

1995

ANNUAL REPORT



**OFFICE OF WATER PROGRAMS
CALIFORNIA STATE UNIVERSITY,
SACRAMENTO**

1995 ANNUAL REPORT

for

**OPERATION OF WASTEWATER TREATMENT PLANTS
ADVANCED WASTE TREATMENT
INDUSTRIAL WASTE TREATMENT
TREATMENT OF METAL WASTESTREAMS
PRETREATMENT FACILITY INSPECTION
OPERATION & MAINTENANCE OF WASTEWATER COLLECTION SYSTEMS
WATER TREATMENT PLANT OPERATION
SMALL WATER SYSTEM OPERATION & MAINTENANCE
WATER DISTRIBUTION SYSTEM OPERATION & MAINTENANCE**



| Summary | 1992 | 1993 | 1994 | 1995 | Total 1972 to Date |
|--------------------|-------------|-------------|-------------|-------------|---------------------------|
| Manuals Sold | 56,370 | 52,632 | 54,364 | 52,883 | 543,583 |
| Enrollments | 13,950 | 13,685 | 13,639 | 13,788 | 130,164 |
| Completions | 8,357 | 9,478 | 8,651 | 9,034 | 88,526 |
| Students Dropped | 1,723 | 2,170 | 3,563 | 2,404 | 20,216 |
| University Credits | 321 | 246 | 177 | 136 | 5,611 |
| Tests Graded* | 68,471 | 74,970 | 65,780 | 71,484 | 412,935 |

*Tabulation of tests graded did not begin until 1989.



Administered and Monitored by

**CSUS FOUNDATION
and
DEPARTMENT OF CIVIL ENGINEERING
KENNETH D. KERRI, PROGRAM DIRECTOR**

for the

U. S. ENVIRONMENTAL PROTECTION AGENCY

January 1996

ANNUAL REPORT
for
OPERATION OF WASTEWATER TREATMENT PLANTS
ADVANCED WASTE TREATMENT
INDUSTRIAL WASTE TREATMENT
TREATMENT OF METAL WASTESTREAMS
OPERATION & MAINTENANCE OF WASTEWATER COLLECTION SYSTEMS
WATER TREATMENT PLANT OPERATION
SMALL WATER SYSTEM OPERATION & MAINTENANCE
WATER DISTRIBUTION SYSTEM OPERATION & MAINTENANCE



The purpose of this report is to provide a summary of the accomplishments of each program on an annual basis since its inception. All programs are operating on a financially self-sustaining basis.



OPERATION OF WASTEWATER TREATMENT PLANTS, (First Edition)

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>CE-12</u> |
|--------------------|----------------------------|-------------------------------------|-----------------------|---------------------------------|---------------------|
| 1972 | 8,063 | 571 | 128 | 82 | 614 |
| 1973 | 5,747 | 1,569 | 1,490 | 51 | 389 |
| 1974 | 6,523 | 1,144 | 1,717 | 40 | 289 |
| 1975 | 4,543 | 804 | 655 | 55 | 164 |
| 1976 | 3,992 | 676 | 1,052 | 39 | 119 |
| 1977 | 3,280 | 570 | 248 | 70 | 166 |
| 1978 | 3,232 | 789 | 310 | 72 | 141 |
| 1979 | 3,180 | 881 | 191 | 82 | 103 |
| 1980 | 2,444 | 745 | 431 | 63 | 109 |
| 1981 | <u>1,093</u> | <u>1,028</u> | <u>239</u> | <u>81</u> | <u>55</u> |
| Total | 41,100 | 8,777 | 4,124* | 68 | 2,149 |

Colleges and Universities: 301
Foreign Countries: 32

*From 1979 on only persons who actually started a course and did not finish were counted as drops.

