income statement for past year by classified costs				
Item	Direct Cost	Overhead Costs		Total
		Variable	Fixed	
Sales				\$292,011
Beginning invent.				32,273
Purchases				95,841
Ending inventory				36,250
Cost of goods				91,864
Gross Profit				200,147
Expenses				
Contracting Supp.		\$5,757		\$5,757
Vehicles	\$11,327		\$2,900	14,227
Equipment rental	2,303			2,303
Salaries	79,605		30,000	109,605
Advertising		1,964		1,964
Repairs		1,341		1,341
Rent			7,174	7,174
Taxes-payroll	6,426		2,700	9,126
Taxes-property			1,332	1,332
Depreciation			10,355	10,355
Utilities			4,384	4,384
Dues & subscript.			474	474
Buying expenses		85		85
Credit card disc.		262		262
Professional fees		0	5,444	5,444
Insurance		4,524	3,740	8,264
Office supplies		2,587		2,587
Net interest			3,051	3,051
Miscellaneous		554		554
Total expenses	99,661	17,074	71,554	188,289
Profit				11,858

Equity then needs to be adjusted to current market value so that the selected return is comparable to the best possible earnings on this sum of money if it were invested elsewhere.

Suppose that the book value of the equity in the contracting department is \$95,000. However, some assets appreciated, some fully depreciated. A conservative estimate of market value of equity is assumed to be \$120,000.

Add previous year data

After estimating equity for the next year, data for the previous year are used along with budgeted fixed costs and targeted profit to find the sales to sustain fixed cost and profits. The historical relationship for direct costs and variable overhead, along with the projected fixed overhead and profit, generate the projected income statement.

Suppose that we select a 15 percent ROI as a goal. Profit then would be estimated at:

$$\$120,000 \times .15 = \$18,000$$

Fixed costs last year were \$71,554 and are expected to increase by 12 percent next year:

The total percent of sales figure is called the marginal ratio, or the

TABLE 3

CONTRACTING DEPARTMENT: Income statement for past year			
Item	Dollars	Percent of Sales	
Sales	292,001	100.00	
Direct costs			
Cost of goods (materials)	91,864		
Vehicles	11,327		
Equipment rental	2,303		
Labor	79,605		
Labor burden	6,426		
Total direct	191,525	65.59	
Overhead costs			
Variable			
Contracting supplies	5,757		
Advertisement	1,964		
Repairs	1,341		
Buying expense	85		
Credit card discounts	262		
Insurance	4,524		
Office supplies	2,587		
Miscellaneous	554		
Total variable	17,074	5.85	
Fixed			
Vehicle insurance	2,900		
Administrative salaries	30,000		
Salary burden	2,700		
Rent	7,174		
Property tax	1,332		
Depreciation	10,355		
Utilities	4,384		
Dues and insurance	474		
Professional fees	5,444		
Insurance	3,740		
Interest	3,051		
Total fixed	71,554	24.50	
Total overhead	88,628	30.35	
Net profit	11,858	4.06	

	\$71,554 x 1.12 = \$80,140	
Profit plus fixed costs to be covered are:	\$18,000 ROI	
	80,140 Fixed cost	
	\$98,140 Total	
From the previous year's records, we find the following:		
	DOLLARS	% of sales
Fixed cost	71,554	24.50
profit	11,861	4.06
		28.56

amount of each dollar needed to cover fixed costs and profit. If these percentages of sales reflect trend, we use the marginal ratio in the next step. If not, we use a trend line to arrive at a representative value.

We now have the basis for completing the next year's income statement (Table 5). Direct cost items are increased by the same percentage amount that sales for the next year are projected to increase above sales for the previous year. Variable overhead

