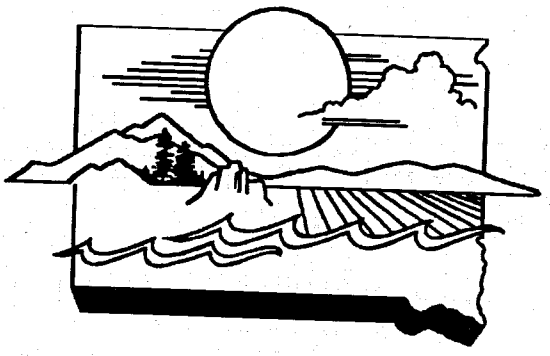
TO

Governor George S. Mickelson
and the
Sixty-eighth Session, Legislative Assembly
1993

1992 DENR Annual Report
1993 State Water Plan
1992 Waste Tire Study



"Protecting South Dakota's Tomorrow...Today"

Department of Environment and Natural Resources

January 1993

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3181

January 12, 1993

Governor George S. Mickelson
and Members of the Legislature
Sixty-Eighth Legislative Session

The Department of Environment and Natural Resources (DENR) is required, each year, to make certain reports. We are required to report on the State Water Plan (SDCL 46A-2-2), to make recommendations concerning projects for the State Water Resources Management System (SDCL 46A-1-10) and to make an annual report on all activites during the preceding year and funding recommendations necessary to implement the water plan (SDCL 46A-1-14).

Additionally, individual pieces of legislation may require the submission of individual reports. This year, we are required to report on management of waste tires (SDCL 34A-6-65).

This year we have combined all those reports in one document which also serves as an annual report for the Department. Not only does this fulfill our statutory requirements, it provides more information to the Legislature and serves other purposes during the year. I note that expansion of the subject matter has not expanded the cost; this document is published at a cost lower than that for last year's State Water Plan and Annual Report.

House Bill 1001, 1992 Legislature. The major accomplishment of the year was the passage and implementation of the most comprehensive environmental legislation in South Dakota's history. Fees on drinking water to implement the Safe Drinking Water Act, on the reporting of chemical storage to implement the Superfund Amendment and Reauthorization Act, and on solid waste and tires at the time of vehicle registration to establish solid waste grants were all put in place this year. Prior to the effective date of the fees, we advised every municipality in the state of the amount of their fees and how we had arrived at the particular numbers. We wrote every individual in the state whom we knew was storing chemicals with the same kind of information. The first round of solid waste grants was made during this year, as is reported elsewhere.

Listening to Customers. We continued to listen to customers. The Citizens Advisory Committee on Hazardous Waste conducted hearings across the state and made several recommendations on the management of such waste. Legislation will be introduced in the 1993 Legislature to enact those recommendations. The Feedlot Program Review Committee heard testimony on regulation of feedlots, and we changed some of our practices and requirements to make complying with those regulations easier to do. This followed the practice we used with the Soil Remediation Standards Ad Hoc Committee which recommended changes in standards used in cleaning up petroleum contaminated sites, changes which we made.

The most important examples of listening to customers were the public testimony meetings conducted, at Governor Mickelson's request, by the Board of Water and Natural Resources. The subject was finding a permanent funding source for water development. More than 400

people had attended a conference on that subject which the Department conducted, and more than 300 attended the meetings, with about 100 offering opinions and recommendations. This will be one of the most important subjects in this legislative session.

The Board of Water and Natural Resources conducted 13 meetings in four cities; more than 500 people attended. The Water Management Board conducted six meetings in three cities; more than 200 people attended. And the Board of Minerals and Environment conducted 10 meetings in three cities; about 225 people attended. We listen to customers.

Cumulative Impact of Environmental Regulation. On a national level, we have been active participants in an effort to instill more flexibility into environmental requirements. We helped establish the Environmental Requirements for Local Governments Policy Dialogue Advisory Committee, a Federal Advisory Committee Act organization, which will provide a forum for state and local governments to provide input into environmental requirements - as they are being developed.

This is not an effort to reduce environmental protection. It is an effort to spend finite resources in the most intelligent way, by requiring that environmental standards be risk based and science based, by abandoning the "one size fits all" kind of standard, by providing authority for state and local governments to prioritize their problems, and by providing additional federal financial, educational, technical and training assistance. It holds great promise for small towns and rural America. In short, it improves environmental protection by not wasting limited resources.

We played an important role in getting the EPA to withdraw its recommendation to establish an enforceable standard for sulfate in drinking water. There was good medical evidence that, where sulfate existed in water, people adjusted within 24 hours, and if enough sulfate existed to cause serious problems, the water would smell and taste so bad, you wouldn't drink it anyway. Thirty percent of South Dakota's drinking water systems would have been out of compliance if the rule had become final, and the construction cost to meet the standard would have been more than $40 million. We played an important role in getting the EPA to defer a rule requiring that petroleum contamination from above ground tanks be treated as hazardous waste - and avoided the approximately $200 million that such a rule would have cost in South Dakota.

Water Projects Approved. The 1992 Legislature approved $37 million as the state's share of water projects. The Congress passed, and the President signed, legislation which authorized the Mid Dakota Rural Water System and the Lake Andes Wagner/Marty II project. South Dakota probably has more approved water projects at this point than at any other point in our history.

This report will tell you where we have been spending our time and effort. I hope it also accurately reflects the numerous achievements of the men and women in the Department during 1992 - public servants of whom the public can be very proud.

Sincerely,

Robert E. Roberts
Secretary

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1992
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

ANNUAL REPORT

Robert E. Roberts
Department Secretary

A. Reese Peck
Deputy Secretary

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

ORGANIZATIONAL CHART

BOARD OF OPERATOR CERTIFICATION

BOARD OF WATER MANAGEMENT

GROUNDWATER RESEARCH & INFORMATION ADVISORY GROUP

SECRETARY DEPT. OF ENVIRONMENT & NATURAL RESOURCES (605) 773-3151

BOARD OF WATER AND NATURAL RESOURCES

BOARD OF MINERALS AND ENVIRONMENT

STATE EMERGENCY RESPONSE COMMISSION

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DIVISION OF ENVIRONMENTAL REGULATION

Steve Pirner
Division Director

The Division is composed of engineers, scientists, geologists, hydrologists, analysts, and secretaries. The staff is highly motivated and is dedicated to achieving all aspects of the Division mission. Highlights in each category of the Division mission are listed below.

QUALITY CUSTOMER SERVICE

- Advisory Committees: One of the methods used to identify the needs of customers and to improve services to meet those needs is through the use of advisory committees. In 1992, the two committees listed below completed their work, and all of their recommendations are in various stages of being studied and implemented. The committee worked in open meetings that more than 300 people attended, and sought and relied upon extensive public testimony in developing their recommendations. Their work has been invaluable in establishing environmental programs that make sense and fit the needs of South Dakota.

