The Sanitation Facilities Construction Program

of the Indian Health Service

Public Law 86-121
Annual Report for 2000

This Annual Report for Fiscal Year (FY) 2000 was produced by the Indian Health Service (IHS) Sanitation Facilities Construction (SFC) Program to make available, in a concise format, frequently requested information about the Program. Additional information can be obtained by writing to the following address:

Indian Health Service
SFC Program
12300 Twinbrook Parkway
Room 610, Twinbrook Metro Plaza
Rockville, MD 20852

We wish to acknowledge the IHS California, Navajo, Oklahoma, and Phoenix Area offices for their contribution to this report.

The Sanitation Facilities Construction Program Annual Report for 2000

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Preface

The Indian Health Service (IHS) Sanitation Facilities Construction (SFC) Program continuously endeavors to identify and report the eligible sanitation needs of all American Indians and Alaska Natives and carry out a program in cooperation with tribal governments to meet those needs. These needs, as well as some of the accomplishments of the Program in FY 2000, are summarized within. Continuing program challenges include improving community water supplies, waste water treatment systems, and solid waste disposal facilities in culturally diverse and often times remote areas; from Alaskan villages to Florida and from Maine to California. Six projects are highlighted in this report which exemplify the SFC Program efforts in addressing these specific challenges.

The SFC Program has worked in partnership with tribal governments to construct essential sanitation facilities since the passage of the Indian Sanitation Facilities Act (P.L. 86-121) in 1959. As a result of more than four decades of cooperative efforts, many tribes have developed the administrative and technical capability to construct their own sanitation facilities with engineering support from IHS. In fiscal year 2000, approximately 88 percent of all the SFC construction work, $110 million in construction funds, was accomplished by either tribes, tribal organizations or Indian-owned construction firms. And as in previous years, a number of tribes have continued to assume responsibility for their respective SFC programs while IHS SFC Program managers have continued to work with tribes and others to support the tribal Self-Governance/Self-Determination decision making process under the expanded authorities of P.L. 93- 638. One goal of this effort has been to make available program information in a more open, accurate, and efficient way. This report, prepared annually since 1993, is one means of achieving this goal.

The Sanitation Facilities Construction Program

Introduction

On July 31, 1959, Public Law (P.L.) 86-121, the Indian Sanitation Facilities Act, was signed by President Eisenhower. The passage of this Act was a milestone in Indian health legislation and lead to the creation of a Sanitation Facilities Construction (SFC) Program within the Indian Health Service (IHS).

Public Law 86-121 authorizes the SFC Program to provide essential water supply and sewage and solid waste disposal facilities for American Indian and Alaska Native homes and communities. From 1959 through 2000, approximately $1.72 billion have been appropriated for the construction of essential sanitation facilities for American Indians and Alaska Natives. These appropriations, plus over $485 million in contributions from other Federal and State agencies, and tribal governments, have funded 10,127 sanitation facilities construction projects that have provided water, sewer and/or solid waste disposal facilities for over approximately 243,000 American Indian and Alaska Native homes.

In the year 2000, 399 sanitation facilities construction projects, provided first-time services to 5,330 homes and sanitation facilities upgrade for another 13,046 homes.

From its inception in 1959, the SFC Program has been viewed as being unique among Federal programs because it mandated consultation with tribal governments and encouraged tribal participation in carrying out its activities. Today, IHS employees work cooperatively with tribal personnel in providing essential sanitation facilities to Indian communities and Alaska villages. Enhancing tribal capabilities and building partnerships based on mutual respect have been major keys to the SFC Program success.

Protecting the health of and preventing disease among American Indian and Alaska Native populations are primary IHS objectives. In the clinical environment, physicians, dentists, nurses, and other medical care providers work to restore the health of ill patients. However, preventing illness is clearly the most effective way to improve health status. Improving the environment in which people live, and assisting them to interact positively with that environment, can be expected to result in significantly healthier populations. Providing sanitation facilities and better quality housing are environmental improvements that have proven track records in that regard.

The SFC Program Mission

Figure 1: Construction of a septic system, 1960's

Today, as it has for the past 40 years, the SFC Program continues to provide assistance to the American Indian and Alaska Native people in eliminating sanitation facilities deficiencies in Indian homes and communities.

The IHS mission is to raise the health status of American Indian and Alaska Native people to the highest possible level. To carry out this mission, the IHS provides comprehensive primary and preventive health services. The SFC Program is the IHS' environmental engineering component. It provides technical and financial assistance to Indian tribes and Alaska Native villages (tribes) for cooperative development and continued operation of safe water, wastewater, and solid waste systems, and related support facilities.

In partnership with the tribes, the SFC Program:

1. ***Develops and maintains an inventory of sanitation deficiencies in Indian and Alaska Native communities for use by IHS and the Congress.***
2. ***Provides environmental engineering assistance with utility master planning and sanitary surveys.***
3. ***Develops multi-agency funded sanitation projects; accomplishes interagency coordination, assistance with grant applications, and leveraging of IHS funds.***
4. ***Provides funding for water supply and waste disposal facilities.***
5. ***Provides professional engineering design and/or construction services for water supply and waste disposal facilities.***
6. ***Provides technical consultation and training to improve the operation and maintenance of tribally owned water supply and waste disposal systems.***
7. ***Advocates for tribes during the development of policies, regulations, and programs.***
8. ***Assists tribes with sanitation facility emergencies.***

Tribal Involvement

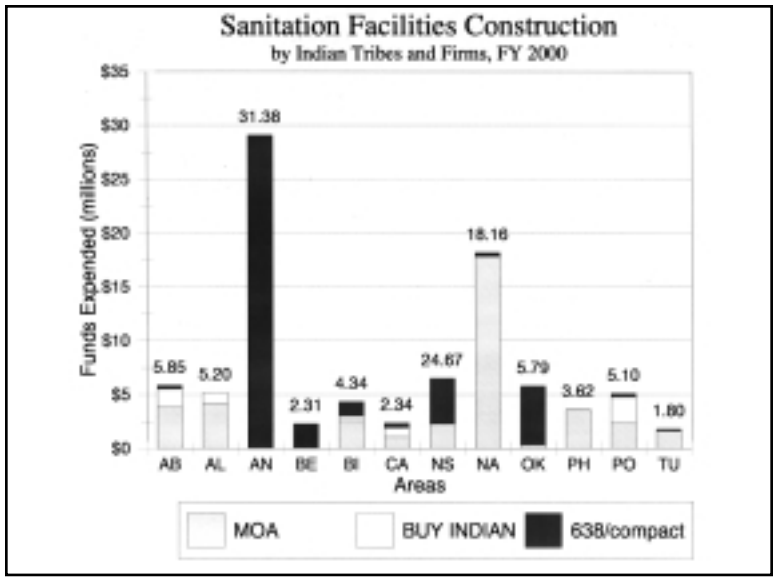


Figure 2: Funds Expended by Indian and Alaska Native tribes and Indian-owned firms in the fiscal year

The SFC Program employs a cooperative approach for providing sanitation facilities to American Indian and Alaska Native communities. During fiscal year (FY) 2000, tribes, tribal organizations or Indian-owned construction firms administered and/or expended approximately $110 million in SFC Program construction funds (approximately 88 percent of all SFC construction expenditures). Also, many tribes participate by contributing labor, materials, and administrative support to projects.

Each sanitation facilities construction project is initiated at the request of a tribe or tribal organization. Consultation with the tribal government is maintained through every phase of the construction process, from preliminary design to project completion. Operation and maintenance of these facilities by the American Indian and Alaska Native people, with ongoing technical assistance from IHS, ensures long-term health benefits associated with improved sanitation conditions.

In addition to construction work, a number of tribes have also assumed responsibility for the administration of their own SFC Program. Under Titles I and III of P.L. 93-638, the Indian Self-Determination and Education Assistance Act, as amended, fifteen tribes from the Billings,

Figure 3: Homeowner training on Navajo Reservation, 1970's

California, Nashville, Oklahoma City and Phoenix Areas managed their own SFC Program through 638 Self-Determination contracts and Self-Governance compacts in 2000. A list of these tribes is shown in Table 1.

The IHS SFC program activity seeks the advice and recommendations through the national Facilities Appropriation Advisory Board and Area - specific Tribal Advisory Committees. These groups review program policies and guidelines and provide input on the future direction of the SFC program.

Figure 4: Unloading construction materials on airplane in Kotlik, Alaska

TABLE 1

Tribes that Managed the SFC Program in FY 2000 Under Title I or III of P.L. 93-638, as Amended

IHS Area	Tribe
Billings	Confederated Tribes of Salish & Kootenai (Flathead)
	Rocky Boys (Chippewa-Cree)
California	Hoopa Valley Tribe
Nashville	Penobscot Tribe of Maine
	Mississippi Band of Choctaw Indians
Oklahoma City	Cherokee Nation of Oklahoma
	Absentee Shawnee Tribe of Oklahoma
	Choctaw Nation of Oklahoma
	Chickasaw Nation of Oklahoma
	Wyandotte Tribe of Oklahoma
	* Modoc Tribe of Oklahoma
	The Seminole Nation of Oklahoma (In Chickasaw Compact)
Phoenix	Ely Shoshone Tribe
	* Gila River Pima-Maricopa Indian Community
	* Ak Chin Indian Community of Papago Indians (In Gila River Contract)

* Title I

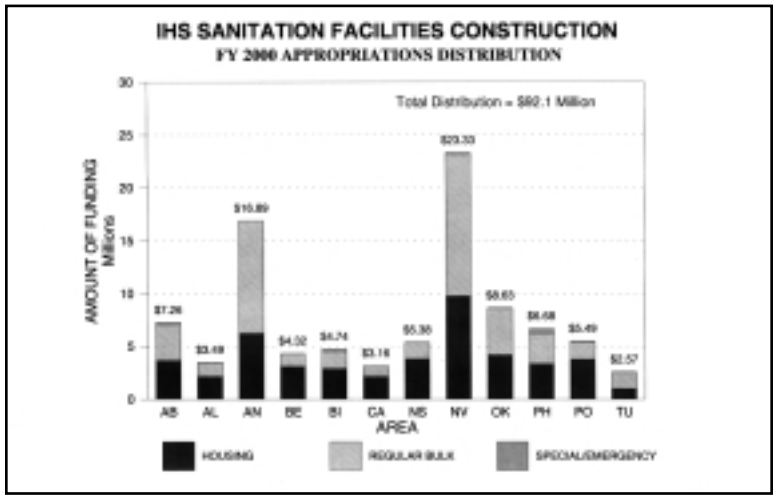


Figure 5: Distribution of SFC Program appropriations, by Area, for fiscal year 2000.

