А

AANHS. See Alaska Area Native Health Service ADEC. See Alaska Department of Environmental Conservation Advanced waste processing technologies under consideration at Ames Research Center, 84-85 AlasCan organic waste and wastewater treatment ceramic toilet, 76 comporting tank, 74-76 greywater treatment tank, 76 kitchen waste disposal system, 76 system characteristics, 74 Alaska Area Native Health Service, 55,58 Alaska Department of Community and Regional Affairs. 65 coordination needs among training programs, 68 O&M funding, 17-18 Alaska Department of Environmental Conservation capital construction funding, 58 certification of sanitation facility operators, 63 coordination needs among training programs, 68 institutional and regulatory framework relevant to Alaskan village sanitation, 52-53 Local Utility Matching Program, 67 mission and accomplishments, 5-6 O&M funding, 17-18 project planning, design, and construction considerations. 62 Remote Worker Maintenance program, 64-65 role and responsibilities, 51-52 RUBA program funding, 65 sanitation condition categories, 34 Alaska Native Claims Settlement Act of 1971,28 Alaska Native Health Board, 14 Alaska Natives' roles and responsibilities capital construction concerns, 58-60 conclusion, 50 coordination of sanitation improvement efforts, 14 economic health and culture of Native villages, 28-31.40-45 Native peoples of Alaska, 26-28 O&M funding concerns, 49-50

O&M of existing piped sanitation technologies, 39-40 O&M of sanitation projects, 7-11, 45-49 setting and sanitation problems, 1-3, 23-28, 31-36 Alaska Science and Technology Foundation, 13-14, 62 Alternative sanitation technologies AlasCan organic waste and wastewater treatment, 74-76 conclusion, 93 congressional options, 18-19 Cowater small-vehicle haul system, 72-74 Entech thermal oxidation system, 83-84 INCINOLET electric toilet system. 80-81 introduction, 71-72 NASA Controlled Ecological Life Support system, 84-86 NASA Extended Duration Orbiter waste management system, 88-90 NASA Space Shuttle Orbiter waste management system, 86-88 Phoenix comporting toilet, 76-78 Self-Contained Home system, 90-91 Storbum propane toilet system, 81-83 Sun-Mar comporting toilet, 78-80 technology issues and needs summary, 91-93 Ames Research Center, 84 Antarctica Analog Project, 85-86 Arctic region, 25 Army Corps of Engineers, 52-55

В

Bering seacoast region, 25 Bureau of Indian Affairs, 4, 55

С

Capital construction funding community concerns, 58-60 factors affecting, 60-61 Federal government role, 55-58 overview and find ings, 6-7 State role, 58

123

Categories of sanitation conditions background, 34 level a. 35 level b, 35 level c. 35 level d, 35-36 level e, 36 CELSS. See Controlled Ecological Life Support System Certification and training of sanitation facility operators, 63-64 Children's exposure to human waste, 33-34 Clean Water Act, 15,53 Clivus Multrum comporting toilet, 76 Congressional oversight considerations or options goals, 11-12 interim option for improving sanitation among Native villages, 12-14 options for solving the waste sanitation problems of Alaskan Natives, 14-21 Controlled Ecological Life Support System Antarctica Analog Project, 85-86 background, 84-85 life support research testbed, 85 Cost of living, role of subsistence practices in, 40-43 Cowater small-vehicle haul system dual-flush toilet, 72-73 haul tank and haul vehicle, 73-74 in-house water supply, 73 Cultural importance of subsistence practices among Alaska's Native villages, 30,44

D

DCRA. See Alaska Department of Community and Regional Affairs Diseases and sanitation problems, 1-2,31,33-34, 37-38,58-59

Distribution of sanitation technologies among rural Alaskan villages, 118-122

Ε

Economic health and culture of Native villages, 28-31,40-45 Emmonak sanitation project, 61-63 Entech thermal oxidation system, 83-84 Environmental Protection Agency, 5, 19-20,52-55, 60,65 EPA. *See* Environmental Protection Agency Estimating Federal subsidy needs, 10-11 Extended Duration Orbiter waste management system, 88-90