  - The Feedlot Program Review Committee: Numerous recommendations were made and are being implemented. The most significant recommendation was that the least costly measures of water pollution control should be the first consideration in designing feedlot water pollution control facilities. The committee also recommended that the only mandatory criteria to be used by the DENR for approval of these systems are minimum storage volumes and seepage rates.

  - Advisory Committee on Hazardous Waste Management: The committee's most significant recommendations were to establish the preferred methods for managing hazardous waste in the state. The committee also concluded that it is in the public interest to promote a policy for managing hazardous waste that is as close to the source of generation as possible. The committee recommended that the state conduct a feasibility study of developing a hazardous waste treatment or disposal facility to meet the needs of the state's hazardous waste generators.

- Public Workshops on Environmental Regulations: Numerous workshops and presentations were held for the public and regulated community on a variety of subjects related to environmental regulations. However, solid waste was the most popular topic in 1992, with the Waste Management staff sponsoring or speaking at more than 59 different events with more than 1,360 people in attendance.

- Toll-Free Telephone Line: Under an EPA grant, a toll free telephone line, 1-800-GET-DENR, was installed in 1992 to provide assistance specifically in the areas of radon and recycling. Other toll-free lines are being planned, such as for getting assis-

tance in completing SARA Title III chemical reports.

- Federal Program Delegation: The delegation of all possible EPA administered programs was proposed as a fundamental policy by Governor Mickelson, and adopted by the Legislature in the Second Century Environmental Protection Act of 1992. EPA's philosophy in administrating environmental programs is to use a "one size fits all" approach on a national level. The DENR approach is to administer those same programs, but with the philosophy of using whatever flexibility is in the federal rule and fitting the program to meet the needs of South Dakota.

- Enforcement Actions: Enforcement actions are taken to ensure that environmental regulations are complied with and to ensure that there is a level playing field for all of the regulated communities. Enforcement actions are represented by a wide range of regulatory actions, such as a simple letter asking for cooperation to solve a problem, a warning letter, a notice of violation, an order, or even a civil or criminal lawsuit. In 1992, five enforcement actions resulted in penalties of $60,522 collected, and two other cases resulted in criminal convictions.

PROTECTION OF PUBLIC HEALTH AND PRESERVATION OF NATURAL RESOURCES

- Drinking Water Quality: High quality drinking water continued to be supplied in 1992 by public water supply systems.

- Groundwater Quality Protection: Groundwater quality protection in South Dakota has been recognized as the most comprehensive, yet practical state program in EPA Region VIII, and has been selected as one of several national models.

- Wellhead Protection: EPA formally approved South Dakota's Wellhead Protection Program in 1992, which is designed to help local governments establish preventative programs to protect their drinking water supplies.

- Underground Storage Tanks: The industry is on schedule for having all tanks in compliance with the new tank rules by 1997.

- Williams Pipeline: The Williams Pipeline spill at Renner, located north of Sioux Falls, was contained and clean-up is underway with over 165,000 gallons of petroleum recovered to date. After this incident was discovered in January 1992, a Pipeline Safety Committee with members from the City of Sioux Falls, Minnehaha County, DENR, and Williams Pipeline was formed. Goals of the committee include developing short term and long term implementation plans to prevent future spills from the pipeline and protect the Big Sioux Aquifer, which is the primary source of water in the eastern side of the State to include the City of Sioux Falls.

- State/Rosebud Sioux Tribe/EPA Clean-up at Mission: Groundwater clean-up efforts at Mission, which is within the Rosebud Reservation boundaries, to remove up to 13 feet of pure gasoline floating on top of the aquifer began in 1992. This project is a cooperative effort involving the City of Mission, local residents, the Rosebud Sioux Tribe, EPA, and DENR.

- Pesticides in Ground Water: In 1992, DENR completed analyzing data collected during 10 consecutive years from the Oakwoods/Poinsett Rural Clean Water Project and concluded that normal label use of pesticides is not contaminating the ground water above EPA drinking water standards

in the project area.

- Acid Mine Drainage: Acid mine drainage from the waste rock dump at the Richmond Hill gold mine in the Black Hills affected water quality downstream. DENR ordered Richmond Hill to cease mining any additional ore until this problem is solved.

- Whitewood Creek Superfund Site: Most of the physical clean-up of old arsenic laden mine tailings. Around 27 residences along an 15 mile segment of Whitewood Creek were completed in 1992. After institutional controls which are designed to keep people from being exposed to the remaining tailings are put in place by local governments, the site is scheduled to be deleted from the national superfund list in 1994.

- Unique and Scenic Areas: The Board of Minerals and Environment determined that a portion of the Dome Mountain/Lost Gulch area near Lead should be placed on the preliminary list for unique and scenic lands. The project may need special study if a mine permit application is ever filed for the area.

- Landfills: An estimated 33 landfills were properly closed out in 1992 as regional landfills continue to be developed.

- PCBs: A study designed to examine the safety of the burning practices of electrical transformer parts by companies in the Colman area was completed by DENR in 1992. The study concluded that the current procedures for burning these transformer parts is being carried out safely and poses no significant threat to human health.

- Waste Oil: In conjunction with DENR, AMOCO Oil Company initiated a waste oil collection program in South Dakota, and there are now 68 AMOCO Stations across the state which will accept waste oil.

PROMOTING ECONOMIC DEVELOPMENT

- Governor's Office of Economic Development: Working relationships between the Governor's Office of Economic Development and DENR continue to be strengthened, as both agencies strive to promote economic development in South Dakota. The agencies have worked together on several potential new industrial development projects.

- Fast Permit Processing: Industry has learned that environmental regulations must be factored into feasibility studies of new projects. To provide these services in a manner that will best suit industries studying South Dakota in their feasibility studies, DENR is seeking the delegation of all possible EPA administered programs.

- General Permits: In keeping with the philosophy of streamlining permitting processes, seven general permits were issued or reissued. General permits contain standard siting and operating criteria for permitted activities that are all relatively generic, routine, and low risk.

- Pennington County Air Quality: In an effort to keep the Rapid City area from failing the air quality tests for dust and having economic sanctions placed on both the county and the state, DENR performed intensive monitoring throughout the city during the summer of 1992 to find the highest areas and sources of dust. That data will be analyzed in 1993, along with conducting an intensive wintertime monitoring program.

- Gold Mining: The permitted gold mines in the state produced 525,357 ounces of gold

in 1991 (1992 data unavailable). This made South Dakota the fourth largest gold producer in the United States, and gold mining jobs remained as one of the highest paying jobs in the state. Figure 11 shows that only 183 additional acres were permitted in 1992 as gold prices remained depressed.

- Homestake Open Cut Expansion Project in Lead: The Homestake Open Cut Expansion permit in the Black Hills was approved in 1992. This expansion will add 4.5 years to the life of the Open Cut project, which is now scheduled for closure in 2002.