In FY 2000, $92.117 million was appropriated for the construction of sanitation facilities. In addition to these appropriated funds, the SFC Program received more than $1.37 million from HUD and $32 million in contributions from other Federal agencies, including EPA, and from non-Federal sources, such as tribes and State agencies. With these contributions, the SFC Program's construction budget for FY 2000 totaled more than $125 million.

With these funds, the SFC Program initiated 399 projects to provide essential sanitation facilities to an estimated 3,886 new and like-new homes, and to 1,444 first service existing homes. Included among the new housing units receiving facilities are 205 new HUD-sponsored units, 314 BIA-HIP sponsored units, and 3,367 units constructed by tribes, individuals, and other entities. In conjunction with providing sanitation facilities for the first time to new and existing homes, water and sewer systems serving 13,046 previously served homes were upgraded. These statistics are summarized in Table 2 on the following page.

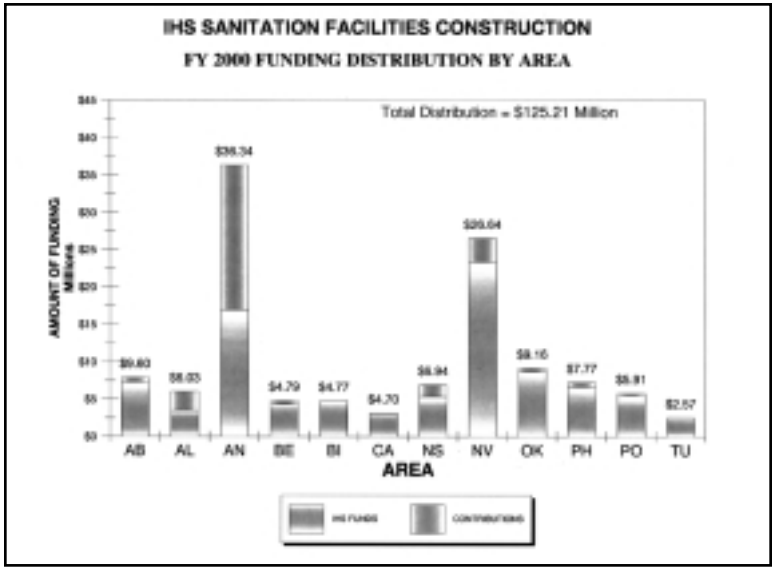


Figure 6: Total distribution of SFC Program funds in FY 2000, Including all contributions and HUD funds.

TABLE 2
IHS Sanitation Facilities Construction Program Statistics for FY 2000

SFC Program Budget:

IHS SFC Appropriation =	$	92,117,000
HUD Contributions (Housing + CDBG) =	$	1,365,280
Other Contributions =	$	31,730,687
Total Funding in FY 2000 =	$	**125,212,967**
Total IHS SFC Appropriations since 1959 =	$	1.72 billion

SFC Projects:

Number of Projects Undertaken in 2000 =	399
Total Number of Projects Undertaken since 1959 =	10,127

Homes Provided Sanitation Facilities in FY 2000:

Number of New and Like-New Homes Served	
HUD-sponsored Homes =	205
BIA-sponsored Homes =	314
Tribal and Other Homes =	3,367
Sub-Total	**3,886**
Number of Existing Homes Served =	1,444
Number of Previously Served Homes Provided Upgraded Sanitation Facilities =	13,046
Total Number of Homes Served in 2000 =	**18,376**

Homes Provided Sanitation Facilities since 1959:

Number of New and Like-New Homes	
HUD-sponsored Homes =	60,156
BIA-sponsored Homes =	21,896
Tribal and Other Homes =	61,815
Sub-Total	**143,867**
Number of Existing Homes =	98,862
Total Number of Homes Served =	**242,729**

Sanitation Deficiency System (SDS) Information:

Total Estimated Cost of Sanitation Deficiencies =	$1.781 billion
Total Estimated Cost of Feasible Projects =	$831 million
Total Number of Projects/Phases Identified =	2,998
Number of Feasible Projects Identified =	2,279
Estimated Total Number of Existing Homes Without Potable Water =	20,191
Estimated Total Number of Homes That Lack Either a Safe Water Supply or Sewage Disposal System, or Both (Deficiency Levels 4 & 5) =	30,120

Figure 7: Nuclear density testing on a construction site on the Tohono O'odam Reservation, Arizona.

Six sanitation facilities construction projects are highlighted on the following pages. These projects represent a small fraction of the total construction workload undertaken by the SFC Program in 2000. They were selected to illustrate typical cooperative efforts undertaken by IHS, the tribes, and other Federal and state agencies to provide safe water supply, sanitary sewage disposal, and solid waste facilities for American Indian and Alaska Native homes and communities.

Figure 8: Septic tank and drainfield installation on the Navajo Reservation, Arizona.

Open Dumps, San Carlos Apache Indian Reservation, Arizona

Project PH 99-R71

Figure 9: San Carlos Indian Reservation open dump.

Open dump sites are blights to any landscape and pose a potential health risk. Because they're open and unauthorized, there are no controls on access to open dumps and people and animals can rummage around in them unabated, becoming susceptible to contacting and spreading diseases.

The San Carlos Apache Indian Reservation had three open dump sites that required closing. The Tribe made the dump closing a priority in the IHS sanitation deficiency system and IHS Project PH 99-R71 was approved to fund the dump closures in compliance with RCRA closure requirements and procedures. One problem faced with closing open dumps is what to do with the large items found at the sites, such as old cars and refrigerators.

After approval of the project, IHS Phoenix Area project engineer, Chris Brady, met with Tribal Utility Construction and Tribal EPA personnel to outline an approach to the open dump closures. During the meeting, the question was asked, "Why should we bury all the scrap metal in the open dumps?" Mr. Brady, Tribal Utility Construction, and

Figure10: Pictured left to right are IHS technician Clark "Sonny" Kniffin, Jr., IHS project engineer, Chris Brady, and Trial Utility Construction Director, Robert Burdette, Jr.

the Tribal EPA representatives decided to take a new approach to cleaning up the dump sites by recycling the old cars and other scrap metal in the dumps. They contacted a scrap metal buyer in Phoenix who was more than willing to come to the reservation and purchase all the scrap metal available.

When Mr. Brady, Tribal Utility Construction, and the Tribal EPA representative approached the Tribe with their plan to recycle scrap metal, the idea mushroomed into a plan to conduct a Reservation-wide scrap metal cleanup. The Tribe, Tribal EPA, Mt. Turnbull Sanitation Service (Tribal solid waste program) and the Bureau of Indian Affairs (BIA) all caught on to the idea and pooled resources to make it work.

Figure11: Reservation-wide scrap metal was hauled by the BIA and San Carlos solid waste program Mt. Turnbull Sanitation Service.

Figure12: Over 800 cars, 365 refrigerators, and vast amounts of scrap metal were recycled

The recycling program was open to the public and advertised in the local newspaper, radio stations and cable television station. The Tribal EPA made its office available for the public to contact to take advantage of the service.

The Phoenix scrap metal recycler set up his metal crusher at each open dump site to process scrap metal located at the site. Pick up services were made available to the public by the Mt. Turnbull Sanitation Service (which picked up the smaller items from homeowners) and the BIA which donated equipment used to pick up large items from the homeowners and transport them to the crush sites. The BIA even went into washes on the reservation to pick up abandoned cars and any other scrap metal items found. Tribal Utility Construction personnel collected unwanted vehicles from the residents.

To date, approximately 800 cars, 365 refrigerators and vast amounts of other scrap metal items have been collected, crushed and removed. Funds collected for the scrap metal are being used by the Tribal EPA to enhance the open dump project. Another positive by-product of the recycling project is the fact that the entire reservation has been made aware of the open dump cleanup and closure project. All remaining waste will be transported to appropriate, licensed solid waste disposal sites. The dump sites will be graded, seeded and site access will be cut off by fences or berms.

The dump closure project will provide many public health benefits. The removal of scrap metal reduces the source of injury and vector problems. The dump sites will no longer be potential repositories for hazardous waste. Air pollution from burning waste and water pollution from site drainage will be eliminated.

McIntosh County Rural Water, Hanna, Oklahoma

Project OK93-L31

Figure 13: Completed 16' x110', 60,000 gallon stand pipe.