OPERATION OF WASTEWATER TREATMENT PLANTS

VOLUME I - Second, Third and Fourth Editions

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-12A</u> |
|--------------------|----------------------------|-------------------------------------|-----------------------|---------------------------------|---------------------------------|
| 1980 | 1,190 | | | | 19 |
| 1981 | 3,960 | 411 | 8 | 98 | 127 |
| 1982 | 3,976 | 731 | 181 | 80 | 98 |
| 1983 | 2,963 | 655 | 184 | 78 | 76 |
| 1984 | 3,347 | 1,087 | 171 | 86 | 66 |
| 1985 | 4,064 | 862 | 267 | 76 | 59 |
| 1986 | 4,534 | 896 | 155 | 85 | 82 |
| 1987 | 5,360 | 828 | 262 | 76 | 47 |
| 1988 | 7,591 | 1,172 | 326 | 78 | 37 |
| 1989 | 8,641 | 1,334 | 142 | 90 | 113 |
| 1990 | 9,338 | 1,561 | 361 | 81 | 43 |
| 1991 | 10,557 | 1,891 | 430 | 82 | 52 |
| 1992 | 11,701 | 2,091 | 596 | 78 | 66 |
| 1993 | 11,106 | 2,322 | 834 | 74 | 42 |
| 1994 | 10,298 | 1,988 | 1,254 | 61 | 42 |
| <u>1995</u> | <u>9,862</u> | <u>2,129</u> | <u>799</u> | <u>73</u> | <u>30</u> |
| Total | 108,488 | 19,958 | 5,970 | 77 | 999 |

VOLUME II - Second, Third and Fourth Editions

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-12B</u> |
|--------------------|----------------------------|-------------------------------------|-----------------------|---------------------------------|---------------------------------|
| 1980 | 715 | | | | 4 |
| 1981 | 3,023 | 182 | | | 47 |
| 1982 | 3,575 | 309 | 18 | 94 | 45 |
| 1983 | 2,438 | 381 | 33 | 92 | 39 |
| 1984 | 2,219 | 472 | 35 | 93 | 29 |
| 1985 | 2,827 | 454 | 91 | 83 | 25 |
| 1986 | 3,161 | 438 | 21 | 95 | 43 |
| 1987 | 4,134 | 604 | 72 | 89 | 20 |
| 1988 | 6,386 | 934 | 49 | 95 | 22 |
| 1989 | 6,038 | 883 | 51 | 95 | 27 |
| 1990 | 6,645 | 761 | 49 | 97 | 27 |
| 1991 | 7,478 | 1,249 | 89 | 93 | 47 |
| 1992 | 8,324 | 1,155 | 93 | 93 | 38 |
| 1993 | 7,769 | 1,133 | 138 | 89 | 35 |
| 1994 | 7,725 | 1,159 | 231 | 83 | 17 |
| <u>1995</u> | <u>6,875</u> | <u>989</u> | <u>148</u> | <u>87</u> | <u>13</u> |
| Total | 79,332 | 10,101 | 1,118 | 90 | 478 |

VOLUME III

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-12C</u> |
|--------------|---------------------|------------------------------|----------------|--------------------------|--------------------------|
| 1980 | 428 | | | | 1 |
| 1981 | 2,422 | 140 | | | 58 |
| 1982 | 1,898 | 213 | 35 | 86 | 25 |
| 1983 | 1,437 | 217 | 33 | 87 | 30 |
| 1984 | 1,537 | 430 | 24 | 95 | 12 |
| 1985 | 1,525 | 310 | 45 | 87 | 17 |
| 1986 | 2,266 | 291 | 30 | 91 | 29 |
| 1987 | 1,762 | 322 | 27 | 92 | 15 |
| 1988 | <u>7</u> | <u>280</u> | <u>19</u> | <u>94</u> | <u>4</u> |
| Total | 13,282 | 2,203 | 213 | 91 | 191 |

Colleges and Universities: 392

Foreign Countries: 43

In 1987 Volume III was revised and split into two manuals, *ADVANCED WASTE TREATMENT* and *INDUSTRIAL WASTE TREATMENT*.

ADVANCED WASTE TREATMENT First, Second and Third Editions

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-12E</u> |
|--------------|---------------------|------------------------------|----------------|--------------------------|--------------------------|
| 1987 | 960 | 7 | 0 | 100 | 0 |
| 1988 | 3,199 | 340 | 1 | 100 | 7 |
| 1989 | 3,291 | 349 | 12 | 97 | 12 |
| 1990 | 3,583 | 531 | 32 | 94 | 20 |
| 1991 | 3,298 | 552 | 58 | 91 | 21 |
| 1992 | 3,912 | 647 | 72 | 90 | 21 |
| 1993 | 3,719 | 642 | 87 | 88 | 24 |
| 1994 | 3,642 | 559 | 170 | 77 | 12 |
| 1995 | <u>3,381</u> | <u>549</u> | <u>108</u> | <u>84</u> | <u>7</u> |
| Total | 28,985 | 4,176 | 538 | 89 | 124 |