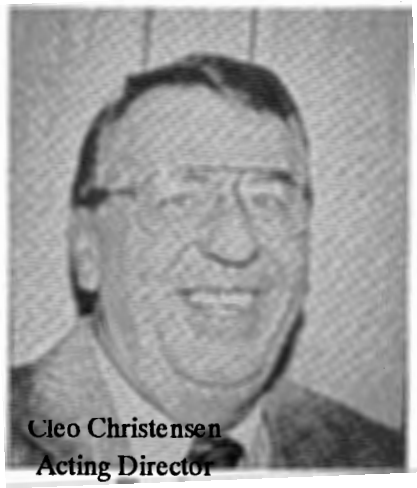
- Sand and Gravel: More than 13 million tons of raw construction materials were mined from 1,846 active properly licensed sites in the state during 1991 (1992 data unavailable).

- Oil and Gas: Nearly 70 million gallons of oil and 5,690 million cubic feet of gas were produced from approximately 200 permitted wells in 1991 in South Dakota (1992 data unavailable).

- Federal Facilities/Innovative Clean-up Technologies: To achieve better clean-ups and be in a position to seek innovative technologies for clean-ups that could become commercialized, the state has entered into several agreements with officials from the U.S. Department of Defense and Ellsworth Air Force Base.

- Recycling: Municipalities developed a number of compost operations for lawn waste across the state, and continue to investigate both subsidized and market based waste reduction and recycling alternatives. The rules for the old solid waste grant program were revised in 1992 to reflect that 50 percent of the funds must go to waste reduction and recycling projects as required by the Second Century Environmental Protection Act of 1992.

DIVISION OF GEOLOGICAL SURVEY



Cleo Christensen
Acting Director

The primary function of the Geological Survey is to locate, map and evaluate the mineral and water resources of the state and to provide the resulting information to all interested consumers. Geological Survey personnel spent time on nearly 100 projects throughout 1992 and answered hundreds of requests for information.

MAJOR ACCOMPLISHMENTS

- Mineral Resources

  - Although mineral-resource evaluation has always been part of the Geological Survey's mission, on August 3, 1992, Secretary Roberts assigned primary responsibility for the promotion of mineral development in the state to the Geological Survey. The Division of Environmental Regulation will continue all regulatory matters dealing with minerals. This provides a clear separation of these functions and the promotional activities fit well within the Geological Survey's goals.

  - Geochemical data from recent research conducted by the Geological Survey on mineral potential has spurred exploration for manganese and other minerals within the state. Four companies have started assessment programs and two of these companies are conducting drilling projects. Contact with industry and federal officials has been aided during the year by participation in national meetings and workshops to showcase mineral potential and development in South Dakota.

- Geologic and Hydrologic Investigations

  - Numerous studies were conducted to evaluate ground-water resources in the state. Ground-water studies for several South Dakota communities and rural water systems were performed to aid in improvement of their water quality or quantity. Additionally, ongoing studies in Mellette, Todd, and Spink Counties will broadly define and assess water resources within each county.

  - Geological Survey personnel continued work on the Split Rock Creek aquifer study. This study is focusing on the long-term potential of the aquifer to serve as a water supply in the Sioux Falls-Brandon area. A progress report on the work accomplished to date is being prepared.

  - A permanent monitoring network consisting of 27 wells at 11 locations throughout the Big Sioux aquifer was sampled. Analyses of these samples will detect water-quality changes and will assist in understanding nonpoint-source pollution in the aquifer.

  - The Geological Survey, in cooperation with the EPA, has been conducting re-

search on hydrologic interconnection between the Big Sioux River and the associated Big Sioux aquifer in the vicinity of Sioux Falls. Research results will be used as a model by EPA to draft national wellhead protection guidelines for similar aquifers. Report review is under way on the project and is expected to be completed this year.

- Basic Data Management System

  - Basic data from all research are entered into a database management system. This basic data, generated and maintained by the Geological Survey and other divisions, are the basis for sound management decisions regarding the state's geologic and hydrologic resources and will be an integral part of the department's geographic information system.

- Interagency Support and Other Activities

  - Technical expertise and liaison support were provided by the Geological Survey for the Black Hills Hydrology Study (BHHS) and the Black Hills Water Management Study (BHWMS), which are included in the State Water Plan. The Geological Survey was also instrumental in the formation of the Black Hills Hydrology Steering Committee which is comprised of local Black Hills residents. The purpose of the committee is to provide input and oversight for the BHWMS and liaison with the West Dakota Water Development District for BHHS and BHWMS.

  - The Geological Survey's research in glacial till provided the technical basis for project planning leading to the 1992 federal authorization of the Lake Andes-Wagner Demonstration and Irrigation Project, another important element of the State Water Plan. It is expected that the Geological Survey will play an important role in implementation of this project.

  - The Geological Survey administered the Ground Water Research and Public Education Grants program which was created in 1989. Thirteen grants were awarded for a total of $600,862 under this program in 1992 and at year's end, there were 20 active projects. Since the inception of this program, 33 awards have been granted for a total of $1,379,906.

  - The Geological Survey also assumed technical roles on a variety of projects for other divisions and departments of state government. Among these are evaluation of most of the contamination incidents involving Williams Pipe Line Company; assisting with the permitting process for a number of city landfills, new regional landfills, and the Fall River Properties, Inc., ash disposal site; technical assistance regarding the Mellette County medical waste dumps; and evaluating the potential of stabilizing the Lake Lakota water level. The Geological Survey also sponsored the 37th Annual Midwest Ground Water Conference which was held in Sioux Falls in October and drew 229 participants from 14 states.

FUTURE EMPHASIS

- Future activities will focus on maintaining and building the Geological Survey's natural resource data base, responding to public needs, providing technical support for interagency activities and elements of the State Water Plan, and participating in educational activities relating to natural re-

source development, management, and environmental activities. Within these broad categories, specific activities will receive special emphasis.

- Public needs will continue to be met, but emphasis will shift from natural resource inventory investigations to water resource management problems focusing around environmental issues such as waste containment, nonpoint-source pollution, aquifer vulnerability, and wellhead protection.

- The Geological Survey will increasingly be involved in providing technical support and liaison activities to other divisions in DENR, as well as other state and federal agencies for State Water Plan projects.

- Although education has always been an aspect of the Geological Survey's mission, increased attention will be focused on making all information more readily available. In addition, more effort will be expended in such activities as water festivals for school children, cooperation on educational videos, and attendance at and, sponsoring of, workshops, technical meetings, and public-interest projects.

DIVISION OF TECHNICAL & SUPPORT SERVICES

Pat Rice
Division Director

This Division along with its three regional offices, provides technical and administrative assistance for all of DENR's programs and to the public. The division's responsibilities include personnel services, budget and grants management, legal assistance, information services, water and wastewater training, environmental education and field operations by the department's three regional offices.

