United States
Environmental Protection
Agency

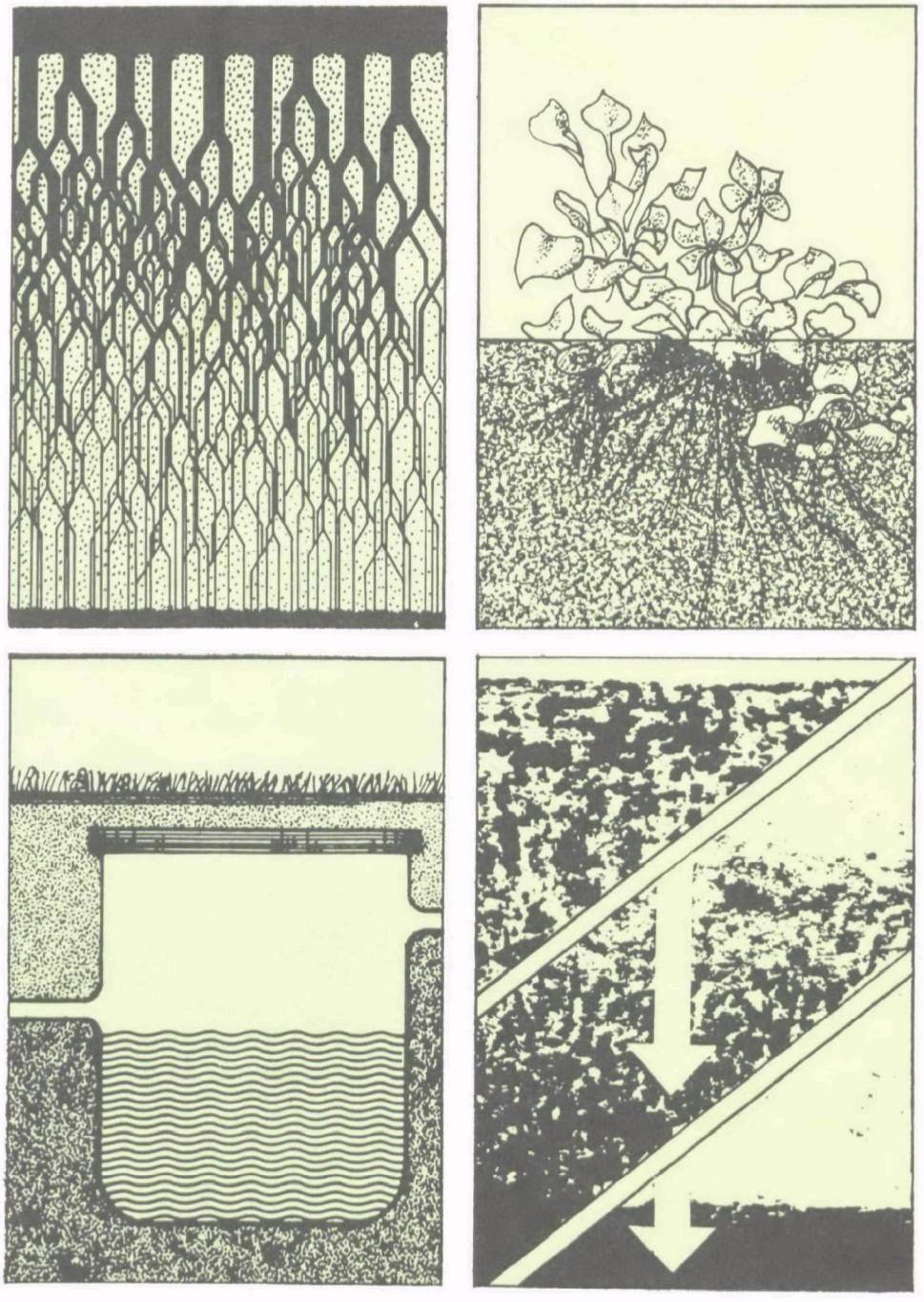
Office of Water
Program Operations (WH-547)
Washington DC 20460

September
1984

EPA

Innovative and Alternative Technology Projects:

A Progress Report



SEPTEMBER 1984

INNOVATIVE AND ALTERNATIVE TECHNOLOGY PROJECTS: A PROGRESS REPORT

U. S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF WATER
WASHINGTON, D. C. 20460

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NOTE

The Office of Water Program Operations issues this annual summary to provide interested parties with an overview of progress in the implementation of innovative and alternative technologies under provisions of the Clean Water Act. The report is based on information from grant awards through March for the year of issue as provided by state agencies or EPA regional offices. State, EPA Region, and EPA headquarters staff have worked diligently to make the listings as accurate and helpful as possible. Richard E. Thomas, National I/A Coordinator, who is listed in Table 5, should be contacted to report errors, omissions, or suggestions to improve the usefulness of the report.

OVERVIEW

The Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500) authorized a major Federal funding program to abate water pollution from municipal treatment facilities. The language of P.L. 92-500 did not define an innovative and alternative (I/A) program, but it did send a clear message that use of the Federal grant funds authorized by this law should encourage implementation of alternative technologies. In reviewing progress toward use of alternative technologies in 1977, Congress chose specifically to define and authorize an I/A program in the Clean Water Act (CWA). The language in this law spelled out and strengthened the Congressional mandate that federal funds should encourage use of innovations and alternatives which would conserve and reuse resources.

Specific provisions of the CWA of 1977 established a three-year test program that included a financial incentive, a mandatory reserve fund, and the authority to federally fund correction of failures. The financial incentive came in the form of a ten percent bonus grant for projects which met certain criteria. The Federal criteria established two classes of qualifying projects. Alternative technology projects were eligible by definition and were named in the Environmental Protection Agency (EPA) regulations detailing the provisions of the I/A program. Individual projects or parts of projects could gain eligibility by being designated as innovative on a case-by-case basis.

Overall, the I/A reserve for the three-year test program anticipated increasing participation with time. The reserve was two percent for the first two years and three percent in the third year. The fact that the reserve is used to fund the ten percent difference between a 75 percent and 85 percent grant means that each percent of set-aside controls about ten percent of a state's total grant funds. The authority to use Federal funds to correct failures was intended to compensate for the requirement that the applicant must take a risk to participate in a program intended to encourage use of relatively unproven or unfamiliar technologies.

The 1981 amendments to the CWA continued and strengthened the statutory mandate to encourage use of innovative and alternative technologies. The I/A provisions of the CWA of 1977 were extended through fiscal year 1985 with changes that increased the financial incentives and added a provision to fund a new category of projects designated as field testing. The bonus

grant for I/A projects will become a mandatory 20 percent bonus of eligible and fundable I or A costs in fiscal year 1985. Some states have exercised an interim option so that the Federal share for their grant applicants is 55 percent for conventional technologies and 75 percent for I/A technologies. The mandatory set-aside was increased to four percent which means that it has been increased from two percent in the first year of the program to four percent or more in the fourth year of the program. Recognizing a need for flexibility, the Congress provided states the option to increase the set-aside up to a seven and one-half percent maximum. The field testing program provides a mechanism to verify the basis of design for promising advances in treatment technology to reduce the risk of failure before funding construction of many similar projects through the I/A program.

In summary, there has been a consistent statutory trend from 1972 to the present to direct federal funds to the implementation of innovations which are promising but unproven for the proposed use and comparatively unknown alternatives for wastewater treatment. The increasingly stronger mandates of Congress have had substantial effects in a comparatively short time. Response to the I/A program at the local and state level has resulted in over 2,900 grant awards for I/A technologies from inception of the program on October 1, 1978 through March of 1984. There is every indication that the national response to the program will encourage the Congress to continue strong legislative support when it considers further authorization of the program.

PROFESSIONAL RECOGNITION

Professional engineering societies such as the American Consulting Engineers Council (ACEC), the National Society of Professional Engineers (NSPE), and the Water Pollution Control Federation (WPCF) continue to recognize I/A projects for their engineering excellence. Even before the establishment of the I/A program, projects emphasizing conservation and reuse gained national recognition. For example, the Muskegon County, Michigan project was selected as one of the ten outstanding engineering achievements of 1972 in the United States by NSPE.

Many projects under the auspices of the I/A program have been nominated for national recognition. Seven I/A projects were chosen as finalists by the officers, member firms, and award committees of the ACEC in their 1983 Engineering Excellence Awards Program. Award-winning projects represented a cross section of I/A technologies. State Award Finalists included Indianapolis, Indiana (pure oxygen/single stage nitrification); Hagerstown, Maryland (dual aerobic/anaerobic digestion); Hastings, Nebraska (land application of liquid sludge); Rochester, Minnesota (Pho-strip/digestor gas utilization); Passaic Valley, New Jersey (computerized financial management system); and Clayton Co., Georgia (silviculture). The Glen Cove coincineration system project was selected as the ACEC grand award winner and the NSPE National Achievement Award Winner.