In a Project Proposal dated July 16, 1993, the Creek Nation of Oklahoma requested assistance from the Indian Health Service in the provision of water supply facilities for the qualifying Indian families residing in the Shell Creek area within the service area of the proposed McIntosh County Rural Water District No. 12.

The improvements were provided at a total estimated cost of $654,100.00. Grant and loan funds were contributed from the Rural Development Administration (RDA) in the amount of $240,100.00 and $89,000.00, respectively, for a total contribution of $329,100.00. An Oklahoma Department of Commerce (ODOC) Community Development Block Grant (CDBG) in the amount of $175,000.00 has also been contributed. In addition, grant funds have been contributed from the Oklahoma Water Resources Board (OWRB) in the amount of $50,000.00. The Indian Health Service will contribute $100,000.00 to the McIntosh County Rural Water District No. 12 as their pro-rata share to provide the fourteen Indian homes with first service rural water.

The project provided rural water distribution facilities in the Shell Creek area where there has been no rural water before this time. The facilities included 16,000 feet of 6-inch, 48,500 feet of 4-inch, and 81,300 feet of 2-inch, PVC water line extension with appurtenances, eighty-five service connections, a 60,000 gallon standpipe, a thirty gpm booster pump station, and connection to the city of Hanna's water treatment plant which will be the water source for the new District.

The total cost to the Indian Health Service of providing individual water supply facilities to the fourteen Indian homes was $139,000.00.

Figure 14: Completed pumphouse and clearwell tank

Tribal Operator Certification Program, Phoenix, Arizona

Figure 15: Electical controls course for tribal operators

Operation and maintenance (O&M) training continues to be a primary focus of the Phoenix Area Office of Environmental Health and Engineering (OEHE) with the highly successful Tribal Operator Certification Program (TOCP) beginning its eighth year in 2001.

The TOCP program was developed as an alternative to State certification programs for Tribal water and sewer utility operators. Through the direction of the OEHE Division of Sanitation Facilities Construction (DSFC) O&M Director Kim Yale, many Phoenix Area reservations now have certified operators.

The DSFC O&M Section provides all training for exam sessions offered to Tribes served by the Phoenix Area, and the Inter Tribal Council of Arizona, Inc. is the Certifying Authority for the program. The five modules and exams provided offer Level 1 certification in Water Treatment, Water Distribution, and Wastewater Collection. Wastewater Treatment-Lagoons certification is also offered for those operators who have lagoon systems.

The examinations were developed in cooperation with the Association of Boards of Certification (ABC) in Ames, Iowa and the Level 1 certifications under the Tribal Operator Certification Program have reciprocity with the equivalent Level 1 certifications offered by states that are ABC members.

Figure 16: Team approach for solving electrical problems

The training modules combine classroom lectures with hands- on training to give an operator complete O&M instruction. In the past seven years, approximately 330 certificates have been issued by ITCA to tribal operators primarily from reservations located in the desert south-west region. Approximately 15 to 20% of the certified operators hold more than one certificate.

In addition to operator certification training, the Phoenix Area OEHE hosts two to four operator training courses that are sponsored by the Environmental Heath Support Center in Albuquerque.

Figure 18: Operators check notes before analyzing the controls.

Figure 17: Utility operators check voltage on electrical panels.

Figure 19: Operators receive final instructions and notes on electrical controls.

Round Valley Community Sewer System, Round Valley Reservation, Covelo, California

Project CA 97-L02, CA99-045, CA99-L17

Figure 20: Sewer main construction on Tabor Road.

The Round Valley Indian Reservation is located in the Coastal Mountain Range of Mendocino and Trinidad Counties, California. The Round Valley Indian Reservation consists of 30,124 acres and is jointly inhabited amongst seven Indian Tribes (Pomo, Pit River, Nomlacki, Concow, Wailacki, Yuki, and Littlelake), making the Round Valley Indian Tribes the third largest land base Tribe in California. The majority of the tribal population lives on the valley floor where there is a high density of homes with individual septic systems. Most of the septic systems located on the valley floor are failing because of poor soil conditions throughout the valley and high ground water during the winter season. It is also true that many of the individual septic tank/drainfield systems have not been maintained and have exceeded their design longevity.

In 1996, the Indian Health Service performed a field investigation and identified that 50% of the reservation's water wells that were analyzed had tested positive for the presence of coliform bacteria. Because of the potential public health risk, the US EPA issued a warning to the Tribes that the water supplies may be contaminated and required that the system be monitored on a monthly basis. The Indian Health Service encouraged the Tribes to develop a master plan to construct a sewer collection system and a centralized wastewater treatment and disposal facili-

Figure 21: Construction of the south dike of the AIWPS outer treatment pond cell

ty in lieu of repairing the existing conventional septic systems. The Tribes vigorously secured EPA Clean Water Act and HUD CDBG funds in addition to the IHS contributions for a total project funding of $2,551,459 for the construction of Phases 1 and 2 of the Round Valley Community Sewer System Project.

Phases 1 and 2 involved the design and construction of 4.5 miles of sewer collection main and service lines with 47 manholes and two deep sewage lift station serving 60 HUD homes and the Housing Authority Office within the Round Valley Piner Subdivision and 22 homes and the tribal health clinic along Little Biggar and Shady Lanes.

Under Phase 1, an advanced integrated wastewater pond system (AIWPS) with a high water level capacity of 12.11 acres, lined with 60 mil HDPE and GCL, and requiring 1.23 million cubic yards of earthwork was constructed to dispose and treat the wastewater. The present design capacity allows for 189 homes to be connected to the sewer system with the capability of expansion under future phases.

Figure 22: Installation of the Reinforced Geosynthethic Clay Liner(GCL) in the AIWPS Fermentation Cell Pit.

Because of the unique nature of the project and because of the 40-inch annual average precipitation known for this area, the contractor was constrained for time to construct the sewer main and AIWPS during the driest months of the year (August through November). This was when the ground water was at acceptable depths for construction purposes and the contractor would not be delayed by weather. A maximum excavation depth of twelve feet was required to construct sewer main and to provide the native materials needed for construction of the pond embankments.

Challenges on the project included unstable soil conditions, maintaining OSHA safety requirements, archaeological burial sites, right-of-way easement issues, earthwork management problems, maintaining road integrity within county requirements during trenching operations, weather delays, and maintaining good public relations with the tribal and non- tribal communities. The completion of the Round Valley Indian Community Sewer Project was the #1 priority for the California Area IHS during FY2000. The use of the AIWPS technology in the design of the Round Valley Sewer Treatment and Disposal Facility will be the prototype for future California Area IHS sewer projects.

Figure 23: Aerial View of the AIWPS

Monument Valley Water System, Navajo Indian Reservation, Monument Valley, Arizona

Project NA 00-A91

Figure 24: Waterline extension in Monument Valley, AZ.

The Oljato Chapter submitted a project proposal dated October 29, 1996, requesting services for 50 existing homes in Monument Valley Pass area. In response to this request a Planning Agreement for Project NA-00-A91 was executed by its last signature on February 13, 1997, and provided $50,000 of Indian Health Service (IHS) planning funds for preliminary engineering, right-of-way and archaeological surveys, and other planning activities associated with the project. Preliminary planning identified 64 homes in need of sanitation facilities in the area at an estimated project cost of $1,596,000.

The project summary proposed to add 127,550 feet of water main to the Oljato Community Water System to provide potable water facilities to the 64 homes. Individual wastewater disposal systems will be provided for 57 homes. The project also included the provision of interior plumbing facilities for 35 homes.

The total cost of this project was $1,596,000 for an average cost of $24,938 per home. The Navajo Nation, Oljato Chapter, through its Utah Navajo Trust Fund and Navajo Revitalization Funds, contributed $87,500 to the IHS for the project. The contribution covers the cost to plumb the 35 homes. The IHS contributed $1,508,500 in Housing Support funds. The Navajo Nation, using additional Utah Navajo Trust Fund and Navajo Revitalization funding, constructed bathroom additions for 25 project homes that have insufficient space for plumbing within the home.

Figure 25: Bathroom addition and waterline construction at a hogan in Monument Valley, AZ.

Shiprock Wastewater Treatment Plant, Navajo Indian Reservation, Shiprock, New Mexico

Project NA 96-847, NA 98-857, NA 00-876

Figure 26: Rebar placement for the base of the clarifier.

The Navajo Area Indian Health Service (IHS), Office of Environmental Health and Engineering (OEHE) in cooperation with the Navajo Nation, the Navajo Engineering and Construction Authority (NECA), the Navajo Tribal Utility Authority, and the U.S. EPA through the Clean Water Act (CWA) Indian Set-aside Program are making phased improvements to the existing Wastewater Treatment Plant (WWTP) located in Shiprock, New Mexico.

The Shiprock WWTP services approximately 1,150 connections with an influent flow averaging 0.938 MGD and a peak incoming flow of 1.9 MGD in year 2000. The average influent flow has increased by 0.1 MGD for the last three years beginning in 1998. The WWTP consist of primary and secondary treatment processes including primary sedimentation, trickling filters, secondary sedimentation, anaerobic digestion of settled solids, and chlorination of effluent exiting the plant.

Currently, the CWA has funded three phases and NHA has funded one phase of improvements to the Shiprock WWTP. The first phase upgraded existing biosolids drying beds and constructed additional storage bio-solids drying beds with a decant lift station. The second Phase constructed a new aeration basin with fine bubble diffusion and provided two 60 Hp blowers for supply air. Also, the

Figure 27: First quarter concrete pour for the clarifier base.

second phase constructed a new secondary sedimentation basin with a return sludge lift station and skimmer lift station.