- **RESPONSIBILITIES AND SERVICES**

  - The Personnel Office makes certain that all of the terms of employment for department employees are met. This office administers the department's biweekly payroll and insures that all employees are aware of the benefit programs that are available to them. The Personnel Office also deals with employee grievances, classification and compensation.

  - The Fiscal Office is responsible for preparation of the TSS budget as well as submission of the department's overall budget. The State EPA Agreement, containing approximately $3,000,000 in grant dollars, is negotiated by the fiscal office on an annual basis. All payments, receipts, federal grants, and legislative accounts in the department are managed in this office.

  - The department's staff attorney also works in TSS. The legislation introduced by the department is drafted or reviewed by the staff attorney.

  - The division's Information Services section deals with press, public relations and computer management functions of the department. In an era of increasing environmental awareness, the information services section has played an important part in educating South Dakotans about DENR's role and mission. This section oversees the publication of "*Water and Environment Today*," the department's quarterly newsletter.

  - TSS also is in charge of the department's computer system. Each DENR employee is provided with a personal computer. Those computers are all linked through a local area network, or LAN. The network allows employees access to program software, communication by electronic mail and frequently shared data bases.

  - The water and wastewater operators play a major role in keeping the state's waters clean. All water and wastewater operators must be certified by the state board of operator certification. To insure that all operators are properly trained and provided with the latest information on state-of-the-art techniques, the TSS' Environmental Education and Training Section regularly conducts training activities on all as-

pects of water pollution control.

- DENR has three field offices located in Sioux Falls, Watertown and Rapid City. The personnel in these offices are involved in support activities for department programs. Field office personnel regularly conduct inspections and enforcement activities; provide technical assistance to towns, cities and rural water systems and handle the responsibilities of emergency response for hazardous materials spills and incidents. In most cases, the regional office staffs are the department's first line of response when environmental problems occur.

- **NEW PROJECTS**

  - TRAINING CENTER

    In 1992, TSS staff members began or continued work on three efforts designed to help DENR meet its responsibilities to the public.

    The Floyd L. Matthew Environmental Education and Training Center was officially dedicated by Governor George S. Mickelson and EPA officials on January 16, 1992.

    The 4,800-square foot center is located adjacent to the Joe Foss Building across the street from the state Capitol in Pierre.

    Included in the center is a large classroom, a teaching laboratory and a library. The training center is used for DENR public education and technical activities. Various departmental citizen boards and other environmental groups also hold meetings in the center. The first activity, a wastewater treatment workshop, was held in the center January 22-23, 1992.

    The center is named after Floyd L. Matthew, who served as DENR secretary from August 1, 1989 until his death from cancer on May 23, 1990.

  - PROJECT SAVE

    Another educational activity for the division this past year was Project SAVE: studies, awareness and values of the environment. The program, available for teachers of grades K-12. It is a collection of educational units the focus on the environmental issues of: Air Quality, Water Quality, Composting and Solid Waste.

    The program was tested at 10 pilot sites throughout South Dakota in 1992. Testing and two week-long teacher workshops were offered.

    An one hour credit class was held at Takini School on the Cheyenne River Tribal Lands. The other was held in Pierre for two hours of college credit. This class was limited to 24 individuals who worked hard for six days to learn about our environment.

    Project SAVE was selected for a National Science Foundation - Statewide Systemic Initiative Program Planning grant. The grant is to lay the groundwork for a curriculum change where Project SAVE becomes part of core curriculum, other than science, such as social studies, math and language arts.

    Response to the program has been good and Project SAVE's three environmental cartoon figures — Can Man, Wendy Water and Sky Guy — have

become student favorites.

The program is expected to expand to more teachers and schools during the next few years.

- GIS

TSS staff members also continued work in 1992 on a Geographic Information System, or GIS, for the department. The system permits the merging of maps with computer data bases to solve complex environmental and other planning problems. DENR has begun implementation of a GIS and studies are currently underway to establish a registered map base for the state at two different scales. When it is implemented, the GIS will help analyze many of the complex data that are now mapped by hand.

DIVISION OF WATER RIGHTS

John Hatch
Division Director

DIVISION ORGANIZATION AND DUTIES

The Division of Water Rights is a regulatory and water management agency primarily responsible for administering the appropriation and use of the state's water resources. The division consists of the administrative, engineering, ground water, and surface water sections with a total of 21 FTE's. Duties performed by the division include:

- Review applications to appropriate water, applications for flood control permits, and applications to conduct weather modification activities.
    - The division reviews approximately 200 applications to appropriate water per year. A written report and recommendation is prepared for each application. A small number of flood control applications are received each year and weather modification applications are typically filed only in response to severe drought conditions.
- Monitor ground water levels and surface water flows.
    - The division maintains an observation well network numbering approximately 1,700 wells. Observation wells are measured 6 to 12 times per year, 60 of the wells are continuously monitored, and every 3 to 5 years samples are taken to check water quality. The division cost shares with the US Geological Survey to maintain 47 stream gaging stations to monitor stream flows.
- Determine availability of unappropriated water and regulate water uses.
    - Water availability is assessed through the observation well network, county hydrology studies, stream gaging stations, watershed runoff estimates, water use data collected from the annual irrigation questionnaire, and review of existing water rights records. Water use is regulated by qualifications attached to water permits and by statutory authority. Examples of regulation include specifying when and how much water may be used and prohibiting the waste of water.
- Inspect dams and permitted water uses for safety of works.
    - The state has an inventory listing of 2,341 state and privately owned dams. Last year a total of 79 private and state owned dams were inspected for safety of works. Approximately 400 permitted water uses are inspected each year to ensure compliance with permit requirements and safety of works.
- License and regulate well drillers.
    - Each year approximately 170 well drillers are licensed to drill wells in

South Dakota. Well completion reports submitted by well drillers are reviewed to determine if wells are properly constructed.

- Regulate stream fence crossings.
  - A number of navigable streams have been designated as requiring a gate or opening in any fence across a stream to allow safe passage of the public.
- Regulate application of chemicals through irrigation systems.
  - Irrigation systems through which fertilizers or pesticides are applied need to be properly equipped to prevent contamination of the water supply. Approximately 10 percent of the irrigators reporting annual water use apply chemicals through their irrigation systems.
- Plug and control flowing wells.
  - Any abandoned well must be plugged to prevent leakage of water under the ground or over the ground and flowing wells must be controlled to prevent waste of water.
- Determine the ordinary high water mark (OHWM), ordinary low water mark (OLWM), and outlet elevation on public lakes.
  - The Water Management Board has set the OHWM on 34 lakes and OLWM on two. Biannually, the division surveys the water level on 138 lakes including the lakes that have an OHWM established.
- Provide technical assistance to counties on drainage issues.
  - Drainage laws are administered at the county level. A request may be made to the state to provide technical assistance concerning drainage activities within the county.