PROGRAM INFORMATION

The I/A program is now in its third year as an integral part of the overall construction grants program after a three-year test period. Most parts of the program are reaching stabilty while the field test and 100 percent modification/replacement grant activities are in a state of transition. The basic provisions of the 1977 law are quite stable as evidenced by the award of over 2,900 grants to design and/or construct over 1,400 facilities with innovative or alternative components. Over $320 million of set-aside funds have been used to provide the ten percent bonus for eligible components of the projects with a total construction cost exceeding $3.8 billion. The effect of increasing the mandatory set-aside to four percent should cause these figures to increase even more rapidly in 1984 and into 1985. Program staff are processing the first few applications under the provision to provide 100 percent modification and replacement (M/R) funding to correct failures of innovative or alternative components. With over 200 of the I/A-funded facilities now in operation, it is reassuring that we have very few requests for 100 percent M/R funding. The new field test program established by the 1981 law is in the early stages of development. There is one field test project already completed, several in progress, and many other projects are under consideration.

Recognizing the value of specific project information, the Office of Water Program Operations has compiled several tabulations to provide summary information on the I/A program. Table 1 lists facilities which include components that meet the criteria to receive federal grant funds as innovative. This table lists the type of technology, location, design flow, basis for approval as innovative, consulting engineering firm, and whether the project is in operation. Table 2 is a numerical summary of those facilities utilizing a defined alternative technology. This listing is arrayed by the EPA Regions and States to show the geographic distribution of facilities using these technologies. Table 3 provides additional information as to location, size, and the consulting firm for selected operating facilities using alternative technologies.

Tables 1 and 3 can be used to make contact with facility owners or consulting firms to obtain additional information on the design, construction, and operation of innovative and alternative technologies. Table 4 contains information on field test and 100 percent modification/replacement grant projects. Additional information on the I/A program and individual projects can be obtained from the appropriate State or EPA contacts listed in Table 5.

TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE TECHNOLOGY PROGRAM

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
"AERATION/MIXING"			
Counter-Current Aeration			
Bay Minnette, AL	1.8	energy	
Boaz, AL	4.1	energy	-
(1)Sheffield, AL	4.0	energy	
Sylacauga, AL	2.4	energy	-
Tuskegee, AL	2.0	energy	-
Hillsborough Co., FL	1.5	energy	-
Rome, GA	18.0	energy	-
Franklin, KY	2.3	energy	-
Ashboro, NC	6.0	energy	-
Cramerton, NC	0.25	energy	-
Greenville, NC	10.5	energy	-
Ranlo, NC	0.2	energy	-
Troy, NC	0.84	energy	-
(1)E. Richland, SC	7.0	energy	-
(2)Clairborne Co., TN	0.32	energy	-
Decherd, TN	0.48	energy	-
Jonesboro, TN	0.5	cost & energy	-
Lebanon, TN	3.74	energy	-
Portland, TN	1.0	energy	-
Springfield, TN	3.44	energy	-
(1)Franklyn,VA	2.0	cost	R. Kenneth Weeks
Parker Co., TX	0.091	energy	Hays & Lindsey, Inc.
Dome Diffused			
Meriden, CT	11.6	energy	C. E. Maguire, Inc.
(1)Brockton, MA	18.0	cost & energy	Fay, Spofford & Thorndike, Inc.
(1)Madison Nine Springs, WI	50.0	Reg. discr.	O'Brien & Gere
Submerged Mixing of Equalization Tanks			
Mankato, MN	10.0	cost	Bolton & Menck
In-Situ Gas Cleaning of Fine Bubble Diffusers			
Alliance, OH	7.5	cost	FA Thomas & Assoc.
Lakewood, OH	18.0	cost	Watermation, Inc.

(1)Indicates that this facility is listed under more than one innovative technology.
(2)Indicates that this facility is operational.

TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Draft Tube			
Atmore, AL	2.0	energy	-
Eufaula, AL	2.55	energy	-
Foley, AL	1.0	energy	-
Opelika, AL	0.94	energy	-
Fairfield, IA	2.8	energy	French, Raneker & Assoc.
(1)Presque Isle, ME	5.2	cost & energy	Wright-Pierce
Star, NC	0.6	energy	-
(1)Bonner Springs, KS	1.4	cost	A.C. Kirkwod & Co.
Submerged Turbine Draft Tube			
Cranston, RI	23.0	energy	Universal Engineering Corp.
U-Tube			
(1)Lewes, DE	0.75	cost	Kidde Consultants
Submerged Propellor Mixer			
Ishpeming, MI	2.64	energy	Foth & Van Dyke & Assoc.
(1)Storm Lake, IA	3.4	cost & energy	Kuehl & Payer
"CLARIFIERS"			
Aerated Clarifier			
(1,2)Choctaw, OK	0.5	Reg. discr.	Rea Engineering & Assoc., Inc.
Fixed-Media Clarifier			
(1)Waynesburg, OH	0.4	energy	-
Aspirating Propellor Pump			
Welch, WV	-	cost	-
Flocculating Clarifier			
Central Valley, UT	50.0	energy	Brown & Caldwell/Koon, King & Knowlton
Denmark, WI	0.5	Reg. discr.	-
(1)Madison Nine Springs, WI	50.0	Reg. discr.	O'Brien & Gere
Inclined Plate Settler			
(2)Sanford, ME	3.6	Reg. discr.	Environmental Engineers, Inc.

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Intra-Channel or Integral Clarifiers			
(1)Lewes, DE	0.75	cost	Kidde Consultants
(1)Storm Lake, IA	3.4	cost & energy	Kuehl and Payer
(1)Fairfield, IL	0.91	cost	Henry Meisenheimer
(1)Bonner Springs, KS	1.4	cost	A.C. Kirkwood & Co.
Berea, KY	2.1	cost	-
Irvington, KY	0.14	cost	-
Owensboro, KY	6.8	cost	-
Paintsville, KY	0.99	cost	-
Springfield, KY	0.43	cost	-
Natchitoches, LA	6.5	cost & energy	Beard Engineering, Inc.
Fredrick, MD	7.0	cost	Greenhorne & O'Mara, Inc.
Bismark, MO	0.25	cost	Kleberger & Assoc.
Gallatin, MO	0.23	cost	Burns & McDonnell
Little Blue Valley, MO	40.0	cost & energy	Burns & McDonnell
Sedalia, MO	2.60	cost & energy	Burns & McDonnell
(1)Spring Valley, MN	0.60	cost	Donohue & Assoc.
(1)Suffern, NY	1.8	cost	Thomas Riddick Assoc.
(1)Breman, OH	0.43	cost	Engineering Assoc. Ltd.
(1)Clyde, OH	2.2	cost	Floyd G. Browne & Assoc.
Tube Settlers w/Chlorination			
(1)Flagstaff, AZ	6.0	cost	Brown & Caldwell
"COLLECTION SYSTEM"			
Collection of Septic Tank Effluent			
(1)Marathon, IA	0.04	cost	DGR & Assoc.
(1)Lake Monroe, IN	0.039	cost	Beam, Longest & Neff
Kenneth, MN	0.01	Reg. discr.	McCombs-Knutson, Assoc.
(1)Lincoln, MT	0.11	env. ben.	Stahly Eng. & Assoc.
Muskingum, OH	0.04	cost	Friedl & Harris
CSO Treatment			
Ogdensburg, NY	6.5	cost	Lombardo Associates, Boston
Lift Station			
Houston, TX	320	cost	Lockwood, Andrews & Newnam