The newly constructed aeration basin and secondary sedimentation basin are designed to work in tandem as a modified activated sludge treatment unit process. Phase II placed 960 cy^3 of concrete with the largest single pour of 400 cy^3 for the base of the secondary sedimentation basin.

Phase III will start construction in May of 2001. Phase III constructs a new anaerobic digester unit with a steel fixed cover. Once the fixed cover digester is completed, it will become the primary digester unit for the WWTP. The existing anaerobic digester then becomes the sludge stabilization basin. The existing digester has a floating cover allowing variable volume in the stabilization operational mode.

Figure 28: Concrete pour for the base of the clarifier.

Figure 29: Clarifier mechanism drive unit on the center column.

Phase IV is scheduled to begin after Phase III is completed. Phase IV constructs upgrades to the existing Chlorine Contact Chamber; upgrades the WWTP headwork's with a new mechanized bar screen; construct additional biosolids drying and storage beds; install a lift station servicing the WWTP holding pond transforming the pond into a flow equalization basin; and several miscellaneous plant improvements.

Sanitation Facilities and Health

Figure 30: Erecting pedestal of 50,000 gallon elevated storage sphere, MN

Protecting the health of and preventing disease among American Indian and Alaska Native populations are primary IHS objectives. In the Indian Health Care Amendments of 1988 and 1992, which amended the Indian Health Care Improvement Act (P.L. 93-437), the Congress declared that "...it is in the interest of the United States, that all Indian communities and Indian homes, new and existing, be provided with safe and adequate water supply systems and sanitary sewage waste disposal systems as soon as possible." Citing this policy, the Congress reaffirmed the primary responsibility and authority of the IHS "...to provide the necessary sanitation facilities..." as authorized under P.L. 86- 121.

A Report to Congress by the Comptroller General, dated March 11, 1974, noted that American Indian and Alaska Native families living in homes with satisfactory environmental conditions placed fewer demands on IHS' primary health care delivery system than families living in homes

Figure 31: Flush and haul holding tank in Northway, Alaska.

with unsatisfactory conditions; i.e., those with satisfactory environmental conditions in their homes required approximately 25 percent of the medical services required by those with unsatisfactory environmental conditions.

The IHS considers the provision of sanitation facilities to be a logical extension of its primary health care delivery efforts. The availability of essential sanitation facilities is critical to breaking the chain of waterborne communicable disease episodes. Properly designed and operated facilities can reduce the incidence of disease by eliminating waterborne bacteria, viruses, and parasites which cause such illnesses as Salmonellosis, Typhoid Fever, Cholera and Giardiosis. In addition, many other communicable diseases, including Hepatitis A, Shigella, and Impetigo are associated with the limited hand washing and bathing practices often found in households lacking adequate water supplies. This is particularly true for families that haul water.

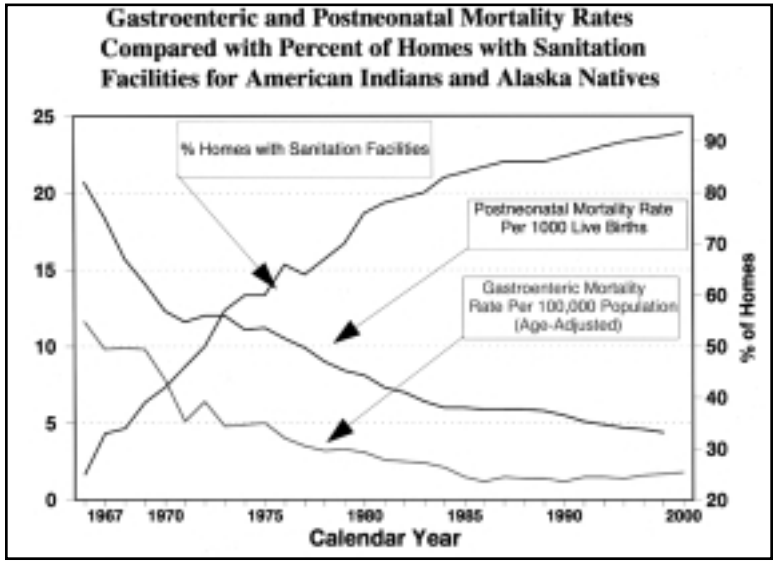


Figure 32: Graph of gastroenteric and postnatal death rates versus the number of Indian homes with sanitation facilities.

Availability of adequate sanitation facilities has value beyond disease intervention. Safe drinking water supplies and adequate waste disposal facilities are essential preconditions for most health promotion and disease prevention efforts. For example, consistently and optimally fluoridated drinking water can virtually eliminate tooth decay among children. Efforts by other public health specialists, such as nutritionists and alcoholism counselors, are enhanced if safe drinking water is readily available. And home health care nursing services are much more effective when safe water and adequate wastewater disposal systems are in place.

There are several diseases that are readily transmitted by contaminated water supplies. Among those of greatest importance are infectious hepatitis; typhoid, cholera, and paratyphoid fevers; and dysenteries. In 1955, more than 80 percent of American Indians and Alaska Natives were living in homes without essential sanitation facilities. The age- adjusted gastrointestinal disease death rate for those living in reservation States was 15.4 per 100,000 population. This rate was 4.3 times higher than that for all other races in the United States. In contrast, the age-adjusted gastrointestinal disease death rate for American Indians and Alaska Natives was 1.4 per 100,000 in 1988; this represents a 91 percent decrease in 33 years. A major factor in this significant gastrointestinal disease rate reduction has been the SFC Program effort to construct water supply and waste disposal facilities.

Improvements in other health statistics for American Indians and Alaska Natives are similarly impressive. In the period from 1955 through 1988, mortality rates for

infants decreased 85 percent; pneumonia and influenza rates decreased 71 percent each; and the tuberculosis rate decreased 96 percent. While a direct correlation between improved environmental conditions and this decreased mortality might not be obvious, the availability of sanitation facilities and improved housing most certainly has been a major factor.

That the SFC Program has been a significant contributor to the improved health status of American Indians and Alaska Natives is most clearly indicated by the decrease in the gastrointestinal disease death rate and concurrent increase in life expectancy.

Program Operations

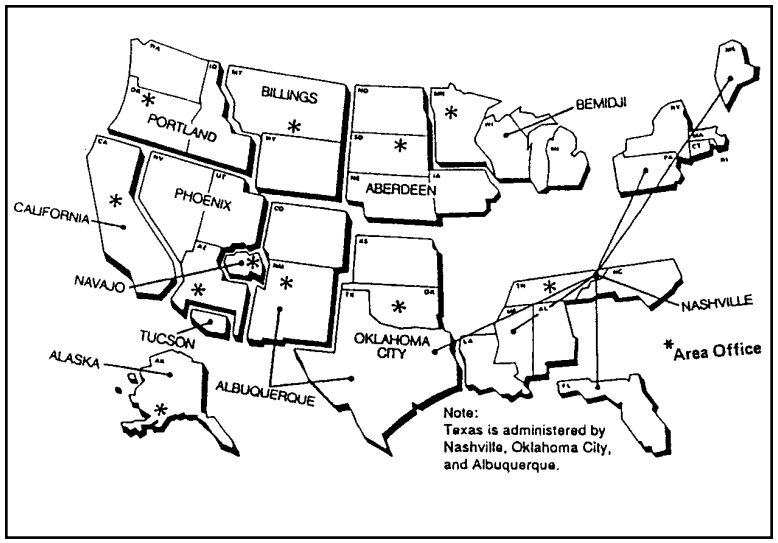


Figure 33: Location of Indian Health Service Area Offices.

With the recent reorganization of IHS in March 1997, the SFC Program is now part of the Division of Facilities and Environmental Engineering. The SFC Program's activities are supported by engineers, sanitarians, full- and part-time technicians, clerical staff, and skilled construction workers.

The IHS SFC Program is implemented by staffs in 12 Area Offices. The Program's Headquarters component, located in Rockville, Maryland, assists the Area Offices by establishing policies, providing guidance to ensure consistent and equitable program implementation nationwide, and interfacing with other Federal agencies.

The SFC Program works cooperatively with the tribes and tribal organizations, tribal housing authorities, and with many governmental agencies, such as the Department of Housing and Urban Development (HUD), the Bureau of Indian Affairs (BIA), the Environmental Protection Agency (EPA), and U.S. Department of Agriculture (USDA) Rural Utility Service (formally Farmers Home) toward achieving its sanitation facilities construction objectives. For example, funding for sanitation facilities construction in support of new and renovated HUD homes is typically made available to the SFC Program by HUD through tribes and Indian housing authorities. Cooperative agreements among the tribes, Indian housing authorities, IHS, and HUD permit the transfer of HUD funds to the IHS-SFC Program for construction of necessary water and sewer facilities.

Figure 34: Tribal meeting in Pedro Bay, Alaska

Figure 35: Engineer Elex Caboni, surveying for solid waste transfer station at Taos Pueblo, NM

Figure 36: Drilling for rock removal to facilitate installation of water main, Bois Forte Reservation.

Similar cooperative agreements involving the tribes, IHS, and the EPA Indian Set-Aside Grants Program have contributed EPA wastewater funds to the SFC Program. States do not have jurisdiction on trust lands, and have provided relatively little assistance to Indian tribes and reservations for the construction of sanitation facilities. One notable exception is the State of Alaska, which through its Village Safe Water program, has participated in many jointly funded construction efforts in Alaska native villages.