MAJOR ACCOMPLISHMENTS

- Established criteria for transferring water rights from irrigation to municipal use. Transfer of a water right is allowed if it does not affect other existing water rights.
- Participated with the U.S. Army Corps of Engineers, Omaha District, and the Missouri River Basin Association in developing the 1993 Annual Operating Plan for the Missouri River Main Stem Reservoirs. Six years of below normal runoff has resulted in dropping water levels in the upper big three reservoirs and decreased service to downstream navigation. Meetings between the Corps and the Missouri River Basin Association have resulted in a compromise operating plan.
- Provided technical input to the U.S. Army Corps of Engineers, Omaha District, for the Missouri River Main Stem Reservoirs Master Water Control Manual Review and Update. The manual identifies criteria that is used to establish the Annual Operating Plan for the reservoirs. Due to disagreements between the upper basin states and the lower basin states the manual is being studied for revision.
- As part of the Black Hills Hydrology Study, three new monitor wells have been installed in the Black Hills area. Two of these wells are completed into the Madison Formation and one into the Minnelusa Formation. The purpose of the monitor wells is to provide basic historical data for evaluation of water quantity and recharge to these formations.

- Prepared amendments to the well construction standards.

- Completed two complex ground water investigations for the Big Sioux:Sioux Falls aquifer and the Big Sioux:Middle Skunk Creek aquifer. The investigation was prompted by domestic well users concerned with water availability and also by city of Sioux Falls filing applications to appropriate water from these aquifers.

- Established an ordinary high water mark and ordinary low water mark on Lake Alice located in Deuel county.

MAJOR ON-GOING ISSUES:

- Continued participation in the review and update of the Missouri River Main Stem Master Water Control Manual. The Corps of Engineers is to prepare a draft environmental impact statement describing several alternatives by January 31, 1993. The final environmental impact statement with the selected operating alternative will be completed by early 1994.

- Participate in contract renegotiations between the U.S. Bureau of Reclamation, City of Rapid City, Rapid Valley Water Conservancy District and fishery interests for water in Pactola Reservoir storage.

- Cooperate with the U.S. Fish and Wildlife Service in developing a long-range water management plan for LaCreek National Wildlife Refuge in Bennett County in western South Dakota. Landowners adjacent to the refuge have complained that private land has been flooded due to mismanagement. The Board of Water Management has directed the refuge to manage its water rights without flooding private property.

- Continue to work with the Wyoming State Engineer, Belle Fourche Irrigation District, U.S. Bureau of Reclamation, and Wyoming irrigators in establishing a recreational pool for Keyhole Reservoir. Withdrawal of water by irrigators has left water levels in the reservoir extremely low. The possibility of adopting rules and regulations for the Belle Fourche River compact is being discussed.

- If funding can be obtained, an attempt will be made to plug an uncontrolled flowing Madison well located near Orman dam in Butte county. The well, drilled in 1951, is flowing approximately 2,000 gallons per minute. The annual volume of flow from the well could supply a city the size of Sioux Falls for two months.

- Continue to work with the Bureau of Reclamation, Corps of Engineers, US Fish and Wildlife Service, and the North Dakota Water Commission to resolve issues involved in use of James River waters.

DIVISION OF WATER RESOURCES MANAGEMENT

Jim Raysor
Division Director

The mission of the Division of Water Resources Management is to provide technical and financial assistance for the protection, restoration, and development of South Dakota's water resources.

The Division of Water Resources Management accomplishes this mission by managing a number of state and federal programs. They are the State Water Pollution Control Revolving Fund Program, the Consolidated Water Facilities Construction Fund Program, the Construction Grants Program, the Solid Waste Management Grant Program, the State Water Resources Management System, the Clean Lakes Program, the Nonpoint Source Water Pollution Control Program, the Environmental Protection Agency 314, 319 Development, 319 Implementation, and 319 Implementation and Education Programs.

MAJOR ACCOMPLISHMENTS

- In February, the State Revolving Fund (SRF) Program completed a successful, annual review by EPA. Throughout the year, 12 SRF applications were approved in the amount of $11,881,664. To date, the SRF program has helped 40 communities with their wastewater funding in providing $31,066,701.20 in low interest loans. The Board of Water and Natural Resources has continued since the onset of the program, to keep the interest rates for these loans at 3% for a 10 year loan, 4% for a 15 year loan, and 5% for a 20 year loan. In September, the staff worked with the Board of Water and Natural Resources, acting in its capacity as the South Dakota Conservancy District, in issuing $4,180,000 revenue bonds as state match for the $9,534,900 1992 EPA Capitalization Grant, as well as the 1993 and 1994 EPA Capitalization Grants.

- For the year 1992, staff reviewed 87 applications for placement on the State Water Plan in order for project sponsors to receive state and federal funding assistance. The Board of Water and Natural Resources approved 84 projects for placement on the State Water Plan. Staff also updated the State Water Planning Process Document, which explains the State Water Plan, State Water Resources Management System, State Revolving Fund, Solid Waste Management Program, Groundwater Research and Public Education Program, and the Consolidated Water Facilities Construction Program. This document also includes applications for funding assistance for each of these programs. Staff also updated the Board of Water and Natural Resources 1992 State Water Plan/1991 Annual Report.

- The Board of Water and Natural Resources received $1,750,000 from the General Fund during the 1992 South Dakota

Legislative Session to award to applicants for the Consolidated Water Facilities Construction Fund Program for the year. During 1992, 43 applications were reviewed by the division; and the Board of Water and Natural Resources awarded 25 grants with a total awarded to date of $1,382,300.

- During the summer and fall, staff managed the 1992 Drought Disaster Livestock Water Supply Assistance Program which received $100,000 from the Consolidated Water Facilities Construction Fund Program and $100,000 from Emergency and Disaster Services. A total of 343 applications were received from landowners across the state with 217 being approved for assistance.

- The Division of Water Resources Management was directly involved in the Department's top 1993 legislative issue of the dedicated funding for water development. In June, the Department hosted the Water Development Roundtable in Pierre. The event drew over 400 South Dakotans together to discuss the need for the funding and possible funding sources. Division staff organized the Roundtable and put together a synopsis of the Roundtable that was distributed to all participants. In August, September, and October the Board of Water and Natural Resources conducted hearings to allow additional public input into the identification of a dedicated revenue source for water development. Staff worked with the Board in scheduling the hearings, providing presentations on water development needs, and compiling the results of testimony submitted. The results were used as the basis for the Board's recommendations to Governor Mickelson regarding the need for the funding and identification of the dedicated revenue source.

- Water Resources Management staff also worked closely with representatives of the Mid-Dakota Rural Water System and the Lake Andes-Wagner/Marty II Irrigation Unit projects which have now received federal authorization for funding in the amounts of $108,400,000 and $200,000,000 respectively.