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Small Diameter Gravity Collection			
(1)Crawford, NY	0.15	cost	Philip J. Clark, Engineers, Inc.
(1)Woodstock, NY	0.2	cost	Lombardo Assoc. of Boston
Montgomery Co., VA	0.25	cost & energy	Draper-Aden
"DISINFECTION"			
UV Disinfection			
(1,2)Lamar, AR	0.011	env. ben.	Burrough, Verling, Braswell, Inc.
(1)Payson, AZ	2.4	cost	Moore-Knickerbocker
Deep River, CT	0.088	-	C. E. Maguire, Inc.
Pella, IA	2.28	Reg. discr.	Veenstran & Kimm
(2)Hesston, KS	0.586	env. ben.	Wilson & Co., Engineers and Architects
(2)McPherson, KS	0.16	env. ben.	Wilson & Co.
(2)Clear Spring, MD	0.2	-	-
(2)Smithburg, MD	0.2	cost	Fellows & Reed
(2)Thurmont, MD	1.0	-	Harrington, Lacey & Assoc.
Dexter, ME	0.54	Reg. discr.	Coffin & Richardson, Inc.
Kennebunkport, ME	-	Reg. discr.	Edward C. Jordan Co., Inc.
(1)Presque Isle, ME	5.2	cost	Wright-Pierce
Albert Lea, MN	3.4	-	Toltz, King, Duvall, Anderson & Assoc.
Bemidji, MN	2.5	cost	Reicke-Carroll-Muller
Knife River, MN	0.04	-	-
N. Koochiching, MN	2.3	cost	Widseth Smith Noltin
Northfield, MN	2.5	Reg. discr.	Bonestroo, Rosene, Anderlik & Assoc.
(2)Cassville, MO	0.5	-	Allgeier, Martin & Assoc.
(1)Chinook, MT	0.5	cost & env. ben.	Robert Peccia & Assoc.
Lewistown, MT	2.83	cost	Hurlbut, Kersich & McCullough
(1)Crawford, NY	0.15	cost	Phillip J. Clark, Engineers, Inc.
Rhinebeck, NY	0.129	Reg. discr.	Brinnier & Larios
(1)Suffern, NY	1.8	cost	Thomas & Riddick
(1)Woodstock, NY	0.2	cost	Lombardo Associates, Boston
(1)Waynesburg, OH	0.4	energy	-
(1)Choctaw, OK	0.5	Reg. discr.	Rea Engineers & Assoc., Inc.
Marietta, OK	0.31	Reg. discr.	Robert L. McCoy
(1)Madison Nine Springs, WI	50.0	Reg. discr.	O'Brien & Gere
Evanston, WY	2.9	cost	Eckhoff, Watson & Preator
Lander, WY	2.12	cost	Western Design Consultants

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Riverton, WY	4.95	cost	ARIX
Worland, WY	1.12	cost	ARIX
Ozonation			
Moorhead, MN	6.0	Reg. discr.	Watermation, Inc.
Pre-Ozonation			
N.E. Ohio, OH	50.0	-	Engineering Science
"DISPOSAL OF EFFLUENT"			
Deep Well Injection of Effluent			
(1)St. Petersburg, FL	60.5	cost	-
Subsurface Filter/Surface Discharge			
Lee County, FL	10.0	cost & energy	-
Town of Newport, VT	0.4	env. ben.	Phillips & Emberley, Inc.
Water Supply/Aquifer Recharge			
Lee Co., FL	10.0	env. ben.	-
(1)El Paso, TX	10.0	env. ben.	Parkhill, Smith & Cooper, Inc.
"ENERGY CONSERVATION AND RECOVERY"			
Active/Passive Solar Heating			
(1)Hillsborough, NH	0.45	energy	Anderson-Nichols Assoc., Inc.
Providence, RI	60.0	energy	Universal Engineering Corp.
Solar Heat/Earth Shelter Insulation			
Lake Crystal, MN	0.31	energy	Bolten & Menk
Active Solar Heating			
(1,2)Vinton, IA	1.8	energy	H.R. Green & Co.
City of Newport, VT	1.2	energy	Webster-Martin, Inc.
Energy Recovery/Heat Pumps			
(1)Storm Lake, IA	3.4	cost & energy	Kuehl & Payer
New York City, NY	110.0	energy	SEA Consultants, Inc.
Hastings, NE	5.7	energy	Henningson, Durham & Richardson
(1)Hillsborough, NH	0.45	energy	Anderson-Nichols Assoc., Inc.

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Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Hydroelectric Generating Station			
Bonney Lake, WA	2.0	energy	Phillip M. Botch & Assoc.
Solar Collectors/Energy Conservation			
Pine River, MN	0.25	Reg. discr.	D. L. Floan
Solar Power System			
(1)Waynesburg, OH	0.4	energy	-
Solar Space Heating			
Cornelia, GA	3.0	Reg. discr.	-
Lake Monroe, IN	0.039	cost	Beam, Longest & Neff
Gaffney, SC	3.2	Reg. discr.	-
(2)Jackson, WY	3.5	energy	ARIX
Supplemental Solar Heating			
(1)Flagstaff, AZ	6.0	energy	Brown & Caldwell
Digester Gas Utilization			
Cullman, AL	4.75	cost & energy	-
(1)Lee Co., FL	10.0	env. ben.	-
(2)Gleenwood, IA	1.43	cost	Henningson, Durham & Richardson
(1)Hardinsburg, KY	0.73	energy	-
(1)Lexington-Fayette, KY	16.0	env. ben. & reliability	-
(1)Hagerstown, MD	8.0	cost & energy	Buchart-Horn
Omaha, NE	46.6	Reg. discr.	Kirkham-Michael & Assoc.
Fergus Falls, MN	2.81	energy	Boonestroo Rosene Anderlink
(1)Lake Crystal, MN	0.31	energy	Bolton & Menk
(1)Rochester, MN	19.1	energy	Kirkham-Michael & Assoc.
(1)Henderson, NC	4.14	env. ben. &	-
(1,2)N. Tulsa, OK	30.0	Reg. discr.	Black & Veatch/Fell, Burton & Knowles
(1)Austin, TX	26.0	energy	Parkhill, Smith & Cooper, Inc.
Use Waste Steam from Power Plant			
Waukesha, WI	11.6	energy	Alvord, Burdic & Howson

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Waste Heat Recovery			
Macon-Bibb, GA	28.0	joint munic./ indust.	-
(1)Greensboro, NC	20.0	energy	-
(1,2)North Tulsa, OK	30.0	Reg. discr.	Black & Veatch/Fell, Brusso, Bruton & Knowles
(1)Tri-City, OR	13.5	cost & energy	CH_2M Hill Engineers
"FILTRATION"			
Continuous Clean Sand Filter			
Eveleth, MN	1.7	cost & energy	Robert R. Wallace & Assoc.
Johnstown, OH	0.75	cost	Evan, Mechwart, Ambleton & Titon, Inc.
One Cell Lagoon/Dual Sand Filter			
Beckemeyer, IL	0.13	cost	Harold Roffman
Grant Park, IL	0.3	-	Sodemann & Assoc.
Hanover, IL	0.1	cost	Fehr, Graham & Assoc.
Hoyleton, IL	0.05	cost	Watwood & Pyle, Inc.
Mill Shoals, IL	0.04	cost	Henry Meisenheimer and Gende
Pittsburg, IL	0.08	cost	RA Nack & Assoc.
Prairie du Rocher, IL	0.06	cost	J. T. Blankinship & Assoc.
St. Elmo, IL	0.3	cost	Hurst-Rosche Engineers
Tamms, IL	0.08	cost	Warren and Van Praag
Tremont, IL	0.275	cost	Anderson & Assoc.
Floating Dredge Sand Filter			
Green River, WY	1.5	Reg. Discr.	Culp, Wesner, Culp
Intermittent Sand Filtration			
(1)Marathon, IA	0.04	cost	DGR & Assoc.
Microscreens			
(2)Sterling, CO	3.88	Reg. discr.	ARIX
Burley, ID	2.25	cost & energy	CH_2M Hill
Newton, MS	0.77	cost	Wayne Watts, Engineer
Scottsbluff, NE	3.14	-	John E. Olsson & Assoc.