The SFC Program's efforts to provide sanitation facilities for American Indian and Alaska Native homes and communities benefits more than 550 Federally recognized tribes and tribal organizations located in the 33 Reservation States. Sanitation facilities are provided, at the request of tribes, bands, or groups, for homes owned and occupied by American Indians and Alaska Natives who are eligible for assistance. Provision of water, wastewater, and solid waste facilities for commercial and industrial purposes is not authorized under P.L. 86-121; therefore, such needs are not addressed by the SFC Program.

Non-HUD sanitation facilities projects that are approved for implementation are classified under one of the following categories:

1) projects to assist new and like new Indian housing (Housing Support Projects);

2) projects to serve existing homes and communities (Regular Projects); and

3) special/emergency projects.

Housing Support Projects provide sanitation facilities for new homes and homes in like new condition for eligible Indian and Alaska Native families. These projects typically serve Indian homes being constructed or rehabilitated by the BIA- Home Improvement Program (HIP), tribes, individual homeowners, or other nonprofit organizations.

Figure 37: Construction of a water tank in Tunica Biloxi, MS

Regular Projects provide sanitation facilities for existing Indian homes and communities. The SFC Program has established a Sanitation Deficiency System (SDS) for identifying and prioritizing projects to serve homes and communities with unmet water, sewer, and solid waste needs. This system is updated annually, and the information and funding requirements are submitted each year to the Congress in accordance with Indian Health Care Improvement Act requirements. A summary of the 1996 inventory of sanitation deficiencies is presented in this report.

Special/Emergency Projects provide sanitation facilities for special studies and emergency situations. Emergency projects typically involve community sanitation facilities which have undergone, or are expected to experience, sudden wide-spread failure that will directly affect the public health. Funding for special/emergency projects is very limited and all projects must be approved by the SFC Program Headquarters Office. The average project funding level is $20 to $50 thousand.

In addition to providing direct services for the construction of sanitation facilities, the SFC Program provides technical assistance on many issues related to construction and operation and maintenance of sanitation facilities.

Technical assistance, such as reviews of engineering plans and specifications for on-site sanitation facilities for new home construction, is routinely provided to tribes and

Figure 38: IHS contractor installing water service line, Santo Domingo Pueblo, NM

Indian housing authorities. Technical reviews of feasibility studies and grant proposals also are routinely provided to tribes by the SFC Program for a wide range of civil and sanitation facilities engineering projects related to Indian Housing.

Upon project completion, the facilities constructed under the SFC Program are owned and operated by the tribe, individual homeowner, or other responsible non-Federal entity. The IHS provides technical assistance to the new facilities owners and provides training on proper operation and maintenance of the new facilities. For example, homeowners who receive individual sanitation facilities are instructed on the proper operation and maintenance of their newly installed wells and/or septic systems, and tribal operators are instructed on the correct operation and maintenance of community water and sewer facilities.

Figure 39: Construction of a pump station and ground level tank, Seminole Tribe, FL

The latter may include training in proper operation and maintenance of chlorination and fluoridation equipment, pumps, and motor control systems for community water supply facilities, and proper operation and maintenance of sewage collection systems, lift stations, and wastewater treatment facilities.

The SFC Program also provides technical assistance to tribes in the development of tribal utility organizations for operation, maintenance, and management of community water and sewer facilities. This assistance may include development of rate structures to determine appropriate customer water and sewer fees.

As additional and more stringent environmental regulations regarding safe drinking water, sewage treatment and disposal, and solid waste disposal are issued, the IHS will continue providing technical support and consultation on environmentally-related public health issues to American Indian and Alaska Native tribes and individual homeowners.

Sanitation Deficiencies

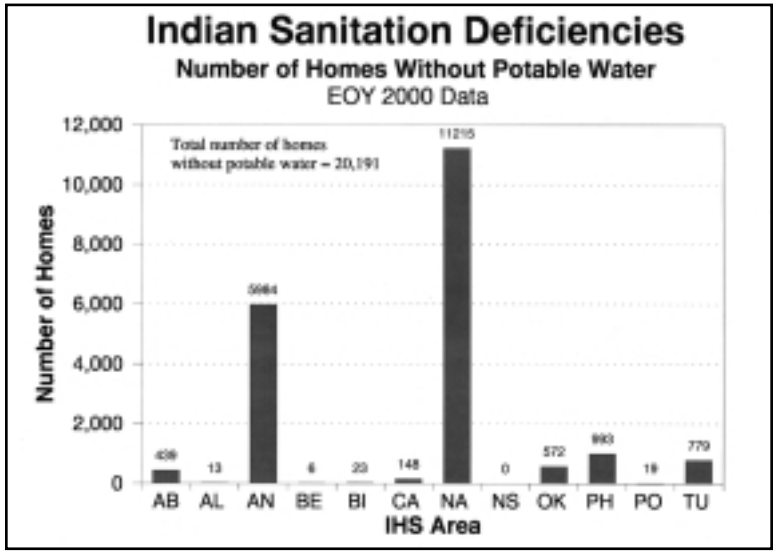


Figure 40: Number of Indian homes without potable water, by Area.

The Indian Health Care Amendments of 1988 (P.L. 100-713, Title III) require the IHS, starting in FY 1990, to develop and begin implementation of a 10-year funding plan to provide safe water supply and sewage and solid waste disposal facilities to existing American Indian and Alaska Native homes and communities, and to new and renovated homes. In accordance with these requirements, the SFC Program annually estimates the total need to provide safe and adequate sanitation facilities for all Indian and Alaska Native homes and communities.

Sanitation deficiencies are reported as proposed projects, or project phases. The 1996 inventory of sanitation deficiencies identified more than 2,750 sanitation facilities construction projects or project phases, costing approximately $1.779 billion. These projects represent the universe of need eligible for IHS funding. However, some projects are prohibitively expensive to construct and/or operate, and therefore are considered to be economically infeasible. Currently, 2,021 of the identified projects are considered to be economically feasible, with an estimated total cost of $716 million.

In an effort to reflect the relative impact on health of various water supply, sewage disposal, and solid waste deficiencies to be addressed, sanitation deficiency levels are determined for each project or project phase. Public Law 100-713 defines the following deficiency levels:

Level I The deficiency level describing an Indian tribe or community with a sanitation system that complies with all applicable water supply and pollution control laws, and in which the deficiencies relate to routine replacement, repair, or maintenance needs.

Level II The deficiency level that describes an Indian tribe or community with a sanitation system that complies with all applicable water supply and pollution control laws, and in which the deficiencies relate to capital improvements that are necessary to improve the facilities in order to meet the needs of such tribe or community for domestic sanitation facilities.

Level III The deficiency level that describes an Indian tribe or community with a sanitation system that has an inadequate or partial water supply and a sewage disposal facility that does not comply with applicable water supply and pollution control laws, or has no solid waste disposal facility.

Level IV The deficiency level that describes an Indian tribe or community with a sanitation system which lacks either a safe water supply system or a sewage disposal system.

Level V The deficiency level that describes an Indian tribe or community that lacks a safe water supply and a sewage disposal system.

The deficiency level assigned to a project is determined by the deficiencies of existing facilities. Projects are divided into phases, as appropriate, to provide logically independent and functional projects that can be funded in 1 year and which generally address one level of deficiency. Each proposed project or project phase will not necessarily bring the facilities for a community or tribe to level I deficiency or better. However, the combination of all projects reported will bring all facilities to deficiency level I or better.

These deficiencies represent an enormous challenge, especially because the resources to meet them are finite. Existing sanitation facilities require upgrading while efforts continue towards providing services to many yet unserved and mostly isolated homes.

In January 1997, the EPA published the results of its first nationwide survey of drinking water system's infrastructure needs, and the associated costs to meet these needs over the next 20 years. The report estimates the nationwide need and the American Indian and Alaska Native communities need for complying with current and future federal regulations, replacing aging infrastructure to protect public health, and consolidation with or acquiring neighboring water systems without safe supplies of drinking water.

The EPA's estimated cost for the American Indian and Alaska Native drinking water systems is $1.3 billion over the next 20 years. This estimate is substantially higher than the most recent SFC Program estimate of $945 million for water deficiencies. The difference can be explained in several ways. For example, the EPA survey includes capital infrastructure needs to serve commercial and tribal

Figure 41: Tribal contractor preparing forms and reinforcement for solid waste transfer station at Taos Pueblo, NM

enterprises. Not included within the SFC Program list of deficiencies are water and wastewater facility needs for commercial and industrial enterprises on reservations. These facilities do not meet the eligibility requirements for IHS assistance. The IHS also limits the needs reported for Indian homes located in non- Indian communities, and does not consider proposed community development projects designed to improve the convenience of services if safe and adequate sanitation facilities already exist.

Cost-effective and practical approaches to meet these needs are being developed by the SFC Program staff in conjunction with those being served. Tribes and communities are being encouraged to consider water conservation measures and to further improve their operation and maintenance activities.

Tables 3 thru 8 and corresponding charts illustrate the type, geographic location and associated costs of the sanitation deficiencies.