- The Construction Grants Section received approval for 10 wastewater projects to receive EPA Construction Grants funds in the amount of $1,752,416. These are the final EPA Construction Grants funds to be awarded due to the phase-out of the program. Administration of the program will continue through federal fiscal year 1994. Total construction grants received from the EPA and distributed to projects by staff since the onset of the program in 1972 is approximately $180,000,000. This year, Division staff testified at federal hearings in Denver, Colorado and Washington, D.C. on behalf of the town of Pollock. Through the hearings, Pollock's initial denial of funding by EPA was reversed, and the town was awarded partial funding through the Construction Grants program with the remainder being awarded through special language in federal legislation.

- The Solid Waste Management Grant Program received 38 applications for recycling and landfill projects in November. The Board of Water and Natural Resources reviewed these applications at its December meeting and awarded 20 grants for $415,400. This grant assistance will generate approximately $692,000 in project activity.

- This year the Clean Lakes Section is active in eight study projects. They involve Lake Hendricks, Lake Campbell, Swan Lake, Lake Kampeska, Lake Andes, Mina Lake, Lake Byron, and Lake Redfield. All pro-

jects consist of a combination of funding assistance by the EPA, state, and local governments. Four implementation projects are currently underway for Wall Lake, Punished Woman's Lake, McCook Lake and Burke Lake. Total federal funding for these four dredge projects is $190,000, with total state funding of $350,000.

- The 1992 Legislature directed that the state-owned dredges be sold at the conclusion of the dredging season. Division staff assisted the Bureau of Administration in the preparation of all materials necessary for the sale. The dredges were advertised for sale in October with a bid opening scheduled for mid-December.

- The Nonpoint Source Section has just implemented the Nonpoint Source Water Pollution Control Program. The program will be funded with EPA grants or with low interest loans from the State Revolving Fund Program. It is a voluntary program to protect and improve water quality in the lakes, rivers and aquifers through control of diffuse sources of pollutants such as cropland runoff, stream bank erosion and excessive use of fertilizers. The program develops best management practices for pollution control, provides technical and financial assistance to willing cooperators, and conducts information and education programs. Because of the diverse nature of pollutant sources and resources available through other agencies, program coordination is achieved through the Nonpoint Source Task Force, which is an ad hoc open membership group composed of representatives from federal, state, local, and tribal governments, and private organizations. New projects for 1992 which address a wide variety of sources and water bodies are Lake Cochrane Protection, Abandoned Well Sealing Demonstration, Foster Creek/Beadle County Riparian Demonstration, Little Minnesota River Watershed Restoration, and Foster Creek/Stanley County Riparian Demonstration.

The goal of the Division of Water Resources Management is to "improve the quality of waters in the state, meet the water supply needs of the citizens, and effectively manage the water resources of the state." Through the ongoing programs and the policies implemented by this division, the needs concerning the management of the water resources of the state of South Dakota are continually being addressed.

BOARD OF MINERALS AND ENVIRONMENT

The Board of Minerals and Environment is a nine member citizen's board appointed by the Governor. Members of the board are appointed for four year terms and are responsible for protecting the environment and natural resources of South Dakota in the areas of mining, hazardous and solid waste, asbestos and oil and gas.

The Board of Minerals and Environment began the year with a request from Koch Exploration Company for approval of two air injection wells in Harding County, and a request from Western Production Company for approval of the development and operation of a First Leo Sand unit in Fall River County to increase the recovery of oil, conserve natural resources, and prevent waste.

In March the board conducted a public hearing on the large scale mine permit application for Homestake Mining Company's Open Cut Expansion Project. Homestake had requested an additional 27 acres be included in the Open Cut project. The board received public testimony from individuals residing within the proposed project area and approved with conditions Homestake's application.

The month of April the board held a contested case hearing on the air quality permit application for a sand and gravel operation, and received a briefing on the results of the 1990 Colman PCB study. Department staff had sampled eight sites in the Colman area to determine environmental contamination levels. A review of the results by an EPA toxicologist concluded that there was no threat to human health from the contamination levels.

At the board's meeting in May, and at the recommendation of the Cumulative Environmental Evaluation Task Force, the board issued Orders to the four mining companies to provide financial assurance regarding the operator's technical and financial ability to respond to accidental releases of cyanide processing solution into the environment.

The board also approved a small scale mine permit for Pete Lien DBA Dakota Block to mine shale in Pennington County, and approved an air quality variance for Mereèn-Johnson's cast iron foundry operation at Webster. This variance allowed Mereen-Johnson time to design and construct the necessary air pollution control equipment.

The month of June brought the presence of two new board members; Craig Grotenhouse of Rapid City and Robert Hayes of Sioux Falls. Mr. Grotenhouse filled the position previously held by John Fitzgerald, who had recently been appointed Seventh Circuit Court Judge. Mr. Hayes took the position that had been held by Mr. Charles Kearns.

In July the board approved the transfer of a mining permit for Golden Reward Mining Company to Golden Reward Mining Company, L.P., and the revocation of a reclamation bond for a small scale mine permit. The board approved release of the bond to the Department to contract for reclamation of the site.

The board also received a report on the recommendations of the Citizens' Advisory Committee on Hazardous Waste Management. In June of 1991, Governor Mickelson signed Executive Order No. 91-10 establishing the Committee to study the issue of hazardous waste management in South Dakota.

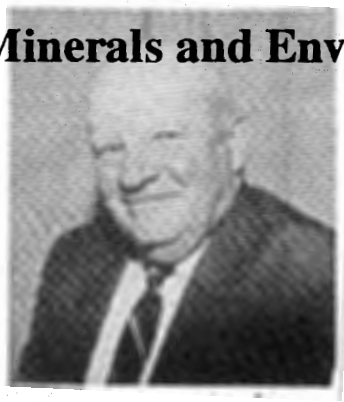
In August the board approved amend-

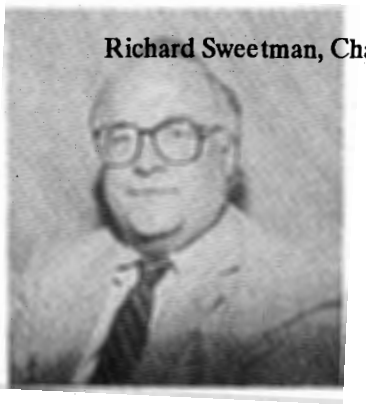
ments to the hazardous waste regulations to update existing rules by incorporating the federal rules by reference.

At the September meeting of the board, a hearing was held on the nomination of Dome Mountain-Lost Gulch Refuge and Anchor Hill Lookout Site to the preliminary list of special, exceptional, critical or unique lands. The board received public testimony at the September meeting and continued the hearing until their October meeting to render a decision.