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Recirculating Rock Filter			
(2)Marionville, MO	0.49	cost	Hood-Rich
(2)Seymour, MO	0.25	cost	Hood-Rich
Recirculating Sand Filter			
Contra Costa, CA	0.033	energy	Harris & Assoc.
Miranda, CA	0.046	energy	Winzley & Kelly
Damiansville, IL	6.0	Reg. discr.	Barttelbort & Rhutas
Sadieville, KY	0.03	cost	-
(2)Alton, MO	0.1085	cost & energy	Crane & Fleming Company
Eminence, MO	0.29	cost & energy	Missouri Engineering
(2)Mountain View, MO	0.27	cost & energy	Crane & Fleming Company
Lane, OR	0.044	energy	Kramer, Chin & Mayo
Slow Rock Filter			
New Haven, IL	0.07	cost	Hunter H. Martin & Assoc.
(1)West Monroe, LA	5.6	-	-
Primary Effluent Filtration			
Wheaton, IL	8.9	cost	Baxter & Woodman
Corry, PA	9.0	cost & energy	Lake Engineering
Warminster, PA	-	-	Carrol Engineering
"LAGOONS"			
Containment Pond			
Geralch, NV	0.03	cost	Walter & Beyer
(2)Marietta, OK	0.3	-	-
Controlled Discharge Stabilization Pond			
Jackman, ME	0.103	cost & energy	Carroll & Taylor Assoc.
Deep Lagoons			
Dodge City, KS	4.25	Reg. discr.	Engineering Enterprises, Inc.
Complete Mix Lagoon			
Douglas, WY	1.5	cost	Black & Veatch

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Facultative Lagoons			
Bristol Bay, AK	0.15	cost & energy	Tryck, Nyman & Hayes
Holbrook, AZ	1.3	energy	John Corollo Engineers
Hydrograph Controlled Release Lagoon			
(2)Blountsville, AL	0.275	cost	-
(1)Butler, AL	0.5	energy/cost	Betz · Converse · Murdoch · Inc.
Courtland, AL	0.15	cost & energy	-
Falkville, AL	0.27	cost	-
(2)Linden, AL	0.45	cost	-
LaCenter, KY	0.16	cost	-
(2)West Monroe, LA	5.6	-	-
Calhoun City, MS	0.32	cost	-
Canton, MS	3.5	cost	Willis Engineers
Heidelberg, MS	0.21	cost	C. B. Holder & Assoc.
(2)Raleigh, MS	0.2	cost	Cook-Coggin Engineers
(2)Valden, MS	0.15	cost	Barth & Assoc.
Vardaman, MS	0.15	cost	-
Verona, MS	1.05	cost	-
Athens, WI	0.135	cost	Beecher-Hopp
Lagoon in Lieu of Chlorination			
Canton, ME	0.04	Reg. discr.	Woodward & Curran, Inc.
"LAND APPLICATION OF EFFLUENT"			
Aquaculture			
(1)Woodstock, NY	0.2	cost	Lombardo & Assoc.
Duckweed			
Paragould, AR	2.2	Reg. discr.	Black & Veatch
Overland Flow			
Alma, AR	1.27	env. ben.	Michle Wagner Assoc.
(1,2)Lamar, AR	0.11	env. ben.	Burrough, Verling, Braswell, Inc.
(2)Wabbaseka, AR	0.104	env. ben.	Affiliated Engineers
(2)Raiford, FL	1.3	cost	-
Fillmore, IL	0.05	Reg. discr.	Knostman & Assoc.
Arcadia, LA	0.515	env. ben.	Balar and Assoc.
Castor, LA	0.03	env. ben.	S. M. Cothren

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
(2)Esterwood, LA	0.018	env. ben.	Alex Theriot, Jr. & Assoc.
Forrest Hill, LA	0.06	env. ben.	Alex Theriot, Jr. & Assoc.
(2)Hall Summit, LA	0.056	env. ben.	Alex Theriot, Jr. & Assoc.
(2)Morse, LA	0.09	env. ben.	Alex Theriot, Jr. & Assoc.
Norwood, LA	0.035	other	US Environmental Planners
Vinton, LA	1.0	env. ben.	Roy F. Weston
(2)Cleveland, MS	3.0	energy	Clark Dietz Engineers
Dickinson, ND	2.85	cost	Ultigh Engineers
(2)Clay Center, NE	0.12	cost	Johnson, Erickson & O'Brien
Heavener, OK	0.45	env. ben.	Alford Engineering Co.
Baileyton, TN	0.065	cost	-
Luttrell, TN	0.2	cost	-
Boling, TX	0.133	cost	Dan Sherwood & Assoc.
(2)Corsicana, TX	1.0	energy	Gilbreth & Assoc.
Rapid Infiltration			
Waycross, GA	7.0	cost	-
Payette Lakes, ID	1.8	cost	JUB Engineers, Inc.
(1)Lincoln, MT	0.11	env. ben.	Stahly Engineers & Assoc.
(2)Madison, SD	1.8	cost	Banner Assoc., Inc.
Laramie, WY	5.0	cost	ARIX
Silviculture			
(1)Dalton, GA	40.0	reliability	-
Eagle Lake, ME	0.023	env. ben. & reliability	Carroll & Taylor & Assoc.
(2)Eagle Lake, ME	0.146	env. ben. & reliability	Carroll & Taylor & Assoc.
Spray Irrigation			
(1)Butler, AL	0.5	energy	Betz · Converse · Murdoch · Inc.
(1)St. Petersburg, FL	60.5	cost	-
(1)Dalton, GA	40.0	reliability	-
(2)Fredericksburg, IA	0.95	cost	Bennett & Assoc.
(2)Sanborn, IA	0.34	cost	Kirkham-Michael & Assoc.
Camp Point, IL	0.2	Reg. discr.	William H. Klingner
(2)Fullerton, NE	0.2	cost	Bruce Gilmore & Assoc.
(2)Gordon, NE	0.4	cost	Baker & Sweeney
(2)Schuyler, NE	0.6	cost	Kirkham-Michael & Assoc.
Hilton Head, SC	0.8	env. ben.	-

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Charlotte, TN	0.08	cost	-
(2)Heber Valley, UT	2.5	Reg. discr.	Horrocks Engineers
Steep Slope Spray Irrigation			
(2)Craigsville, VA	0.25	env. ben.	Betz, Converse & Murdock
Aquaculture			
Paragould, AR	2.2	-	-
Wilton, AR	0.09	env. ben.	McClelland Consulting Engs. Inc.
(1)Austin, TX	26.0	energy	Parkhill, Smith & Cooper, Inc.
Wetlands			
Granger, IA	0.311	env. ben.	Veenstra & Kimm, Inc.
Norwalk, IA	0.633	env. ben.	Associate Engineers, Inc.
Riverside, IA	-	env. ben.	Shive-Hattery & Assoc.
St. Paul, KS	-	env. ben.	Shetler, Griffith & Shetlar
Incline Village, NV	2.14	cost	CH_2M Hill Engineers/Culp-Wesner-Culp
Cannon Beach, OR	49.0	cost & energy	CH_2M Hill Engineers
"NITRIFICATION"			
Fixed Growth Biological Nitrification			
Redwood Falls, MN	0.7	Reg. discr.	-
Pure Oxygen/Single Stage Nitrification			
Indianapolis, IN	125.0	Reg. discr.	Reid, Quebe, Allison Wilcox & Assoc.
Upflow Packed Bed Nitrification			
(2)Upper Eagle Valley, CO	3.2	cost	M&I Engineers
RBC Nitrification			
Milford, ME	-	Reg. discr.	Haley & Ward, Inc.
"NUTRIENT REMOVAL"			
Bardenpho			
Ft. Meyers, FL	24.0	energy	-
(1)Payson, AZ	2.4	cost	Moore Knickerbocker & Assoc.

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Chemical Addition to Lagoon for P Removal			
Albany, MN	0.4	cost	Rieke-Carroll-Muller & Assoc.
Albertville, MN	0.12	cost	Meyer Rohlin, Inc.
PhoStrip			
(1)Brockton, MA	18.0	cost & energy	Fay, Spofford & Thorndike, Inc.
(1)Rochester, MN	19.1	energy	Kirkham-Michael & Assoc.
Reno, NV	30.0	cost	Kennedy, Jenks Engineers
Amherst, NY	12.0	cost	Neussbuner, Clark & Velzy
Biofilter/Diffused Air TKN Removal			
Oakland, MD	0.9	cost	Franklin Assoc.
Water Valley, MS	1.4	-	-
Waste Pickle Liquor/P Removal			
(1)Baltimore, MD	170.0	cost	Whitman, Reguardt & Assoc.
Anoxic/Oxic System			
Largo, FL	13.0	cost	-
(1)Baltimore, MD	70.0	cost	Whitman, Reguardt & Assoc.
(1)Tri-City, OR	13.5	cost & energy	CH_2M Hill Engineers
Lancaster, PA	30.0	cost	Huth Engineers
Chatham, VA	0.45	cost & energy	Olver, Inc.
"OXIDATION DITCH"			
Over-Under Aeration			
Cleveland, VA	0.04	energy	-
Benthal Stabilization			
Wellsboro, PA	2.0	cost	Tatman & Lee
Carrousel Oxidation Ditch			
(2)Mount Holly Springs, PA	0.3	cost & energy	Tracy Engineers
Draft Tube Oxidation Ditch			
Eufaula, AL	2.55	-	Betz · Converse · Murdoch · Inc.
Foley, AL	1.0	-	Betz · Converse · Murdoch · Inc.
Opelika, AL (2 plants)	0.94	-	Betz · Converse · Murdoch · Inc.
	4.0		Betz · Converse · Murdoch · Inc.