TABLE 4

CONTRACTING DEPT. : Projected income statement for next year by classified costs				
Item	Dollars	Percent of Sales Exposure		
Sales	343,627	100.00		
Direct costs				
Cost of goods (mat.)	108,105			
Vehicles	13,329			
Equipment rental	2,710			
Labor	93,679			
Labor burden	7,562			
Total direct	225,385	65.59	100.00	
Overhead costs				
Variable				
Contracting supp.	6,778			
Advertisement	2,312			
Repairs	1,579			
Buying expense	100			
Credit card disc.	309			
Insurance	5,326			
Office supplies	3,046			
Miscellaneous	652			
Total variable	20,102	5.85	8.92	
Fixed				
Vehicle insurance	3,248			
Admin. salaries	33,600			
Salary burden	3,024			
Rent	8,035			
Property tax	1,492			
Depreciation	11,597			
Utilities	4,410			
Dues and subsc.	531			
Professional fees	6,097			
Insurance	4,189			
Interest	3,417			
Total fixed	80,140	23.32	35.56	
Tot. overhead	100,242	29.17	44.48	
Net profit	18,000	5.24		

Sales required to meet the targeted ROI
Budgeted Fixed Cost + Profit
Marginal Ratio
\$80,140 + \$18,000 = \$343,627
.2856

costs are expected to maintain the same proportional relationship as for the previous year. Since fixed overhead costs were projected to increase by 12 percent over the previous period, each cost item in this group is multiplied by 1.12. Profit is the goal of \$18,000.

Subtotals

Next, the subtotals of costs are first calculated as a percent of sales. Of course, direct and overhead variable costs maintain the same percentage relationship to sales as for the previous year unless adjustments were made in the marginal ratio. Overhead fixed and total overhead costs and profits as a percent of sales change

TABLE 5

SERVICE DEPT. : Income statement for past year by classified costs				
Item	Direct Cost	Overhead Costs		Total
		Variable	Fixed	
Sales				\$90,849
Purchases				5,691
Cost of gds.				5,691
Gross Profit				85,158
Expenses				
Vehicles	\$11,327		\$2,900	\$14,227
Salaries	41,054		10,000	51,054
Repairs		\$1,340		1,340
Rent			1,000	1,000
Taxes-payroll	3,400		850	4,250
Taxes-prop.			184	184
Depreciation			7,141	7,141
Utilities			877	877
Pro. fees			158	158
Insurance		1,508	2,341	3,849
Office supp.		892		892
Net interest			1,052	1,052
Misc.		191		191
Total exp.	55,781	3,913	26,503	86,215
Net profit				(1,057)

from the values of a year earlier.

A new column called percent of exposure is added. These are calculated as a percentage of total direct costs. This value means that total direct costs must be marked up nearly 44.5 percent in order to break even if about \$343,600 in sales are achieved.

An example

Let's examine the procedure used to reach a bid price which meets the goal of 15 percent ROI.

Suppose the proposed job contains \$10,000 of direct costs (materials, labor, etc.).

Overhead mark-up to direct job cost:

$\$10,000 \times 1.4448 = \text{breakeven price}$

Target price = profit + breakeven

Target price - profit = breakeven

Profit may be expressed as target price \times profit as percent of sales which in this case is 5.24 or .0524.

Substituting, we get:

Target price - .0524 target price = breakeven

.9476 target price = breakeven

Target price = breakeven/.9476

$\$14,448 / .9476 = 15,247$

Check:

$\$15,247 - \$14,448 = \$799$

$\$799 / 15,247 = 5.24\%$

Alternative: (Adjust exposure factor for profit)

$1.4448 / .9476 = 1.5247$

Illustrating with the job containing \$10,000 direct costs:

$\$10,000 \times 1.5247 = \$15,247 \text{ target price}$

TABLE 6

SERVICE DEPARTMENT: Income statement for past year			
Item	Dollars	Percent of Sales	
Sales	90,849	100.00	
Direct costs			
Cost of goods	5,691		
Vehicles	11,327		
Labor	41,054		
Labor burden	3,400		
Total direct	61,472	67.66	
Overhead costs			
Variable			
Insurance	1,508		
Office supplies	892		
Repairs	1,340		
Miscellaneous	191		
Total variable	3,931	4.33	
Fixed			
Vehicle insurance	2,900		
Admin. salaries	10,000		
Salary burden	850		
Rent	1,000		
Property tax	184		
Depreciation	7,141		
Utilities	877		
Professional fees	158		
Insurance	2,341		
Interest	1,052		
Total fixed	26,503	29.17	
Total overhead	30,434	33.55	
Net profit	(1,057)	(1.16)	

Material	\$5,000
Labor & other direct costs	5,000
	10,000
$\$10,000 \times 1.5247 = \$15,247$	

Adjustment:	
Material	$\$5,000 \times 1.20 = \$6,000$
Labor, etc.	$5,000 \times y = 9,247$
	15,247
	$\$5,000y = \$9,247$
	$y = 1.8494$
$\$15,247 - 6,000 = 9,247$	

Material markup fixed

Often it is not possible to markup some of the materials to achieve the firm's goal. When this is the case, other direct costs must be marked up more to compensate.