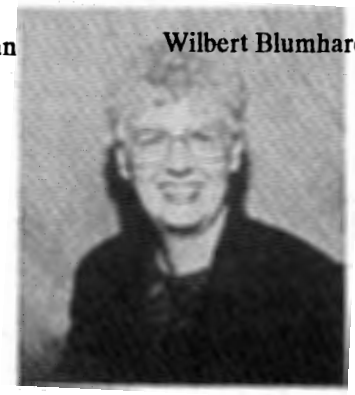
At their meeting in October the board voted 5-4 to not include this area on the preliminary list.

Board of Minerals and Environment Members

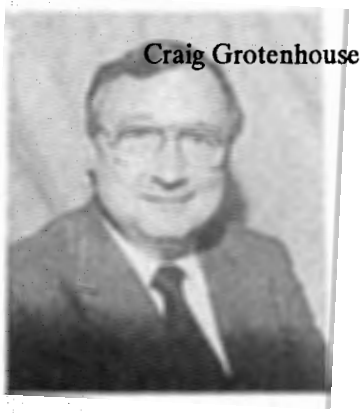




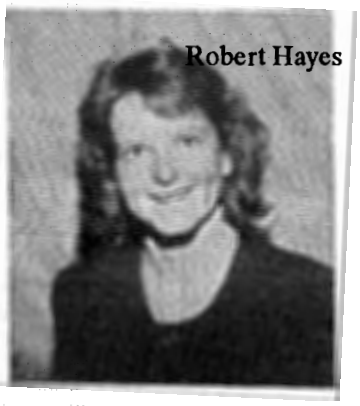
Richard Sweetman, Chairman



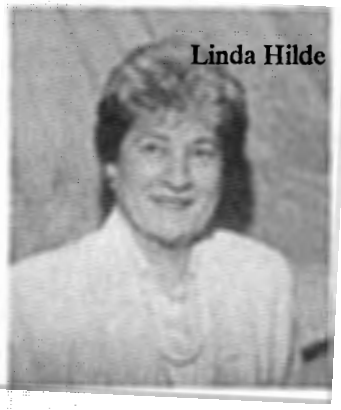
Wilbert Blumhardt



Craig Grotenhouse



Robert Hayes



Linda Hilde

Lee McCahren

Vivian L. Pappel

Grace Petersen

Mary Wiese

WATER MANAGEMENT BOARD

The Water Management Board is a seven member citizen's board appointed by the Governor. Areas of interest represented by board members are the public at large (two members), municipal government, irrigation, domestic, industrial, and fish and wildlife interests. The board is a multi issue board that issues, denies or cancels water permits, establishes surface and groundwater quality standards, sets ordinary high water marks, regulates water use, establishes safety of dams standards, validates vested water right claims, issues water quality variances, establishes well construction standards, establishes standards for above and below ground storage tanks and underground injection wells.

MAJOR ACCOMPLISHMENTS

- The Water Rights Division petitioned the board to adopt a declaratory ruling limiting the annual water withdrawals from the Big Sioux:Sioux Falls aquifer. The board adopted a declaratory ruling limiting annual withdrawals, excluding domestic water use, to 32,200 acre-feet of water per year. Extensive development of the aquifer as a water supply and concerns over water availability from area residents prompted the declaratory ruling.

- Residents near Renner SD filed a petition requesting the board to adopt a declaratory ruling that domestic wells were being deprived of reasonable domestic use of water due to excessive water uses from the Big Sioux:Sioux Falls aquifer. Domestic water users were concerned about declining water levels in their wells and the impact caused by the city of Sioux Falls developing additional municipal wells. The board adopted the declaratory ruling; however, no action had to be taken by the board to address the problem. The city of Sioux Falls offered to provide city water services to the impacted area.

- The board adopted rules amending existing well construction standards to clarify minimum well construction practices.

- The United States Fish and Wildlife Service filed three applications to appropriate water for the LaCreek National Wildlife Refuge. Each of the applications was contested by area residents. The Board held a hearing and approved the applications with the stipulation that the permitted water use may not impair the use of any private lands adjoining the refuge.

- Petitions were filed requesting the board to delete segments of the Cheyenne River, Belle Fourche River and the Little Minnesota River from the list of navigable streams requiring installation of gates in fences crossing the streams. After a hearing, the board found that either the public did not make sufficient use of the stream segments or the flow was not sufficient for a stream to be classified as navigable. Rules were adopted deleting the stream segments from the list of navigable streams that require a gate in any fence crossing the streams.

- The board considered and approved four contested water permit applications to transfer irrigation rights for Rapid Creek natural flows to municipal use by Rapid City. Area water users contested the applications due to concerns about the impact of the water transfers to existing water users.

- The board adopted revisions to the state surface water discharge permit regulations to conform with the latest federal regulations, established site specific surface water

quality standards for Whitewood Creek, and conducted the three year review of the state surface water quality standards.

Members of the Board of Water Management pictured left to right (back row) Bernita Loucks, Leo Holzbauer, Marian Gunderson, Joel Rickenbach; (front row) Rodney Freeman, Francis Brink (Chairman), and Dwayne Rollag.

BOARD OF WATER AND NATURAL RESOURCES

1993 STATE WATER PLAN
AND
1992 ANNUAL REPORT

January 1993

1992 LEGISLATIVE OVERSIGHT COMMITTEE

Senator Henry A. Poppen	DeSmet
Senator Doris P. Miner	Gregory
Rep. William F. Cerny, Jr.	Burke
Rep. Steven K. Cutler	Claremont

BOARD OF WATER AND NATURAL RESOURCES

James G. Bell, Chairman	Rapid City
Steven Lowrie, Vice-Chairman	Watertown
Dale Kennedy, Secretary	Beresford
Thomas Everist	Sioux Falls
John Loucks	Rapid City
Glen A. Severson	Huron
George Scully	Wentworth

Pictured are members of the Board of Water and Natural Resources from left to right (back row) Glen Severson, George Scully, John Loucks; (front row) Steve Lowrie, James Bell (Chairman), and Dale Kennedy. Not pictured is Tom Everist.

ANNUAL REPORT

An annual report of the Board of Water and Natural Resources (BWNR) is statutorily required under SDCL 46A-1-14 and SDCL 46A-2-2. This report is to contain all activities that the Board has engaged in during the year (to include a detailed account of all expenditures from the South Dakota water and environment fund) and a comprehensive statewide water plan which outlines water resource projects as presented to the Board.

The Board of Water and Natural Resources had several key issues come before it during 1992. The main issue was the establishment of a dedicated revenue source for water development. In June the Department of Environment and Natural Resources held a funding roundtable to determine whether there was support for a dedicated revenue source. This roundtable indicated that there was support to establish a dedicated revenue stream. In July, Governor Mickelson charged the Board with the responsibility to hold public meetings throughout the state to determine whether there is support throughout the state and, if so, what type of dedicated revenue would be most acceptable.