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Rehobeth Beach, DE	4.0	cost	Betz, Converse, Murdoch
Sante Fe, NM	6.5	energy	Scanlon & Assoc., Inc.
Montgomery, NY	0.5	cost	Erikson & Silber
Monticello, NY	3.1	cost	Erikson & Silber
Thompson, NY	1.0	cost	Philip J. Clark
Woodbury, NY	4.0	cost	Erikson & Schmitt
Hallstead, PA	0.35	cost & energy	Bellante & Clauss
(1)Franklin, VA	2.0	cost	R. Kenneth Weeks
Keysville, VA	0.03	cost & energy	May-Heines & Assoc.
South Hill, VA	1.0	energy	-
(2)Crab Orchard, WV	1.0	energy	Gates Engineering
Oxidation Ditch			
Fairfield, IA	2.8	energy	French Reneker
(1,2)Vinton, IA	1.8	cost	H.R. Green & Co.
(1)Fairfield, IL	0.91	cost	Henry Meisenheimer
(1)Bonner Springs, KS	1.4	cost & energy	A.C. Kirkwood & Co.
(1)Spring Valley, MN	0.60	cost	Donahue and Assoc.
(1)Bremen, OH	0.43	cost	Engineering Assoc. Ltd
(1)Clyde, OH	2.2	cost	Floyd G. Browne & Assoc.
McAlester, OK	1.3	cost & energy	Poe & Assoc.
(2)King George County, VA	0.05	Reg. discr.	Gilbert W. Clifnor
(2)Smithfield, VA	0.5	Reg. discr.	R. Kenneth Weeks
(2)Southhampton County, VA	0.303	Reg. discr.	Henry T. Sadler
"RBC's"			
Hydraulically Assisted RBC's			
(1)Hardinsburg, KY	0.73	energy	-
Air Driven RBC's			
Oakview, CA	1.0	cost & energy	James Montgomery Engineers
"SLUDGE TECHNOLOGY"			
Thickeners, Belt Filter Presses			
(1)Cape May Co., NJ	6.3	Reg. discr.	Pandullo, Quirk & Assoc.

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Lateral Flow Thickeners			
(1)Bonner Springs, KS	1.4	energy	A.C. Kirkwood & Co.
(1)Hutchison, KS	8.3	cost	Wilson & Co.
Carver-Greenfield			
Los Angeles, CA	420.0	energy	Montgomery & Parsons
Mercer Co., NJ	56.0	cost, energy & env. ben.	Clinton-Bogart Assoc.
Belt Filter Presses With Lime Feed			
Ewing-Lawrence, NJ	18.0	cost & energy	Buck Siefort & Jost
Vacuum Sludge Drying Beds			
Nevada City, CA	-	energy	-
Brighton, CO	1.76	cost	Hendrickson, Durham, Richardson
Belle Plaine, IA	0.61	Reg. discr.	H.R. Green Co.
Gilman, IL	0.5	Reg. discr.	Jerry Lacy & Assoc.
(2)Portage, IN	3.5	Reg. discr.	American Engineering
(2)Union City, IN	1.5	Reg. discr.	M. W., Inc.
(1)Chinook, MT	0.5	cost & env. ben.	Robert Peccia & Assoc.
Buena Vista, VA	-	cost	White & Co.
Vacuum/Belt Series			
Oklahoma City, OK	40.0	energy	Benham-Blair & Affiliates, Inc.
Odor Control for Sludge Lagoons			
Sacramento, CA	-	cost & energy	Sacramento Area Consultants
Disposal			
Co-Disposal			
(2)ECO-Rock, PA	250.00	Reg. discr.	Greeley & Hansen
Facultative Sludge Lagoons			
(1)Flagstaff, AZ	6.0	cost & energy	Brown & Caldwell
Traveling Guns to Land Apply Sludge			
Grand Strand, SC	6.0	cost	-

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Incineration			
Chromium Detoxification of Fluidized Bed Ash			
S. Essex, MA	41.0	Reg. discr.	Tighe and Bond
Co-Incineration			
Macon Co., GA	14.0	cost	-
Glen Cove, NY	8.0	Reg. discr.	Wm. F. Cosulick & Assoc./E. F. W. Frank
Memphis, TN	80.0	cost & energy	-
Starved Air Combustion of Sludge			
(2)St. Louis, MO	167.0	energy	Consoer, Townsend & Assoc.
(1)Greensboro, NC	20.0	energy	-
Sludge Composting			
Aerated Static Pile Composting			
(1)Lexington-Fayette, KY	16.0	env. ben & reliability	-
Myrtle Beach, SC	12.5	env. ben. & reliability	-
Modified Windrow Composting			
Tampa, FL	60.0	cost	-
Invessel Mechanical Composting			
Brunswick, GA	10.0	-	-
(1)Cape May, NJ	6.3	Reg. discr.	Pandullo, Quirk & Assoc.
Clinton Co., NY	-	cost	Metcalf & Eddy
New York, NY	280.0	cost	NY City/Compost Systems, Inc
(1)East Richland, SC	7.0	env. ben. & reliability	-
Sludge Composting			
Jefferson Co., AL	35.0	env. ben. & reliability	-
(2)Beatrice, NE	1.9	cost	Hoskings, Western & Sonderegger
(1)El Paso, TX	10.0	env. ben.	Parkhill, Smith & Cooper, Inc.

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Sludge Digestion			
Aerobic Digestion			
(1)Weiser, ID	2.3	env. ben.	CH_2M Hill
(1)Chinook, MT	0.5	cost & env. ben.	Robert Peccia & Assoc.
Anaerobic Digestion			
(1)Aroostook/Presque Isle, ME	1.3	energy	Wright-Pierce, Inc.
Dual Aerobic/Anaerobic Digestion			
(1)Hagerstown, MD	8.0	cost & energy	Buchart-Horn
(1)Henderson, NC	4.14	env. ben. & reliability	-
Lackawanna, NY	4.5	reliability	Neussbuner, Clark & Velzy
"MISCELLANEOUS"			
Aerobic Pure Oxygen Fluidized Bed Reactor			
East Bay Dischargers, CA	13.1	cost & energy	CH_2M Hill
Nassau Co., NY	10.0	Reg. discr.	Consoer, Townsend & Assoc.
Biological Aerated Filter			
Oneonta, AL	2.2	cost	-
Wallace, NC	0.64	cost	-
St. George, SC	0.8	cost	-
Captor			
Moundsville, WV	2.75	cost	Cerrone & Vaughn, Inc.
Chemical Air Scrubber Odor Control			
Western Lake Superior, MN	43.9	Reg. discr.	Southwest Survey Eng.
Community "Mound System"			
Elbe, WA	0.4	cost	Byrne-Stevens & Assoc.
Computerized Financial Management			
Passaic Valley, NJ	-	cost	Arthur Young & Company

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Digestor Supernatant Treatment			
Mokena, IL	1.10	Reg. discr.	Mulford Engineering
Dissolved Air Flotation			
(1)Weiser, ID	2.3	env. ben.	CH_2M Hill
Earthen Pond System			
Quincy, CA	0.72	cost & energy	John Corollo Engineers
Eductor Induced Vacuum Chemical Addition			
Washington, DC	309.0	cost	
Enclosed Impeller Screw Pumps			
(1)Hutchison, KS	8.3	cost	Wilson & Co.
Westborough, MA	7.68	Reg. discr.	SEA Consultants, Inc.
(1)Hillsborough, NH	0.45	cost & energy	SEA Consultants, Inc.
Modular Activated Sludge			
Edgar Springs, MO	0.04	cost	Heagler & Marshall
Norwood, MO	0.04	cost	Scott Consulting Eng.
Permafrost Construction			
Naknek, AK	-	cost	Tryck, Nyman & Hayes
Powdered Activated Carbon/Regeneration			
Sauget, IL	27.0	Reg. discr.	Russell Axon & Assoc.
Kalamazoo, MI	53.3	cost	Jones & Henry
(2)Burlington, NC	9.5	cost	-
Bedford Heights, OH	2.5	Reg. discr.	Dalton, Dalton, Little
N. Olmsted, OH	8.0	cost	Dalton-Dalton-Little
(1)El Paso, TX	10.0	env. ben.	Parkhill, Smith & Cooper
Primary Treatment Facility			
E. Millinocket, ME	0.5	cost	Camp, Dresser & McKee, Inc.
Sequencing Batch Reactor			
Idaho Springs, CO	0.6	cost	McCall, Ellingson & Morrill, Inc.
LaClaire, IA	0.5	Reg. discr.	Shive Hattery & Assoc.
(2)Grundy Center, IA	0.83	Reg. discr.	Clapsaddle-Garber & Assoc.
Sabula, IA	0.7	Reg. discr.	Shive Hattery & Assoc.
Horn Point, MD	0.04	cost	-