Figure 42: Drainfield control valve for multi-field system, Canyon de Chelly, AZ

Table 3
Number of Homes at Each Deficiency Level
by Area

AREA	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	TOTAL
ABERDEEN	809	7,834	12,915	1,348	477	23,383
ALBUQUERQUE	2,595	6,208	3,307	852	36	12,998
ANCHORAGE	242	1,484	10,760	581	4,049	17,116
BEMIDJI	4,702	4,554	4,330	445	120	14,151
BILLINGS	2,790	3,358	5,322	634	13	12,117
CALIFORNIA	61	194	3,185	2,372	421	6,233
NAVAJO	3,213	8,009	25,533	957	10,673	48,385
NASHVILLE	980	2,732	4,063	1,030	68	8,873
OKLAHOMA CITY	54,410	1,293	22,341	1,996	536	80,576
PHOENIX	3,767	6,913	9,624	336	994	21,634
PORTLAND	21	4,312	5,630	408	8	10,379
TUCSON	693	477	3,185	231	1,535	6,121
TOTAL	74,283	47,368	110,195	11,190	18,930	261,966

Table 4
Number of Homes Requiring Assistance
By Type of Facility

AREA	WATER	SEWER	SOLID WASTE	Eligible Homes
ABERDEEN	10,359	7,322	10,756	23,383
ALBUQUERQUE	10,036	6,625	1,372	12,998
ANCHORAGE	13,508	12,437	15,791	17,116
BEMIDJI	6,964	4,606	2,221	14,151
BILLINGS	6,033	2,511	6,054	12,117
CALIFORNIA	6,071	6,089	5,784	6,233
NAVAJO	28,418	12,892	33,382	48,385
NASHVILLE	7,603	7,662	7,540	8,873
OKLAHOMA CITY	5,510	2,121	21,600	80,576
PHOENIX	14,684	10,137	6,192	21,634
PORTLAND	5,178	5,793	7,334	10,379
TUCSON	5,415	2,134	5,251	6,121
TOTAL	119,779	80,329	123,277	261,966

Indian Sanitation Deficiencies

Number of Homes at Deficiency Level 4 & 5 EOY 2000

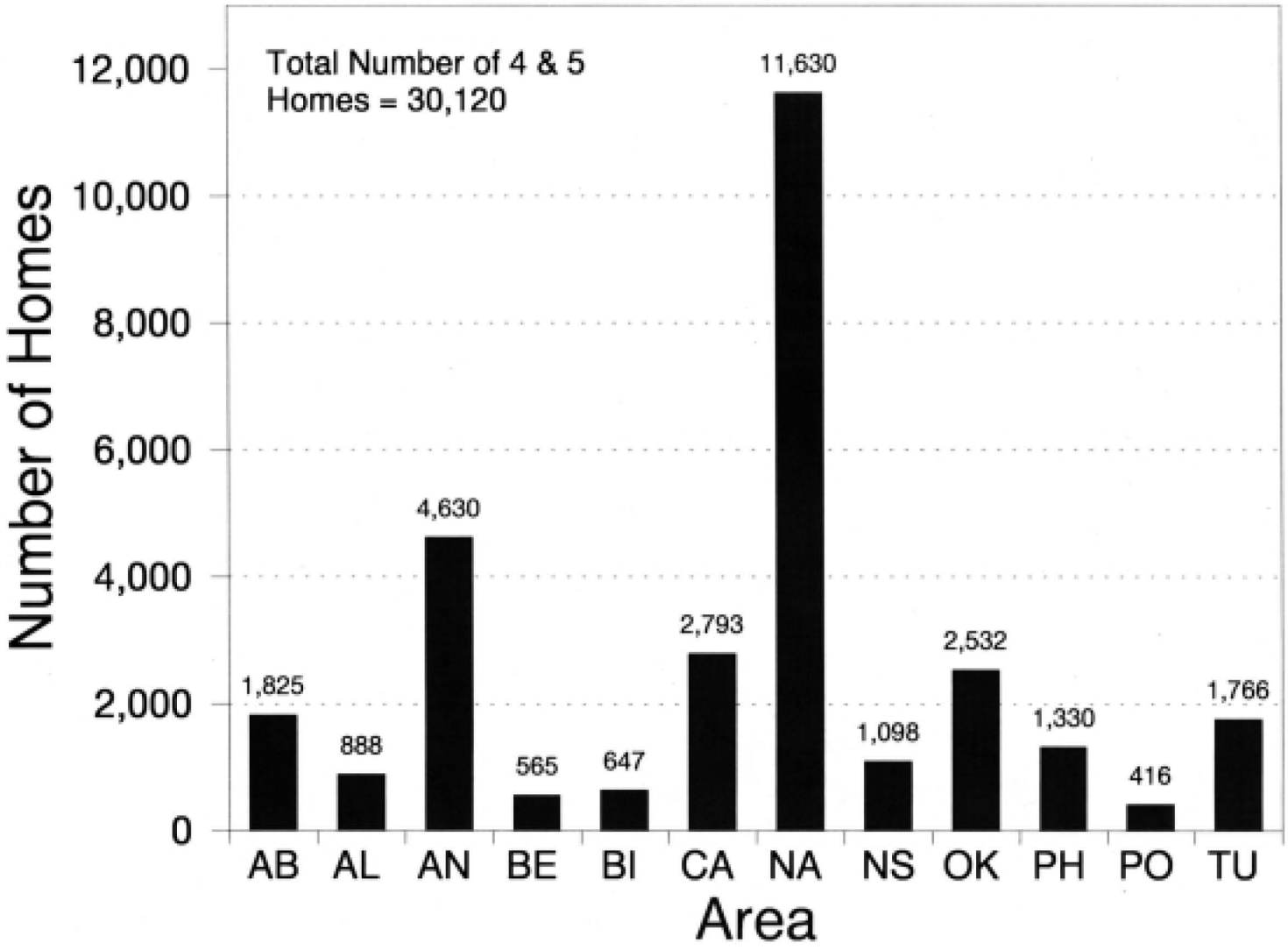


Table 5

Project Cost Estimate by Deficiency Level

Feasible Projects

AREA	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	TOTAL
ABERDEEN	$0	$29,238,500	$21,741,500	$7,416,000	$3,778,000	$62,174,000
ALBUQUERQUE	$0	$26,964,690	$13,947,000	$2,643,000	$310,000	$43,864,690
ANCHORAGE	$0	$31,160,755	$87,560,925	$138,906,266	$2,537,425	$260,165,371
BEMIDJI	$0	$9,534,219	$6,787,611	$1,618,129	$0	$17,939,959
BILLINGS	$0	$9,412,200	$6,234,000	$2,045,800	$0	$17,692,000
CALIFORNIA	$0	$2,722,000	$8,392,000	$964,000	$264,000	$12,342,000
NAVAJO	$0	$15,873,801	$13,303,500	$10,766,689	$182,193,804	$222,137,794
NASHVILLE	$0	$10,738,700	$13,012,250	$11,901,450	$0	$35,652,400
OKLAHOMA CITY	$0	$2,456,500	$8,355,900	$13,035,400	$1,176,500	$25,024,300
PHOENIX	$0	$42,004,750	$25,579,000	$1,443,000	$14,349,000	$83,375,750
PORTLAND	$0	$16,170,000	$7,748,842	$1,209,500	$0	$25,128,342
TUCSON	$0	$5,846,287	$5,532,383	$7,306,168	$7,070,433	$25,755,271
TOTAL	$0	$202,122,402	$218,194,911	$199,255,402	$211,679,162	$831,251,877