F

Facilities construction, 4.6-7.55-61 Farmers Home Administration, 45,60 Federal and State agencies' roles and responsibilities. See *also specific* agencies by name capital construction funding, 6-7, 55-61 conclusion, 69-70 external subsidies for O&M maintenance activities. 68-69 institutional and regulatory framework relevant to Alaskan village sanitation, 52-55 introduction, 51-52 mission and accomplishments of agencies responsible for sanitation, 3-6 permit types needed to constructor upgrade rural waste sanitation facilities, 54-55 project planning, design, and construction, 61-63 technical assistance, 17-18,64-68 training and certification of sanitation facility operators, 63-64 Federal Field-Alaska Rural Sanitation Work Group, 14,20-21,22,55 Funding issues capital construction funding, 6-7,55-61 O&M funding, 10-11, 17-18,49-50,68-69 subsidized goods and services and transfer payments, 30-31,43-44,68-69

G

Geographic setting of Alaska, 23-28

Η

Health epidemics and sanitation services, 33-34. See *also* Diseases and sanitation problems
Hepatitis A in rural Alaska, 3,31,33-34, 116-117
Honey bucket haul systems improvement program, 12-14, 16
Honey bucket use statistics
general distribution of Alaska's major indigenous cultures and of native villages operating honey buckets, 31-32
rural Alaskan Native villages using honey buckets as predominant sanitation technology, 1-2

IHS. See Indian Health Service

INCINOLET electric toilet system

maintenance requirements, 81

system characteristics, 80-81

Indian Health Amendments of 1992,5, 15, 17, 49-50,69

Indian Health Care Improvement Act of 1976, 4-5, 49-50,69

Indian Health Service

capital construction funding, 7, 55-61 community commitment to projects, 45 coordination needs among training programs, 68 improvement of existing honey bucket systems, 12-13 institutional and regulatory framework relevant to Alaskan village sanitation, 52-55 mission and accomplishments, 4-5 O&M funding, 10-11, 17-18, 49-50,68-69 project planning, design, and construction considerations. 61-63 role and responsibilities, 51-52, 69 Sanitation Technology Demonstration Work Group funding, 15 training of sanitation facility operators, 63 Utility Maintenance Specialist program, 64 Indian Sanitation Facilities Construction Act of 1959.4-5.51.55 Institutional and regulatory framework relevant to

Alaskan village sanitation, 52-55 Interior region, 25

K

Kuskokwim and Yukon communities compared, 46-47

L

Land claims and tribal movements of Alaska Natives, 28, 111-115 Life support research testbed, 85 Local Utility Matching Program, 67 LUMP. *See* Local Utility Matching Program

М

Modern Alaska and emergence of Native corporations, 28-31

Ν

Nana Regional Corp., 62
NASA. See National Aeronautics and Space Administration
National Aeronautics and Space Administration Controlled Ecological Life Support System, 84-86
Extended Duration Orbiter waste management system, 88-90
Space Shuttle Orbiter waste management system, 86-88

National Arctic Research Laboratory, 85

National Science Foundation, 85 Native corporations, 14, 2S-3 I Native peoples of Alaska, 26-28

0

O&M. See Operation and maintenance issues Operation and maintenance issues congressional oversight considerations, 15, 17 factors contributing to inadequate O&M, 7-11, 48-49 funding of O&M activities, 10-11, 17-18,49-50, 68-69 Native communities' role in O&M, 7-11, 45-49 piped sanitation technologies O&M, 39-40 technical assistance, 17-18,64-68 training and certification of sanitation facility operators, 63-64 Oversight hearings option, 19-21 Overview and findings capital construction for- sanitation facilities, 6-7 conclusion, 21-22, 38 congress ional oversight considerations or options, 11-21 factors contributing to inadequate O&M of sanitation facilities, 7-11 mission and accomplishments of agencies responsible for sanitation, 3-6 modern Alaska and the emergence of Native corporations, 28-31 Native villages' setting and sanitation problems, 1-3, 23-28, 31-36 water availability and sanitation in rural Alaska, 4.36-38