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TABLE 1 -- INNOVATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE INNOVATIVE/ALTERNATIVE PROGRAM (continued)

Description of Technology/Grantee	Design Flow (MGD)	Basis of Approval	Design Consulting Firm
Poolesville, MD	0.6	cost & energy	Kamber Engineers
(1,2)Choctaw, OK	0.5	Reg. discr.	Rea Engineering & Assoc., Inc.
Rush/Ryan, PA	0.05	cost & energy	Nassaux-Hemsley
Tullahoma, TN	3.0	cost	-
Union City, TN	4.03	cost	-
Shallow Bed Trickling Filter Media			
Delmont, PA	-	cost	Duncan & Assoc.
Swirl Concentrators			
Auburn, IN	1.7	cost	Howard, Needles, Tammen & Bergendoff
(1)Presque Isle, ME	5.2	cost & energy	Wright-Pierce
Toledo, OH	160.0	cost	Jones & Henry
Teacup Separator for Grit Removal			
(1)Lewes, DE	0.75	cost	Kidde Consultants
Omaha, NE	46.0	Reg. discr.	Camp, Dresser & McKee, Inc.
Trickling Filter-Solids Contact			
(2)Coer D'Alene, ID	4.2	cost	Brown & Caldwell
Geneseo, IL	1.48	cost	Beling Engineering
Tubular Screw Pumps			
Ft. Meade, FL	1.0	env. ben.	-
(1)Aroostook-Presque Isle, ME	1.3	energy	Wright-Pierce, Inc.
Gardiner, ME	1.8	Reg. discr.	SEA Consultants, Inc.
Wind Turbine Generators			
Erie, NY	16.0	cost	-
Windmill Compressed Air Aeration			
Menan, ID	0.218	-	Thompson Engineers, Inc.

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TABLE 2

A SUMMARY OF ALTERNATIVE TECHNOLOGY PROJECTS FUNDED THROUGH THE I/A PROGRAM

		Wastewater									Sludge				
EPA Region	State	Aquaculture	Containment Ponds	Direct Reuse	Overland Flow	Rapid Infiltration or Aquifer Recharge	Slow Rate (Irrigation)	Alternative Collection Systems	On-Site Treatment	Septage Treatment	90% Methane Recovery	Self-Sustaining Incineration	Composting Prior to Land Application	Drying Prior to Land Application	Land Application
I	Connecticut					2		2	2	5	2	1			
	Maine							9	5				9		
	Massachusetts					3	1	1	1	11	2	2	5		1
	New Hampshire						1		2	8					
	Rhode Island											1			
	Vermont						1	5	5					6	9
II	New Jersey							4	1	16	1		6	3	
	New York				4	3	3	25	3	2	12	1	4		
	Puerto Rico														
	Virgin Islands														
III	Delaware							2	3					1	1
	Wash., DC													1	
	Maryland				2		3	8	1		1		2		
	Pennsylvania	1			1		4	15	5		1		1		1
	Virginia				2	1	1	5	1		2		3	2	3
	West Virginia							13			2				
IV	Alabama						1	2			1		1		1
	Florida			1		2	10				2		2		1
	Georgia				1		9	1			1				4
	Kentucky						2	8	2		2		1		9
	Mississippi				7		1	2							2
	North Carolina						20	3			5				4
	South Carolina					1	8								1
	Tennessee				1		4	8				1	1		3
V	Illinois				1	1	2	5	3	1	3				10
	Indiana						1	5			1	1			4
	Michigan					6	8	4	3	3	1				11
	Minnesota						10	4	10	1	4				12
	Ohio						1	2			1		2		4
	Wisconsin					10	6	1	1		3				6
VI	Arkansas	1		1			4	12		2	2				
	Louisiana				1		5	6	2						1
	New Mexico			1			6				2		1		
	Oklahoma		22				24				1				
	Texas	1	1	4		1	8	4	1		4		1	4	3
VII	Iowa						2	2			1				12
	Kansas		24	1		1	9				5		1		17
	Missouri				2		8	16	1		2	1		9	18
	Nebraska		18		1		3				1		2	1	4
VIII	Colorado			1		1	1	1							1
	Montana		2			7	5	1			1				6
	North Dakota		12				5	14	5						
	South Dakota		6			4	1	1	1		1				6
	Utah						2				1				1
	Wyoming		3			3	2								1
IX	Amer. Samoa														
	Arizona		3		1	2	6				3			1	1
	California		2	5	2	11	12	6	2		1	2	1		2
	Guam		1			2									
	Hawaii						1								
	Nevada		4	1		2	3				1				
	N. Marianas Is.														
	Pac. Islands														
X	Alaska									1				1	
	Idaho		3		1	1	6	4		1					2
	Oregon	1				1	5	2	1		2				4
	Washington	1	1				4	2	2		2				
TOTAL		5	102	15	27	63	219	205	63	51	77	10	43	29	165

TABLE 3

SELECTED OPERATING ALTERNATIVE TECHNOLOGY FACILITIES FUNDED THROUGH THE I/A TECHNOLOGY PROGRAM

Selected Operational Facilities

State	Community	Design Flow (MGD)	Design Consulting Firm
	WASTEWATER TREATMENT		
Containment Ponds			
AZ	Alpine	--	Ellis, Murphy & Hogate
AZ	Show Low	--	Johannessen & Gerald/Rod, Gomez
CA	Eastern Municipal	0.8	Neste, Brudin & Stone, Inc.
CA	Fall River Mills	--	Rolls, Anderson & Rolls
ID	Bruneau	0.025	Tudor Eng. Co.
KS	Lorraine	--	Evans, Bierly, Hutchinson & Assoc.
MT	Gilford	0.023	Lightowler & Johnson
ND	Kramer	0.01	Wold Engineering
ND	Marmath	0.014	North Central Consultants
ND	Martin	0.009	Houston Eng.
NE	Brainard	0.02	Johnson, Erickson, O'Brien & Assoc.
NE	Broadwater	0.018	Baker, Sweeney & Assoc.
NE	Craig	0.03	Consolidated Engineers
NE	Edgar	0.098	Johnson, Erickson, O'Brien & Assoc.
NE	Harvard	0.01	Price, Johnson & Erickson
NE	Maywood	0.032	Paul Mousel & Assoc.
NE	Overton	0.068	Great Plains Eng.
NE	Stapleton	0.03	Bruce L. Gilmore & Assoc.

Selected Operational Facilities

State	Community	Design Flow (MGD)	Design Consulting Firm
NV	Elko-Jackpot	0.237	J.V.V. Engineers
NV	Eureka	0.05	Chilton Engineers
OK	Fox Rural	0.032	Fox & Drechsler
OK	Mooreland	0.15	C. H. Guernsey & Co.
SD	Lake Norden	--	Schoell & Matson
WY	La Grange	0.035	Wells Engineering
WY	Glendo	0.095	MSM Consultants, Inc.
Direct Reuse			
CA	Las Virgenes	8.0	Boyle Engineers
CA	Marin	2.7	Marin MWD Engineers
CO	North Glen	4.0	Schaffer & Roland
Overland Flow			
AZ	Alpine	--	Ellis, Murphy & Holgate
CA	Davis	5.0	Brown & Caldwell
CA	Newman	--	Brown & Caldwell
ID	Santa-Fernwood	0.1	J-U-B Engineers
MS	Sumrall	0.2	--
TX	Chico	0.076	--
VA	Kenbridge	0.3	Environmental Technology Consultants, Inc.

TABLE 3 (cont'd)

Selected Operational Facilities

State	Community	Design Flow (MGD)	Design Consulting Firm
Aquifer Recharge or Rapid Infiltration			
AZ	Pima	30.0	Black & Veatch
CA	Boron	0.21	BPW Engineers
CA	San Bernardino	0.21	CM Engineering Assoc.
CA	Sonoma	0.067	Brelge & Race
CA	Woodbridge	0.24	Darrhl Dentoni & Assoc.
CO	Sterling	3.9	ARIX
KS	Syracuse	0.23	Evans, Bierly, Hutchison & Assoc.
MT	Bozeman	5.75	Thomas, Dean, & Hoskins
MT	Corvallis	0.051	Morrison-Maierle
MT	East Glacier	0.91	Kehnlein, Lightower & Johnson
NV	Tonopah	0.5	Phillsbury, Dew & Stowell
WI	Crandon	0.026	Donohue & Assoc., Inc.
WI	Hayward	0.68	Morgan & Parmley
WY	Jackson	3.5	ARIX
Slow Rate Infiltration			

*There are slow rate infiltration projects in most states; you should contact your local I/A coordinator for the location of individual projects.