Colleges and Universities: 140

Foreign Countries: 28

INDUSTRIAL WASTE TREATMENT

First Edition*

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-12EF</u> |
|--------------|---------------------|------------------------------|----------------|--------------------------|---------------------------|
| 1987 | 941 | 3 | 0 | 100 | 0 |
| 1988 | 2,273 | 132 | 1 | 100 | 5 |
| 1989 | 2,502 | 146 | 14 | 91 | 6 |
| 1990 | 3,473 | 268 | 30 | 90 | 21 |
| 1991 | 3,119 | 349 | 39 | 90 | 26 |
| 1992 | 3,480 | 347 | 56 | 86 | 20 |
| 1993 | 3,039 | 402 | 70 | 85 | 22 |
| 1994 | <u>2,237</u> | <u>313</u> | <u>116</u> | <u>88</u> | <u>7</u> |
| Total | 21,064 | 1,960 | 326 | 91 | 107 |

*In 1994 *INDUSTRIAL WASTE TREATMENT* was revised and split; Volume I was available in Fall 1994; Volume II was available Spring 1995.

VOLUME I - Second Edition

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-21A</u> |
|--------------|---------------------|------------------------------|----------------|--------------------------|--------------------------|
| 1994 | 1,105 | 17 | 0 | 100 | 0 |
| 1995 | <u>3,417</u> | <u>234</u> | <u>53</u> | <u>82</u> | <u>2</u> |
| Total | 4,522 | 251 | 53 | 83 | 2 |

VOLUME II - First Edition

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-21A</u> |
|-------------|---------------------|------------------------------|----------------|--------------------------|--------------------------|
| 1995 | 1,538 | 72 | 0 | 100 | 0 |

Colleges and Universities: 126
 Foreign Countries: 31

TREATMENT OF METAL WASTESTREAMS
First and Second Editions

(Formerly *TREATMENT OF WASTEWATER FROM ELECTROPLATING, METAL FINISHING AND PRINTED CIRCUIT BOARD MANUFACTURING*)

| Year | Manuals Sold | Successful Completion | Dropped | Percent Completed | Registered CE-12D |
|--------------|---------------------|------------------------------|----------------|--------------------------|--------------------------|
| 1986 | 1,281 | 98 | 0 | 100 | 18 |
| 1987 | 1,678 | 229 | 5 | 98 | 25 |
| 1988 | 2,077 | 283 | 4 | 99 | 13 |
| 1989 | 2,524 | 344 | 5 | 99 | 7 |
| 1990 | 2,798 | 332 | 27 | 92 | 22 |
| 1991 | 2,716 | 332 | 21 | 94 | 13 |
| 1992 | 2,688 | 393 | 24 | 94 | 25 |
| 1993 | 2,760 | 518 | 19 | 96 | 12 |
| 1994 | 3,003 | 495 | 61 | 89 | 13 |
| 1995 | <u>2,120</u> | <u>550</u> | <u>28</u> | <u>95</u> | <u>5</u> |
| Total | 23,645 | 3,575 | 194 | 95 | 153 |

Colleges and Universities: 97
Foreign Countries: 34

PRETREATMENT FACILITY INSPECTION
First and Second Editions

| Year | Manuals Sold | Successful Completion | Dropped | Percent Completed | Registered CE-12G |
|--------------|---------------------|------------------------------|----------------|--------------------------|--------------------------|
| 1988 | 1,355 | 48 | 0 | 100 | 0 |
| 1989 | 1,135 | 310 | 8 | 97 | 6 |
| 1990 | 1,216 | 380 | 76 | 83 | 11 |
| 1991 | 1,027 | 237 | 56 | 81 | 10 |
| 1992 | 1,346 | 373 | 48 | 89 | 19 |
| 1993 | 1,043 | 292 | 57 | 84 | 13 |
| 1994 | 889 | 268 | 90 | 75 | 6 |
| 1995 | <u>888</u> | <u>234</u> | <u>59</u> | <u>80</u> | <u>3</u> |
| Total | 8,899 | 2,138 | 394 | 84 | 68 |

Colleges and Universities: 44
Foreign Countries: 23

OPERATION & MAINTENANCE OF WASTEWATER COLLECTION SYSTEMS
First Edition

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-11</u> |
|--------------|---------------------|------------------------------|----------------|--------------------------|-------------------------|
| 1976 | 966 | 3 | | | 7 |
| 1977 | 1,093 | 281 | 8 | 97 | 77 |
| 1978 | 759 | 246 | 70 | 78 | 46 |
| 1979 | 633 | 179 | 83 | 68 | 34 |
| 1980 | 645 | 226 | 53 | 81 | 37 |
| 1981 | 680 | 218 | 37 | 85 | 46 |
| <u>1982</u> | <u>601</u> | <u>265</u> | <u>42</u> | <u>86</u> | <u>23</u> |
| Total | 5,377 | 1,418 | 293 | 83 | 263 |