Suppose we have the following situation:

However, materials can only be marked up 20 percent instead of the 52.47 percent needed for targeted profit.

Therefore, labor and other direct costs must be marked up by 1.8494 instead of 1.5247 when they carry equal weights in total direct costs.

TABLE 7

SERVICE DEPT. : Projected income statement for next year by classified costs			
Item	Dollars	Percent of	
		Sales	Exposure
Sales	132,750	100.00	
Direct costs			
Cost of goods	8,316		
Vehicles	16,551		
Salaries	50,988		
Labor burden	4,968		
Total direct	98,823	66.67	100.00
Overhead costs			
Variable			
Insurance	2,204		
Office supplies	1,303		
Repairs	1,958		
Miscellaneous	279		
Total variable	5,744	4.33	6.39
Fixed			
Vehicle insurance	3,248		
Admin. salaries	11,200		
Salary burden	952		
Rent	1,120		
Property taxes	206		
Depreciation	7,998		
Utilities	982		
Pro. fees	177		
Insurance	2,622		
Interest	1,178		
Total fixed	29,683	22.36	33.05
Tot. overhead	35,427	26.69	39.44
Net profit	7,500	5.65	

		% of sales
Fixed cost	\$26,503	29.17
Profit	(1,507)	(1.16)
		28.01

The service department

The past year's income data are contained in Tables 5 and 6.

Next year's income statement was projected on basis of a 15 percent return on equity with a market value of \$50,000. Fixed costs in the department were also expected to increase by 12 percent.

Since profits in the previous year were negative, the negative value is used in calculating the marginal ratio:

Sales for the next year were projected as $\$132,750 = (\$29,683 + 7,500) / .2801$. The next year's income statement is contained in Table 7.

Another strategy often used in pricing results when one item of direct costs greatly dominates, or when a major cost item such as labor maintains a fixed relationship to the other direct costs. When this is the case, this key factor may be used for bidding or pricing rather than using all direct costs.

The 1.4779 is multiplied by the ap-

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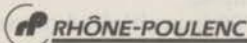
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TABLE 8

MERCHANDISING DEPT. : Income statement for past year by classified costs				
Item	Direct Cost	Overhead Costs		Total
		Variable	Fixed	
Sales				\$175,702
Begin. inventory				32,608
Purchases				91,142
Ending inventory				31,034
Cost of goods				92,716
Gross Profit				82,986
Expenses				
Vehicles	\$800		\$200	\$1,000
Salaries	31,610		10,000	41,610
Advertising		\$4,583		4,583
Rent			4,026	4,026
Taxes-payroll	2,614		850	3,464
Taxes-property			743	743
Depreciation			357	357
Utilities			12,274	12,274
Dues & subsc.			475	475
Buying expenses		85		85
Credit card disc.		786		786
Professional fees			286	286
Insurance		1,509	1,629	3,138
Office supplies		1,706		1,706
Net interest			2,012	2,012
Miscellaneous			364	364
Total	35,024	9,033	32,852	76,909
Profit				6,077

For example, we shall use labor:

Sales		\$132,750
Direct costs	\$8,316	
Cost of goods	16,551	
Vehicles	59,988	
Labor	4,968	
Labor burden	89,823	
Total direct	5,744	
Overhead-variable	29,683	
Overhead-fixed		\$125,250
Total costs		\$7,500

For example, we shall use labor:

$$\frac{\text{Total Direct + Overhead + Profit}}{\text{Total Direct}} = 1.4779$$

appropriate total direct cost for the price of the job. However, only labor (labor cost) may be used:

$$\frac{\text{Total direct + overhead + profit}}{\text{Labor}} = 2.2129$$

Thus, the markup is 2.2129 times direct labor instead of using total and direct cost.