Selected Operational Facilities

State	Community	Design Flow (MGD)	Design Consulting Firm
Alternative Collection Systems			
AL	Dallas Co.	0.9	Goodwyn & Mills
CA	Santa Ynez	0.2	Montgomery Engineers
CA	South Lake Tahoe	--	Swanson & Oswald
CO	Three Lakes	1.34	ARIX
ID	Avery	0.023	David Welch & Assoc., Inc.
ID	Rocky Point	0.06	J-U-B Engineers
IN	Hamilton Lake	0.3	C. E. Williams & Assoc.
KY	Fancy Farms	0.3	Lenard A. Griggs & Assoc.
MD	Queen Annes	0.8	O'Brien & Gere Engs., Inc.
MI	Rudyard Township	0.077	McNamee, Porter & Seely
MO	Mokane	0.1	Williams & Works
MS	Granada	0.06	Miller, Wihry & Lee
NC	Creswell	0.064	L. E. Wooten & Assoc.
NY	Gardiner	0.05	Erikson & Silber
NY	Orleans	0.053	Sargeant, Webster, Crenshaw & Folley
TN	Belle Meade	0.325	Barge, Waggener & Assoc.
TX	East Cedar Creek	--	Johnson Eng. Co.

TABLE 3 (cont'd)

Selected Operational Facilities

State	Community	Design Flow (MGD)	Design Consulting Firm
Alternative Collection Systems			
WA	Black Diamond	0.03	Kramer, Chin & Mayo, Inc.
WA	Eastsound	0.08	ARC Engineering
On-Site Treatment			
CA	Taylorsville	0.045	--
ME	Isleboro	0.014	Edward C. Jordan Co., Inc.
MI	West Traverse	0.006	Williams & Works
NH	Weare	0.25	Anderson-Nichols
WA	Chelan	0.025	City of Wenatchee
WA	Eastsound	0.08	ARC Engineering
Septage Treatment			
ID	Avery	0.023	David Welch & Assoc., Inc.
MI	Michigamme	0.042	McNamee, Porter & Seely
MI	West Traverse	0.006	Williams & Works

Selected Operational Facilities

State	Community	Design Flow (MGD)	Design Consulting Firm
SLUDGE TREATMENT			
90% Methane Recovery			
AZ	Flagstaff	--	Brown & Caldwell
CA	Contra Costa	--	CDM/KKA Consultants
KS	Topeka	20.0	Van Doren, Hazard & Stallings
MI	Charlotte	1.2	Capital Consultants
WA	Enumclaw	2.4	Kramer, Chin & Mayo, Inc.
WI	Waukesha	11.6	Alvord, Burdic & Howson
Composting Prior to Land Application			
ME	Old Town	--	James W. Souall Co., Inc.
ME	South Portland	5.5	Wright-Pierce
NE	Falls City	0.52	Garber & Work
Land Application			

*There are sludge land application projects in most states; you should contact your local I/A coordinator for the location of individual projects.

TABLE 4

FIELD TEST PROJECTS AND 100% M/R AWARDS

Field Test Projects

Location	Status	Technology Involved
Clinton, AR	planned	Biological Aerated Filter
Fayetteville, AR	planned	Biological Nutrient Removal
Wauconda, IL	under construction	Trickling Filter/ Solids Contact
Winnfield, LA	planned	Boat Clarifier
Jackman, ME	under construction	Phosphorus Removal
Roswell, NM	in progress	Aerobic Composting
Chemung County, NY	in progress	Trickling Filter/ Solids Contact
Hornell, NY	in progress	Seeded Bacterial Nitrification
Toledo, OH	planned	Swirl Concentrators
Choctaw, OK	planned	Sequencing Batch Reactor
Clear Lake, WI	complete	Primary Effluent Filtration

100% M/R Awards

Fallen Leaf Lake, CA	Awarded 9/83	Valves and controls in vacuum/pressure collection system
Manila, CA	Awarded 8/83	STEP system sonic level detectors

TABLE 5

FEDERAL AND STATE I/A TECHNOLOGY
COORDINATORS AND CONTACTS

US EPA - REGION I

Charles R. Conway
U.S. EPA Water Management Div.
JFK Federal Building, Room 2203
Boston, Massachusetts 02203
(617) 223-3990
(FTS) 223-3990

Connecticut

William Hogan
Connecticut Department of
Environmental Protection
165 Capital Avenue
Hartford, Connecticut 06115
(203) 566-2793

Maine

Dennis Purington
Department of Environmental
Protection
Hospital Street
Augusta, Maine 04333
(207) 289-3901

Massachusetts

Robert Cady
Division of Water Pollution
Control
Massachusetts Department of
Environmental Quality
Engineering
100 Cambridge Street
Boston, Massachusetts 02202
(617) 292-5713

New Hampshire

Paul Currier
New Hampshire Water Supply and
Pollution Control Commission
P. O. Box 95, Hazen Drive
Concord, New Hampshire 03301
(603) 271-2508

Rhode Island

Pierce Glazer
Rhode Island Division of Water
Supply and Pollution Control
75 Davis Street
Providence, Rhode Island 02908
(401) 277-2234

Vermont

Edward Leonard
Environmental Engineering Division
Vermont Agency of Environmental
Conservation
State Office Building
Montpelier, Vermont 05602
(802) 828-3345

US EPA - REGION II

Bruce Kiselica
U.S. EPA Water Management Div.
26 Federal Plaza, Room 813
New York, New York 10278
(212) 264-5670
(FTS) 264-5670

TABLE 5 (cont'd)

New Jersey

Bob Kotch
New Jersey Department of
Environmental Protection
P. O. Box CN-029
Trenton, New Jersey 08625
(609) 292-2723

New York

John Marschilok
Local Assistance Section
New York State Department of
Environmental Conservation
50 Wolf Road
Albany, New York 12233
(518) 457-3810

Puerto Rico

Jose Bentacourt, Chief
Local Assistance Grants Section
I/A Coordinator
Puerto Rico Environmental
Quality Board
P. O. Box 11488
Santurce, Puerto Rico 00910
(809) 725-5140, ext. 355

Virgin Islands

Francine Lang, Director
Natural Resources Management
Office
Virgin Islands Department of
Conservation and Cultural
Affairs
P. O. Box 4340
Charlotte Amalie, St. Thomas,
Virgin Islands 00801

US EPA - REGION III

Lee Murphy
U.S. EPA Water Management Div.
Curtis Building
6th and Walnut Streets
Philadelphia, Pennsylvania 19106
(215) 597-9597
(FTS) 597-9597

Delaware

Richard Aurich
Delaware Department of Natural
Resources and Environmental
Control
Division of Environmental Control
Tatnall Building
Dover, Delaware 19901
(302) 736-5081

District of Columbia

Lester Slocum
District of Columbia
Department of Environment
5000 Overlook Avenue, S.W.
Washington, D.C. 20032
(202) 767-7603

Maryland

John Milnor
Office of Environmental Programs
Department of Health and Mental
Hygiene
201 W. Preston Street
Baltimore, Maryland 21201
(301) 383-7556

TABLE 5 (cont'd)

Pennsylvania

Terry Killian
Pennsylvania Department of
Environmental Resources
Bureau of Water Quality Management
P. O. Box 2063
Harrisburg, Pennsylvania 17120
(717) 787-3481

Virginia

Walter Gills
Virginia Water Control Board
P. O. Box 11143
Richmond, Virginia 23230
(804) 257-6362

West Virginia

Michael Johnson
West Virginia Department of
Natural Resources
Division of Water Resources
1201 Greenbrier Street
Charleston, West Virginia 25311
(304) 348-0637

US EPA - REGION IV

Bob Freeman
U.S. EPA Water Management Div.
345 Courtland Street, N.E.
Atlanta, Georgia 30365
(404) 881-4015
(FTS) 257-~~4015~~ 4180

Alabama

Rusty Jones
Health Service Administrator
Alabama Water Improvement
Commission
State Office Building
Montgomery, Alabama 36130
(205) 277-3630