Ρ

Phoenix composting toilet comporting tank, 78 kitchen waste disposal inlet, 77-78 maintenance requirements, 78 system characteristics, 76-77 toilet system, 77
Piped sanitation technologies operation and maintenance, 39-40 types considered for rural Native Alaskan villages, 8 types in rural Alaskan villages, 40-42
Project planning, design, and construction considerations, 61-63

R

Regional Native corporations, 14, 28-31 Regulatory and institutional framework relevant to Alaskan village sanitation, 52-55 Remote Maintenance Worker program, 64-65 RMW program. See Remote Maintenance Worker program

RUB A. See Rural Utility Business Advisor Program Rural Utility Business Advisor Program, 65-67

S

Safe Drinking Water Act, 15 Sanitation facility operator certification and training, 63-64 Sanitation technologies. See also Alternative sanitation technologies: Piped sanitation technologies existing technologies considered for Native villages in rural Alaska, 8-10 honey bucket haul systems improvement program, 12-14, 16 use statistics, 1-3, 31-32, 118-122 Sanitation Technology Demonstration Work Group, 14-15 Self-Contained Home system, 90-91 Septic systems, 8 Setting and sanitation problems of Native villages, 1-3, 23-28.31-36 Sewage management. See Sanitation technologies Snyder Act of 1921,4 Southwestern Alaska, 23, 25 Space Shuttle Orbiter waste management system sewage collection/storage system, 88 system characteristics, 86-87 urine collection system, 87-88 State agencies' roles and responsibilities. See Federal and State agencies' roles and responsibil i tics Storburn propane toilet system, 81-83 Subsidized goods and services and transfer payments, 30-31,43-44.68-69 Subsistence practices cultural importance among Alaska's Native villages, 44 modern Alaska and emergence of Native corporations, 28-31 role in village cost of living, 40-43 Sun-Mar comporting toilet Centrex and Water Closet Multrum models, 80 Compact and X-L (EXCEL) models, 80 maintenance requirements, 80 system characteristics, 78-80

Т

Technical assistance programs, 17-18,64-68 Technology issues and needs summary actual costs of systems to Native villages, 92-93 household size and design, 92 local village economy, 92 Native community involvement in projects, 92 permafrost influence, 91 technical training of Natives, 92 water availability, 91-92 Training and certificat ion of sanitation facility operators, **63-64** Transfer payments and subsidized goods and services, 30-31, 43-44,68-69 Tribal movements and land claims of Alaska Natives, 111-115 Truck haul system, 8, 31

U

University of Alaska Anchorage, 13, 62, 64, 76, '79U.S. Army Corps of Engineers. See Army Corps of EngineersU.S. Environmental Protection Agency. See Environmental Protection AgencyUtility Maintenance Specialist program, 64

V

Village Safe Water Act, 58
Village Safe Water program

capital construction funding, 7, 58-61
community commitment to projects, 45
institutional and regulatory framework relevant
to Alaskan village sanitation, 52-53
Local Utility Matching Program, 67
mission and accomplishments, 5-6
project planning, design, and construction
considerations, 61-63, 62-63
role and responsibilities, 5 I -52, 69
RUBA program funding, 65
sanitation condition categories, 34-35
training of sanitation facility operators, 63
VSW. See Village Safe Water program

W

Waste sanitation technologies. See Sanitation technologies Water availability and sanitation, 2, 3,4,36-38 Western Alaska, 25 Westerninfluence and accessibility of Native communities. 44-45

Y

Yukon and Kuskokwim communities compared, 46-47 Yukon -Kuskokwim Delta region, 34 Yukon -Kuskokwim Health Corporation, 38