Indian Sanitation Deficiencies
Cost Estimate for Feasible Projects-EOY 00 Data

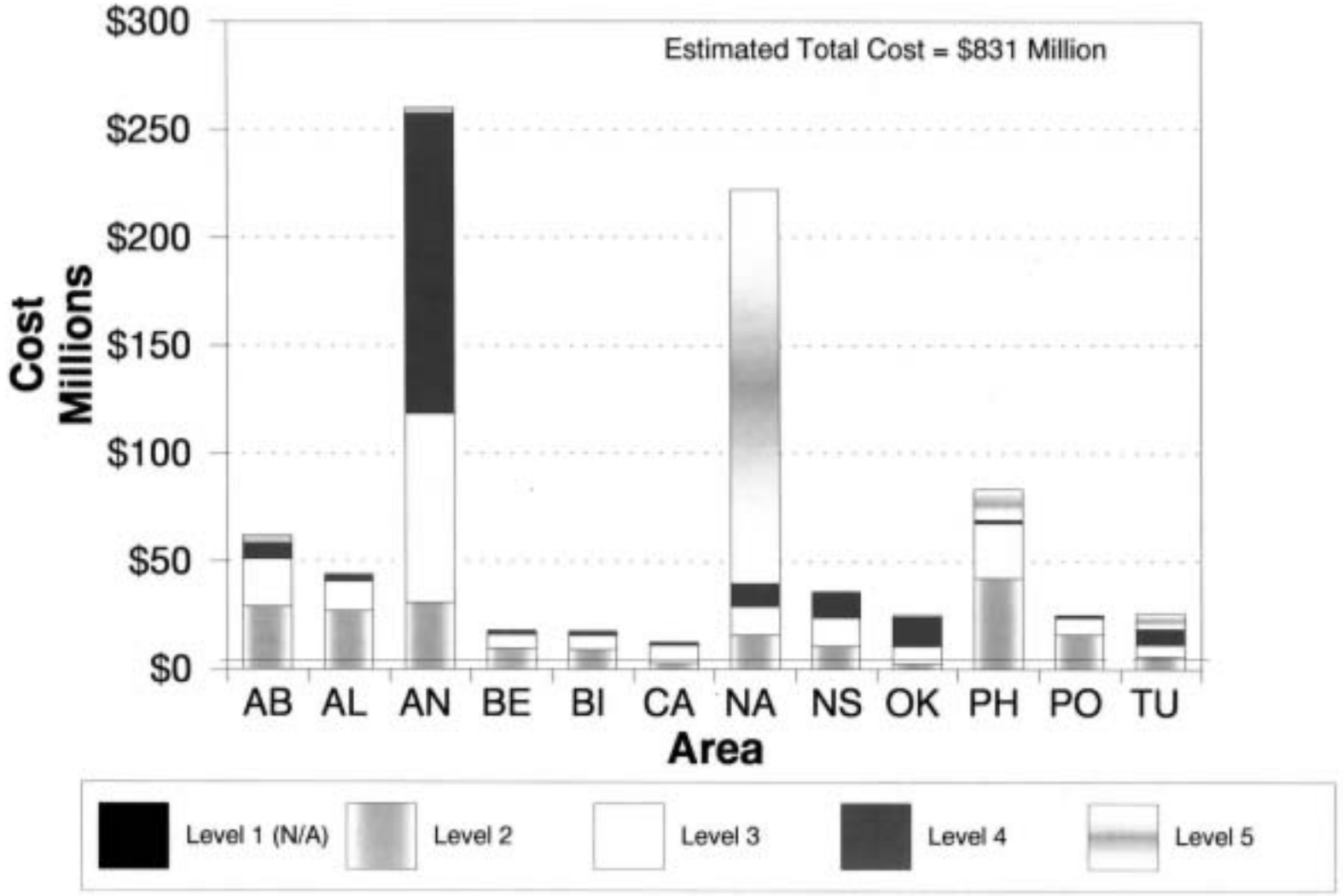


Table 6

Project Cost Estimate by Deficiency Level

Total Data Base

AREA	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	TOTAL
ABERDEEN	$1,695,000	$57,853,500	$30,696,500	$8,774,000	$4,018,000	$103,037,000
ALBUQUERQUE	$14,563,397	$33,120,690	$17,718,750	$5,059,000	$360,000	$70,821,837
ANCHORAGE	$6,721,570	$33,514,755	$374,122,925	$422,790,600	$5,513,925	$842,663,775
BEMIDJI	$15,234,400	$23,541,369	$10,979,413	$1,999,129	$0	$51,754,311
BILLINGS	$303,000	$11,660,200	$6,891,000	$2,405,800	$0	$21,260,000
CALIFORNIA	$37,000	$2,892,000	$11,421,000	$964,000	$769,000	$16,083,000
NAVAJO	$3,255,000	$148,687,981	$13,695,500	$17,649,389	$193,291,394	$376,579,264
NASHVILLE	$1,490,500	$15,501,400	$18,488,700	$13,152,450	$0	$48,633,050
OKLAHOMA CITY	$0	$2,688,500	$9,127,900	$13,803,400	$1,512,500	$27,132,300
PHOENIX	$401,000	$64,086,750	$42,761,000	$2,309,000	$24,409,000	$133,966,750
PORTLAND	$0	$22,116,750	$26,675,642	$2,700,400	$0	$51,492,792
TUCSON	$301,000	$8,450,287	$7,727,483	$9,163,168	$11,531,633	$37,173,571
TOTAL	$44,001,867	$424,114,182	$570,305,813	$500,770,336	$241,405,452	$1,780,597,650

Indian Sanitation Deficiencies

Total Data Base - EOY 2000 Data

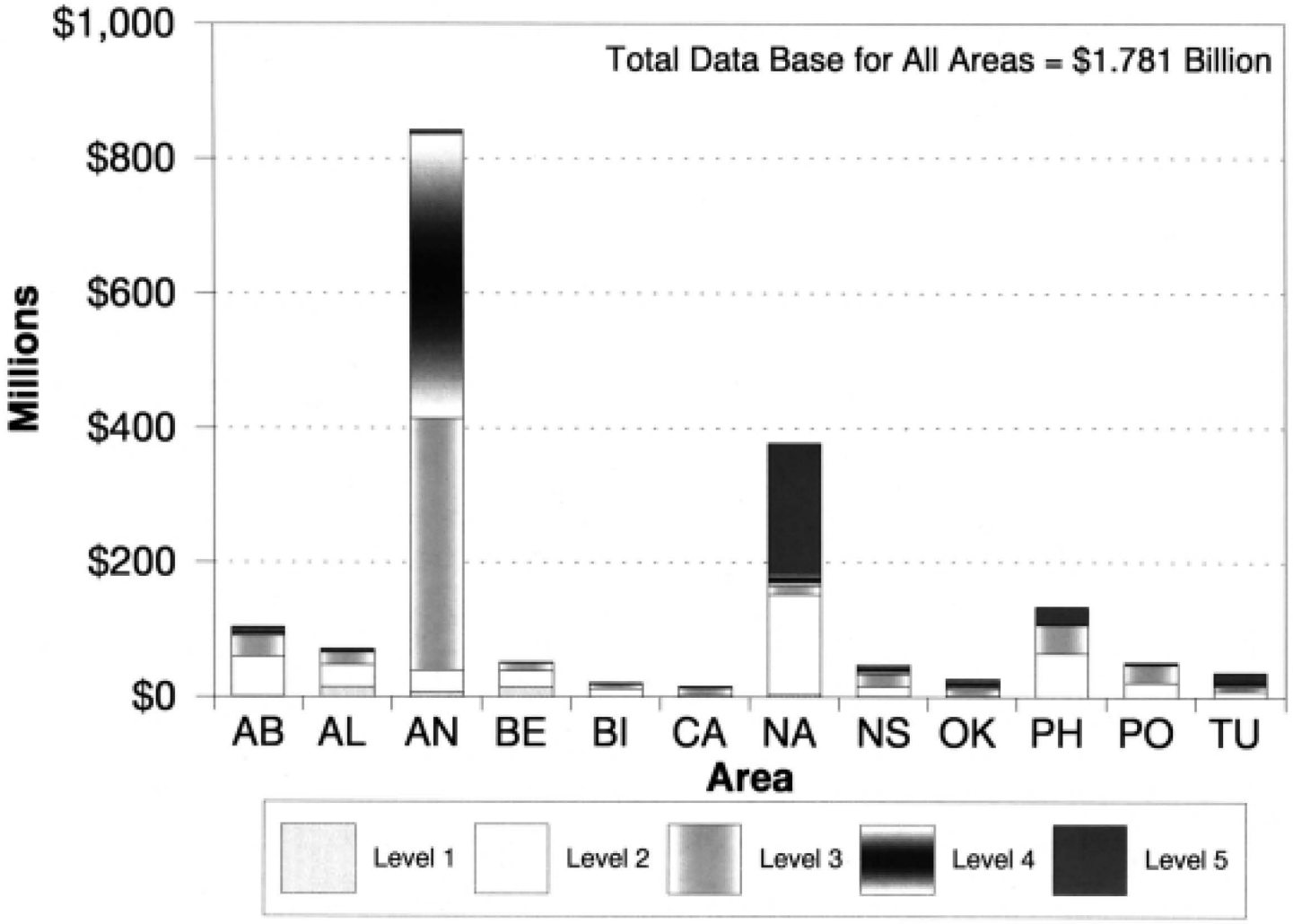


Table 7

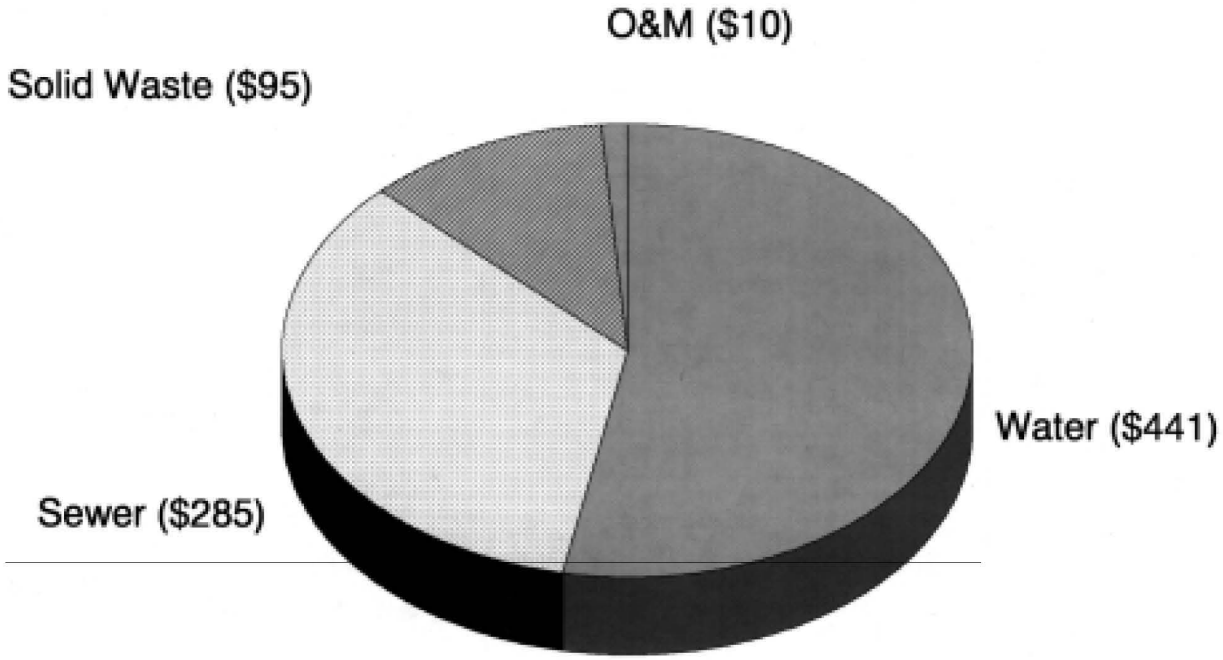
Cost Estimates by Type of Needed Facility by IHS Area