Second Edition*

| | | | | | |
|--------------|--------------|------------|------------|-----------|-----------|
| 1983 | 583 | 25 | 0 | 100 | 3 |
| 1984 | 751 | 97 | 10 | 91 | 10 |
| 1985 | 1,103 | 147 | 16 | 90 | 13 |
| 1986 | 1,237 | 157 | 31 | 84 | 13 |
| 1987 | 1,108 | 329 | 90 | 79 | 9 |
| 1988 | <u>0</u> | <u>121</u> | <u>33</u> | <u>79</u> | <u>4</u> |
| Total | 4,782 | 876 | 180 | 83 | 52 |

*In 1987 the Second Edition was revised and split into two Volumes.

VOLUME I - Third and Fourth Editions

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-11A</u> |
|--------------|---------------------|------------------------------|----------------|--------------------------|--------------------------|
| 1987 | 546 | 2 | 0 | 100 | 0 |
| 1988 | 1,803 | 189 | 0 | 100 | 3 |
| 1989 | 2,350 | 177 | 27 | 87 | 3 |
| 1990 | 3,100 | 367 | 47 | 89 | 15 |
| 1991 | 3,192 | 490 | 58 | 89 | 6 |
| 1992 | 3,516 | 428 | 96 | 82 | 18 |
| 1993 | 3,177 | 551 | 109 | 83 | 14 |
| 1994 | 3,137 | 520 | 183 | 74 | 7 |
| 1995 | <u>3,154</u> | <u>566</u> | <u>113</u> | <u>83</u> | <u>8</u> |
| Total | 23,975 | 3,290 | 633 | 84 | 74 |

VOLUME II - Third and Fourth Editions

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-11B</u> |
|--------------|---------------------|------------------------------|----------------|--------------------------|--------------------------|
| 1987 | 338 | 0 | 0 | 0 | 0 |
| 1988 | 1,413 | 65 | 0 | 100 | 1 |
| 1989 | 1,545 | 99 | 5 | 95 | 3 |
| 1990 | 2,330 | 171 | 3 | 98 | 9 |
| 1991 | 2,401 | 265 | 9 | 97 | 9 |
| 1992 | 2,660 | 254 | 10 | 96 | 12 |
| 1993 | 2,366 | 319 | 16 | 95 | 8 |
| 1994 | 2,054 | 270 | 47 | 85 | 6 |
| 1995 | <u>2,199</u> | <u>304</u> | <u>33</u> | <u>90</u> | <u>5</u> |
| Total | 17,306 | 1,747 | 123 | 93 | 53 |

Colleges and Universities: 136
Foreign Countries: 34

WATER TREATMENT PLANT OPERATION

VOLUME I - First, Second & Third Editions

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-18A</u> |
|--------------------|----------------------------|-------------------------------------|-----------------------|---------------------------------|---------------------------------|
| 1983 | 1,469 | 31 | 0 | 100 | 10 |
| 1984 | 2,068 | 327 | 27 | 92 | 116 |
| 1985 | 2,344 | 355 | 82 | 81 | 69 |
| 1986 | 2,391 | 415 | 108 | 79 | 35 |
| 1987 | 2,972 | 422 | 143 | 75 | 29 |
| 1988 | 3,898 | 554 | 159 | 78 | 20 |
| 1989 | 5,044 | 717 | 160 | 82 | 22 |
| 1990 | 5,554 | 793 | 242 | 77 | 24 |
| 1991 | 5,507 | 936 | 317 | 75 | 22 |
| 1992 | 6,626 | 1,212 | 407 | 75 | 48 |
| 1993 | 6,675 | 1,444 | 489 | 75 | 30 |
| 1994 | 7,320 | 1,180 | 774 | 60 | 26 |
| 1995 | <u>6,767</u> | <u>1,458</u> | <u>577</u> | <u>72</u> | <u>24</u> |
| Total | 58,635 | 9,844 | 3,485 | 74 | 475 |