Florida

Bhupendra Vora
Bureau of Wastewater Management
and Grants
Florida Department of
Environmental Regulations
Twin Towers Office
2600 Blair Stone Road
Tallahassee, Florida 32301
(904) 488-8163

Georgia

Bill Martello
Environmental Protection Division
Georgia Department of Natural
Resources
270 Washington Street, S.W.
Atlanta, Georgia 30334
(404) 656-4769

Kentucky

Sanjiv Shah
Construction Grants Branch
Kentucky Natural Resources and
Environmental Protection Cabinet
18 Reilly Road
Ft. Boone Plaza
Frankfort, Kentucky 40601
(502) 564-3410, Ext. 509

Mississippi

Mark Smith
Municipal Facilities Branch
Mississippi Department of
Natural Resources
Bureau of Pollution Control
P. O. Box 10385
Jackson, Mississippi 39209
(601) 961-5131

TABLE 5 (cont'd)

North Carolina

Allen Wahab, Supervisor
Local Planning Management Unit
Division of Environmental Management
North Carolina Department of Natural Resources and Community Development
P. O. Box 27687
Raleigh, North Carolina 27611
(919) 733-6900

South Carolina

Sam Grant, Section Manager
201 Planning
Environmental Quality Control
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29211
(803) 758-5067

Tennessee

Robert G. Threadgill, Jr.
Tennessee Department of Health and Environment
150 9th Avenue North
Terra Building
Nashville, Tennessee 37203
(615) 741-6615

US EPA - REGION V

Charles Pycha
U.S. EPA Water Management Div.
230 South Dearborn Street
Chicago, Illinois 60604
(312) 886-0259
(FTS) 886-0259

Illinois

Terri Zeal/Jim Leinicke
Division of Water Pollution Control
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62706
(217) 782-2027

Indiana

Steve W. Kim
Division of Water Pollution Control
Indiana State Board of Health
1330 West Michigan Street
Indianapolis, Indiana 46206
(317) 633-0708

Michigan

Brian Myers
Grants Administration Section
Water Quality Division
Michigan Department of Natural Resources
P. O. Box 30028
Lansing, Michigan 48909
(517) 374-9075

Minnesota

Lawrence Zdon
Facilities Section
Division of Water Quality
Minnesota Pollution Control Agency
1935 West County Road, B-2
Roseville, Minnesota 51133
(612) 296-7214

TABLE 5 (cont'd)

Ohio

Sanat K. Barua, P.E.
Manager, East Engineering Section
Division of Construction Grants
Office of Wastewater Pollution
Ohio Environmental Protection Agency
361 East Broad Street
Columbus, Ohio 43216
(614) 466-5383

Wisconsin

John Melby
Municipal Wastewater Section
Wisconsin Department of Natural Resources
P. O. Box 7921
Madison, Wisconsin 53707
(608) 267-7666

US EPA - REGION VI

Ancil Jones
U.S. EPA Water Management Div.
First International Building
1201 Elm Street
Dallas, Texas 75270
(214) 767-9905
(FTS) 729-9905

Arkansas

Martin Roy
Arkansas Department of Pollution Control and Ecology
8001 National Drive
Little Rock, Arkansas 72209
(501) 562-7444

Louisiana

Ashok Patel
Louisiana Department of Natural Resources
P. O. Box 44066
Baton Rouge, Louisiana 70804
(504) 342-9009

New Mexico

Edward Stokes
New Mexico Environmental Improvement Agency
Water Quality Section
P. O. Box 968, Crown Building
Santa Fe, New Mexico 87501
(505) 984-0020, ext. 352

Oklahoma

Dr. H. J. Thung
Oklahoma Department of Health
Environmental Health Services
3400 North Eastern Avenue
P. O. Box 53551
Oklahoma City, Oklahoma 73152
(405) 271-7346

Texas

Milton Rose
Texas Department of Water Resources
P. O. Box 13087
Austin, Texas 78711
(512) 475-3926

US EPA - REGION VII

Mario Nuncio
U.S. EPA Water Management Div.
324 E. 11th Street
Kansas City, Missouri 64106
(816) 374-~~2725~~ 2813
(FTS) 75~~8-2725~~
12813

Iowa

Wayne Farrand
Iowa Department of Water, Air and Waste Management
Henry A. Wallace Building
900 E. Grand
Des Moines, Iowa 50319
(515) 281-8992

TABLE 5 (cont'd)

Kansas

Laven Brendan
Kansas Department of Health and Environment
Division of Environment
Bureau of Water Quality
Forbes Field
Topeka, Kansas 66620
(913) 862-9360, ext. 240

Missouri

David Cavendar
Missouri Department of Natural Resources
Program Support Environment Section
P. O. Box 1368
Jefferson City, Missouri 65102
(314) 751-3241

Nebraska

Movva Reddy
Nebraska Department of Environmental Control
Engineering Division
P. O. Box 94877
State House Station
301 Centenniel Mall South
Lincoln, Nebraska 68509
(402) 471-2186

US EPA - REGION VIII

Stan Smith
U.S. EPA Water Management Div.
1860 Lincoln Street
Denver, Colorado 80295
(303) 837-2735
(FTS) 564-~~2735~~ 1563
~~293-1443~~

Colorado

Frank Rozich
Water Quality Control Division
Colorado Department of Health
4210 E. 11th Avenue
Denver, Colorado 80220
(303) 320-8333

Montana

Joseph Steiner
Water Quality Bureau
Environmental Sciences Division
Cogswell Building
Helena, Montana 59620
(406) 449-2406

North Dakota

Wayne Kern
Division of Water Supply and Pollution Control
North Dakota Department of Health
Missouri Office Building
1200 Missouri Avenue
Bismarck, North Dakota 58505
(701) 224-4856

South Dakota

Larry Van Hout
South Dakota Department of Water and Natural Resources Management
Joe Foss Building
Pierre, South Dakota 57501
(605) 773-3351

TABLE 5 (cont'd)

Utah

Kiran L. Bhayani
Utah Bureau of Water Pollution Control
150 W. North Temple Street
Box 2500
Salt Lake City, Utah 84110
(801) 533-6146

Wyoming

Mike Hackett
Water Quality Division
Department of Environmental Quality
Hathaway Building
Cheyenne, Wyoming 82002
(307) 777-7085

US EPA - REGION IX

Bruce Anderson
U.S. EPA Water Management Division
215 Fremont Street
San Francisco, California 94105
(415) 974-8338
(FTS) 454-8338

Arizona

Ron Frey
Arizona Department of Health Services
1740 W. Adams
Phoenix, Arizona 85007
(602) 255-1272

California

Don Owen
California State Water Resources Control Board
P. O. Box 100
Sacramento, California 95801
(916) 322-3004

Hawaii

Hiram Young
WTW Construction Grants Program
Hawaii State Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801
(808) 548-4127

Nevada

James Williams
Nevada Department of Environmental Protection
201 S. Fall Street
Carson City, Nevada 89710
(702) 885-5870

US EPA - REGION X

Tom Johnson
U.S. EPA Water Management Div.
1200 6th Avenue
Seattle, Washington 98101
(206) 442-4012
(FTS) 399-4012

Alaska

Dick Markham
Alaska Department of Environmental Conservation
Division of Water Programs
Pouch O
Juneau, Alaska 99811
(907) 465-2611

TABLE 5 (cont'd)

Idaho

Robert Braun
Idaho Department of Health and Welfare
Division of Environment
State House
Boise, Idaho 83720
(208) 334-4269

Oregon

B. J. Smith
Department of Environmental Quality
P. O. Box 1760
Portland, Oregon 97207
(503) 229-5257

Washington

Chris Haynes
Department of Ecology
Office of Water Programs
Olympia, Washington 98504
(206) 459-6101

Washington EPA
I/A Technology Contact

Richard Thomas
U.S. EPA (WH-547)
Washington, D.C. 20460
(202) 382-7370
(FTS) 382-7370

Washington EPA
Small Flows Technology Contact

Keith Dearth
U.S. EPA (WH-595)
Washington, D.C. 20460
(202) 382-7266
(FTS) 382-7266

MERL EPA
I/A Technology Contact

Jim Kreissl
U.S. EPA MERL
Cincinnati, Ohio 45268
(513) 684-7611
(FTS) 684-7611

R. S. Kerr EPA
I/A Technology Contact

George Keeler
R. S. Kerr Environmental Research Laboratory
P. O. Box 1198
Ada, Oklahoma 74820
(405) 332-8800
(FTS) 743-2212

*U.S. GOVERNMENT PRINTING OFFICE : 1984 0-421-545/11823