Feasible Projects

AREA	WATER	SEWER	SOLID WASTE	O&M	TOTALS
ABERDEEN	$31,364,000	$19,841,500	$9,964,500	$1,004,000	$62,174,000
ALBUQUERQUE	$25,275,190	$14,311,900	$3,293,000	$984,600	$43,864,690
ANCHORAGE	$118,438,162	$98,411,054	$39,687,820	$3,628,335	$260,165,371
BEMIDJI	$10,353,901	$6,790,208	$558,400	$237,450	$17,939,959
BILLINGS	$10,055,800	$3,679,200	$3,655,000	$302,000	$17,692,000
CALIFORNIA	$4,931,000	$5,079,000	$2,214,000	$118,000	$12,342,000
NAVAJO	$142,937,811	$69,627,483	$8,772,500	$800,000	$222,137,794
NASHVILLE	$14,891,100	$17,351,150	$3,202,860	$207,290	$35,652,400
OKLAHOMA CITY	$16,012,500	$5,416,900	$3,144,900	$450,000	$25,024,300
PHOENIX	$40,864,750	$30,825,000	$10,336,000	$1,350,000	$83,375,750
PORTLAND	$14,493,800	$4,997,800	$5,420,242	$216,500	$25,128,342
TUCSON	$11,301,014	$8,794,057	$5,043,818	$616,382	$25,755,271
TOTAL	$440,919,028	$285,125,252	$95,293,040	$9,914,557	$831,251,877

Current 10-Year Funding Plan to Address Indian Sanitation Deficiencies

Cost Estimate by Type of Facilities
EOY 2000 Data - Economically Feasible Projects



Total IHS Estimate = $ 831 Million

(Costs Shown in Millions of Dollars)

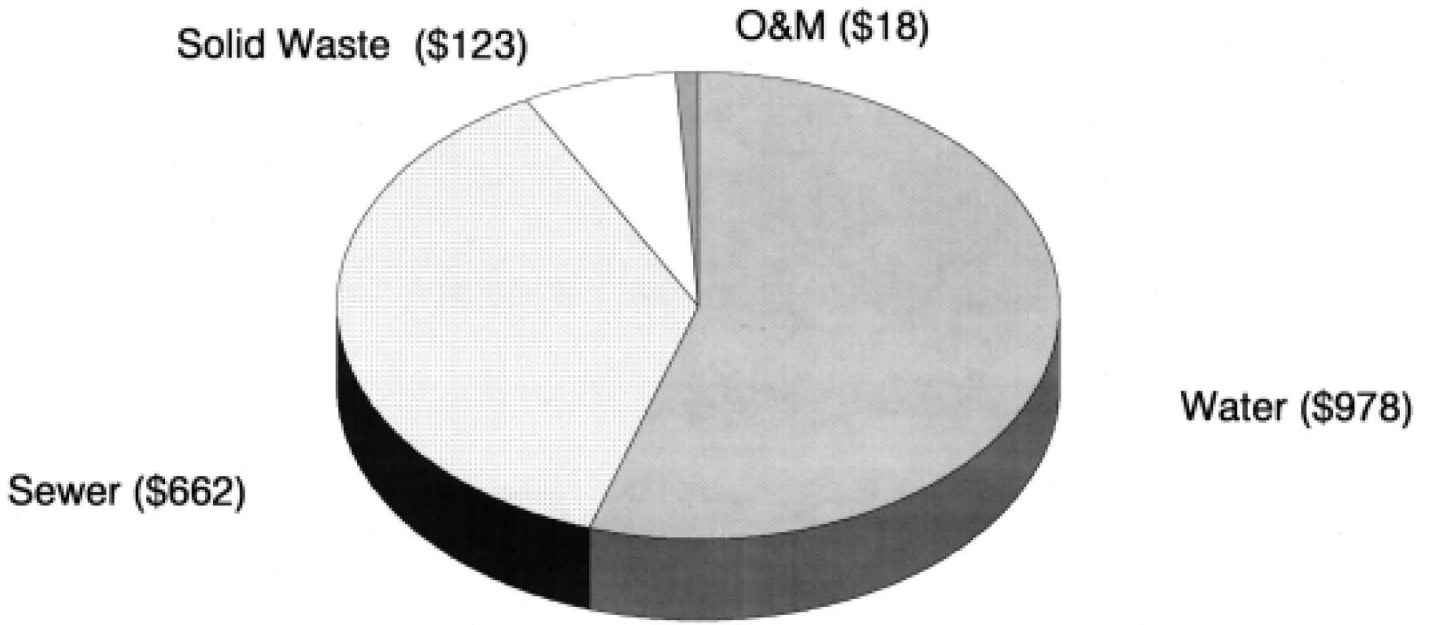
Table 8

Cost Estimates by Type of Needed Facility by IHS Area

Total Data Base

AREA	WATER	SEWER	SOLID WASTE	O&M	TOTALS
ABERDEEN	$64,033,000	$27,175,500	$9,964,500	$1,864,000	$103,037,000
ALBUQUERQUE	$39,450,590	$26,568,647	$3,383,000	$1,419,600	$70,821,837
ANCHORAGE	$389,131,714	$381,959,126	$62,642,600	$8,930,335	$842,663,775
BEMIDJI	$25,823,303	$24,149,758	$756,200	$1,025,050	$51,754,311
BILLINGS	$12,079,800	$5,223,200	$3,655,000	$302,000	$21,260,000
CALIFORNIA	$7,778,000	$5,497,000	$2,681,000	$127,000	$16,083,000
NAVAJO	$290,096,621	$74,535,143	$10,847,500	$1,100,000	$376,579,264
NASHVILLE	$20,508,100	$24,632,150	$3,270,060	$222,740	$48,633,050
OKLAHOMA CITY	$17,661,500	$5,875,900	$3,144,900	$450,000	$27,132,300
PHOENIX	$61,736,550	$60,492,200	$10,336,000	$1,402,000	$133,966,750
PORTLAND	$28,992,050	$16,738,000	$5,517,242	$245,500	$51,492,792
TUCSON	$20,179,514	$9,649,057	$6,436,018	$908,982	$37,173,571
TOTAL	$977,470,742	$662,495,681	$122,634,020	$17,997,207	$1,780,597,650

Cost Estimate by Type of Facilities
EOY 2000 Data- Total Data Base



Total IHS Estimate = 1.781 Billion

(Costs Shown in Millions of Dollars)

The Challenge Ahead

The ultimate goal of the SFC Program is to provide adequate water and sewer facilities for all existing Indian homes. However, despite current funding levels, there are numerous factors that will continue to create additional sanitation facility needs in the future. These factors include population growth and the corresponding additional need for homes. The number of Indian families is increasing faster than new homes are being constructed, making it especially difficult to meet critical sanitation needs in many Indian communities.

Another factor is the need to upgrade or replace existing sanitation facilities when their useful design life is reached. This factor becomes increasingly critical as the reliability decreases and the cost of operating and maintaining older sanitation facilities increase. Despite an IHS emphasis on designing systems that are simple and economical to operate and maintain, the reliability of most community water and sewer systems in Indian country needs to be improved.

More stringent environmental standards and more difficult site conditions also will challenge the SFC Program as it endeavors to provide needed sanitation facilities in years to come. Standards for public water supply systems, solid waste disposal facilities, and sewage treatment facilities are continually being modified by legislation and regulation. The impact of these changes is generally most severe on small utility systems such as those serving American Indians and Alaska Natives. As a result of more stringent regulations, small systems are costing more to build and operate.

In the future, the technical and managerial skills of IHS and tribal staff to design, construct, and operate needed sanitation facilities in an environment with more fiscal and regulatory challenges will be tested. A true partnership among Tribes, Congress and IHS is needed if we are to meet these challenges successfully.

Figure 43: Alaskan native testing the new running water in the bathroom in Pedro Bay, Alaska.

IHS Area SFC Program Directory

Aberdeen Area/DSFC
115 4th Avenue, Southeast
Aberdeen, SD 57401
Ph. (605) 226-7451

Anchorage Area/DSFC
4141 Ambassdor Drive
Anchorage, AK 99508-5997
Ph. (907) 729-3540

Albuquerque Area/DSFC
5300 Homestead Road, N.E.
Albuquerque, NM 87110
Ph. (505) 248-4264

Bemidji Area/DSFC
104 Federal Building
Bemidji, MN 56601-3060
Ph. (218) 444-0504

Billings Area/DSFC
P.O. Box 2143
Billings, MT 59102
Ph. (406) 247-7096

California Area/DSFC
1825 Bell Street, Suite 200
Sacramento, CA 95825-1097
Ph. (916) 566-7339

Nashville Area/DSFC
711 Stewarts Ferry Pike
Nashville, TN 37214-2634
Ph. (615) 736-2503

Navajo Area/DSFC
P.O. Box 9020
Window Rock, AZ 86515
Ph. (520) 871-5852

Oklahoma City Area/DSFC
3625 NW 56th Street, Five Corporate Plaza
Oklahoma City, OK 73112
Ph. (405) 951-3882

Phoenix Area/DSFC
Two Renaissance Square
40 North Central Ave., Suite 600
Phoenix,, AZ 85004
Ph. (602) 364-5068

Portland Area/DSFC
1220 SW 3rd Avenue, Room 476
Portland, OR 97204-2892
Ph. (503) 326-2001

Tucson Area Indian Health Service
7900 South J Stock Road
Tucson, AZ 85746-2508
Ph. (520) 295-2580