Merchandising department

Tables 8 and 9 contain the data for the previous year for the merchandising department. Profit for the year ahead was projected as 15 percent on an equity with a current market value of \$80,000. Fixed costs were projected to increase by 12 percent.

In order to achieve the \$12,000 desired ROI, sales were projected at

TABLE 9

MERCHANDISING DEPARTMENT: Income statement for past year			
Item	Dollars	Percent of Sales	
Sales	175,702	100.00	
Direct costs			
Cost of goods (purchases)	92,716		
Vehicles	800		
Labor	31,610		
Labor burden	2,614		
Total direct	127,740	72.70	
Overhead costs			
Variable			
Advertisement	4,583		
Buying expense	85		
Credit card discounts	786		
Insurance	1,509		
Office supplies	1,706		
Miscellaneous	364		
Total variable	9,033	5.14	
Fixed			
Vehicle insurance	200		
Administrative salaries	10,000		
Salary burden	850		
Rent	4,026		
Property tax	743		
Depreciation	357		
Utilities	12,274		
Dues and insurance	475		
Professional fees	286		
Insurance	1,629		
Interest	2,012		
Total fixed	32,852	18.70	
Total overhead	41,885	23.84	
Net profit	6,077	3.46	

For example:

Sales		\$220,189
Direct costs		
Purchase	\$116,187	
Vehicles	1,002	
Labor	39,612	
Labor burden	3,276	
Total direct costs	160,077	
Overhead-variable	11,318	
Overhead-fixed	36,794	
Total costs		\$208,189
Profit		\$12,000

Using the total of direct cost:

$$\frac{\text{Total Direct + Overhead + Profit}}{\text{Total Direct}} = 1.3755$$

\$220,189 (Table 10).

This required a factor of 1.3006 markup on direct costs to breakeven or 1.3755 to cover all costs and profit. Rather than pricing merchandising at retail as a function of direct cost, a more common policy is to mark it up as a function of merchandise (purchase) cost.

For example:

The 1.3755 is multiplied times the appropriate total direct cost in order

TABLE 10

MERCHANDISING DEPT. : Projected income statement for next year by classified costs			
Item	Dollars	Percent of Sales Exposure	
		Sales	Exposure
Sales	220,189	100.00	
Direct costs			
Cost of goods (purch.)	116,187		
Vehicles	1,002		
Labor	39,612		
Labor burden	3,276		
Total direct	160,077	72.70	100.00
Overhead costs			
Variable			
Advertisement	5,742		
Buying expense	106		
Credit card disc.	985		
Insurance	1,891		
Office supplies	2,138		
Miscellaneous	456		
Total variable	11,318	7.07	7.07
Fixed			
Vehicle insurance	224		
Admin. salaries	11,200		
Salary burden	952		
Rent	4,509		
Property tax	832		
Depreciation	400		
Utilities	13,747		
Dues and insur.	532		
Pro. fees	320		
Insurance	1,825		
Interest	2,253		
Total fixed	36,794	22.99	22.99
Tot. overhead	48,112	30.06	30.06
Net profit	12,000		

to ascertain the selling price. However, if only the merchandise (purchase price—cost of goods) cost is used:

$$\frac{\text{Total direct + overhead + profit}}{\text{merchandise (purchases)}} = 1.8951$$

Thus, the markup is 1.8951 times merchandise cost instead of total direct cost. However, usually at retail, the selling price is expressed in terms of markup from the selling price instead of the purchase price. The factor of 1.8951 to be multiplied by the purchase price may be converted to selling price basis (Table 11).

For example, an item which has a purchase price of \$1, with the above targeted markup would be priced by $\$1.0000 \times 1.8951 = \1.90 or $\$1.0000 / .5277 = \1.90 .

The asking price

Now that we have looked at alternative applications of arriving at the price, what price do we actually ask? Let's look at merchandise first because it is less complicated.

The targeted price is designed as the average realized by the department. Since some merchandise will