VOLUME II - First and Second Editions

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-18B</u> |
|--------------------|----------------------------|-------------------------------------|-----------------------|---------------------------------|---------------------------------|
| 1983 | 183 | 0 | 0 | | 1 |
| 1984 | 1,331 | 140 | 0 | 100 | 9 |
| 1985 | 1,572 | 133 | 7 | 95 | 19 |
| 1986 | 1,467 | 163 | 21 | 89 | 6 |
| 1987 | 1,916 | 211 | 13 | 94 | 12 |
| 1988 | 2,301 | 266 | 23 | 92 | 9 |
| 1989 | 3,047 | 365 | 22 | 94 | 12 |
| 1990 | 3,298 | 500 | 29 | 95 | 10 |
| 1991 | 3,752 | 541 | 52 | 91 | 20 |
| 1992 | 4,114 | 651 | 66 | 91 | 23 |
| 1993 | 3,985 | 717 | 77 | 90 | 18 |
| 1994 | 4,378 | 743 | 156 | 83 | 16 |
| 1995 | <u>4,326</u> | <u>635</u> | <u>116</u> | <u>85</u> | <u>15</u> |
| Total | 35,670 | 5,065 | 582 | 90 | 170 |

Colleges and Universities: 302
 Foreign Countries: 40

WATER SUPPLY SYSTEM OPERATION

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-17</u> |
|--------------|---------------------|------------------------------|----------------|--------------------------|-------------------------|
| 1983 | 537 | 0 | 0 | | 3 |
| 1984 | 1526 | 140 | 0 | 100 | 13 |
| 1985 | 1957 | 146 | 22 | 87 | 39 |
| 1986 | 1814 | 148 | 50 | 75 | 5 |
| 1987 | <u>399</u> | <u>290</u> | <u>71</u> | <u>80</u> | <u>10</u> |
| Total | 6,233 | 724 | 143 | 84 | 70 |

Colleges and Universities: 59
Foreign Countries: 9

*In 1987 *WATER SUPPLY SYSTEM OPERATION* was revised into a Second Edition and split into two manuals, *SMALL WATER SYSTEM OPERATION & MAINTENANCE* and *WATER DISTRIBUTION SYSTEM OPERATION & MAINTENANCE*.

SMALL WATER SYSTEM OPERATION & MAINTENANCE
Second and Third Editions

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-19</u> |
|--------------|---------------------|------------------------------|----------------|--------------------------|-------------------------|
| 1987 | 2,175 | 36 | 0 | 100 | 2 |
| 1988 | 2,115 | 177 | 9 | 95 | 5 |
| 1989 | 2,926 | 146 | 44 | 77 | 3 |
| 1990 | 3,090 | 266 | 62 | 81 | 9 |
| 1991 | 2,841 | 330 | 121 | 73 | 7 |
| 1992 | 3,641 | 314 | 119 | 73 | 14 |
| 1993 | 2,937 | 478 | 128 | 79 | 15 |
| 1994 | 3,766 | 497 | 251 | 66 | 16 |
| 1995 | <u>3,189</u> | <u>459</u> | <u>144</u> | <u>76</u> | <u>10</u> |
| Total | 26,680 | 2,703 | 878 | 75 | 81 |

Colleges and Universities: 116
Foreign Countries: 35

WATER DISTRIBUTION SYSTEM OPERATION & MAINTENANCE
Second and Third Editions

| <u>Year</u> | <u>Manuals Sold</u> | <u>Successful Completion</u> | <u>Dropped</u> | <u>Percent Completed</u> | <u>Registered CE-20</u> |
|--------------------|----------------------------|-------------------------------------|-----------------------|---------------------------------|--------------------------------|
| 1987 | 2,864 | 42 | 0 | 100 | 0 |
| 1988 | 2,812 | 226 | 12 | 95 | 9 |
| 1989 | 2,933 | 197 | 38 | 84 | 13 |
| 1990 | 4,332 | 362 | 56 | 87 | 11 |
| 1991 | 3,961 | 589 | 100 | 85 | 16 |
| 1992 | 4,362 | 492 | 136 | 78 | 17 |
| 1993 | 4,056 | 660 | 146 | 82 | 13 |
| 1994 | 4,810 | 641 | 230 | 74 | 9 |
| 1995 | <u>4,918</u> | <u>715</u> | <u>178</u> | <u>80</u> | <u>14</u> |
| Total | 35,048 | 3,924 | 896 | 81 | 102 |

Colleges and Universities: 128
 Foreign Countries: 37