The Board held public hearings in Sioux Falls, Huron, and Rapid City. Upon completion of these hearings, the Board compiled the testimony and adopted Resolution #92-94 (Appendix ?) which recommended that the Governor and the Legislature establish a dedicated water fund through the implementation of a one year, one time, one cent sales tax in conjunction with a permanent water user fee.

STATE REVOLVING FUND

Another key issue before the Board in 1992 was the authorization of a bond issue to provide state match for federal funds for the State Revolving Fund (SRF) loan program. In September, the Board approved a $4,180,000 bond issue to provide state match for the EPA Capitalization Grants for federal fiscal years 1992-1994.

The SRF program, which began in 1988, is designed to provide low-interest loans to municipalities, sanitary districts, and watershed districts. The loans are to be used to upgrade wastewater treatment facilities or for nonpoint source pollution control projects.

To be eligible for an SRF loan, projects must be on the Intended Use Plan. The Board held public hearings in March and September to approve potential projects for SRF funds.

The Board approved 13 loans (TABLE 1) during the past year totaling $12,083,767. A total of 40 loans have been made to date from the program totaling $32,383,956. Interest rates for the program are set annually by the Board according to ARSD 74:05:08:18. In October, the Board voted to continue the rates at 3% for 10 years, 4% for 15 years, and 5% for 20 years. These rates have been in effect since October 1990.

TABLE 1

STATE REVOLVING FUND

Sponsor	Project Description	Loan Amount	Interest Rate
Canton	Major Rehabilitation	$ 621,000	4%
Chamberlain	Rehab/Storm Sewer	350,500	3%
Hot Springs	Collectors	196,930	3%
Lead	Sewer Corrections	405,000	3%
Mobridge	Secondary Treatment	158,000	4%
N. Sioux City	Storm Sewer	239,650	3%
Rapid City	Advance Treat/Rehab	1,138,200	4%
Sioux Falls	Major Rehab/Collectors	1,955,000	3%
Sioux Falls	Storm Sewer	700,000	3%
Spearfish	Advance Treatment	1,956,000	4%
Watertown	Advance Treatment	4,000,000	4%
Waubay	Collectors	163,487	5%
Whitewood	Secondary Treatment	200,000	4%
		$12,083,767	

GRANT PROGRAMS

One of the duties of the Board is to review grant applications for funding from the Consolidated Water Facilities Construction Program (CWFCP), the Groundwater Research and Public Education Program (GRPEP), and the Solid Waste Management Program (SWMP).

Consolidated Program

The CWFCP was established by the 1986 State Legislature to provide grants or loans for water development projects included in the State Water Facilities Plan. This program replaced the construction loan program and several smaller programs in an effort to simplify the State's financing process for small water projects.

Due to an increased appropriation for the Consolidated Water Facilities Construction Program by the 1992 State Legislature, the Board was able to award 25 CWFCP grants (TABLE 2) totaling $1,382,300. The Board also awarded $100,000 from the Consolidated Program to be used in the Drought Assistance Program.

TABLE 2

1992 CONSOLIDATED GRANT AWARDS

Sponsor	Description	CWFCP Funds	Project Cost
Big Sioux	water treatment plant	$ 50,000	$ 4,020,000
Bristol	wastewater treatment	35,000	349,575
Burke	dredge	65,000	150,000
B-Y Water	expansion	150,000	11,580,000
Campbell Cnty	WEB expansion	50,000	4,422,323
Canton	sewer improvements	50,000	671,000
Cavour	wastewater treatment	50,000	247,017
Chamberlain	water treatment	40,000	110,000
East Dakota WDD	abandoned well sealing	8,800	55,000
Hitchcock	water system upgrade	15,000	51,000
Izaak Walton	McCook Lake dredge	80,000	165,000
Lakeside Assoc.	water storage	8,500	38,000
McCook Lake SD	wastewater treatment	50,000	1,277,319
Minnehaha CD	Wall Lake dredge	120,000	400,500
Pennington	drainage/flood control	75,000	380,650
Platte	water system upgrade	25,000	80,000
Punished Wmn's	lake dredge	85,000	175,000
Randall CWD	treatment plant upgrade	50,000	735,300
Rapid Valley	water system upgrade	75,000	661,200
Roberts County	lake restoration	18,350	392,508
So. Brown CD	lake restoration	31,650	350,000
Stanley County	nonpoint source	30,000	380,000
Tripp Cnty WUD	system upgrade/expansion	100,000	2,974,900
Veblen	wastewater treatment	20,000	304,800
Watertown	water system expansion	100,000	268,000
TOTAL CWFCP GRANTS	$1,382,300	$30,239,092	
Drought Assistance Program	$ 100,000	$ 1,300,000	
TOTAL CWFCP EXPENDITURES		$1,482,300	$31,539,092

Groundwater Program

The Groundwater Research and Public Education Program was created to study groundwater contamination, to provide information on sound groundwater management, and to develop methods for preventing groundwater pollution. The Groundwater Protection Fund has four sources of revenue: 1)the Pesticide Groundwater Fee; 2)the Fertilizer Inspection Fee; 3)the Petroleum Release Compensation Fund; and 4)the Surface Mining Chemical Leaching Fee. The Board approved 13 GRPEP grant awards totaling $600,862 in 1992 (TABLE 3).

TABLE 3

1992 GROUNDWATER RESEARCH AND PUBLIC EDUCATION PROGRAM

Project Sponsor	Project Description	Amount Authorized
Dr. Charles Cranston	SD Groundwater Video	72,758
Drs. Arnold & Koczon	Field vs Laboratory	30,425
East Dakota WDD	Abandoned Well Sealing	15,000
SIMPCO	Groundwater Education	12,749
Dr. Arden Davis	Vulnerability Assessment	81,842
Dr. M.R. Islam	Cleaning Petroleum Soils	32,230
Dr. Vern Schaefer	Feedlot Clay Liners	73,345
Nepstad & Wiles	Black Hills Caves Groundwater	16,385
Dr. Henry Mott	Adsorption Petroleum To Soils	48,446
Dr. M. R. Islam	Black Hills Aquifer Fractures	35,000
David Clay	Tillage Microrelief	101,400
Janssen,Rickerl, & Machacek	Wetlands & Farms	50,282
Mellette County	Hydrological/Geological Study	31,000
		$600,862

Solid Waste Program

The 1989 State Legislature established the Solid Waste Management Program to provide grant assistance to cities and counties for the development of comprehensive solid waste planning and management programs. However, the 1992 State Legislature provided the first funding sources for the program. In preparation for the first funding round the Board held public hearings in August and September to revise the rules governing the grant program. In December the Board held its first funding cycle, awarding 20 grants totaling $415,400 (TABLE 4).

TABLE 4

1992 SOLID WASTE MANAGEMENT GRANT AWARDS

MUNICIPAL SOLID WASTE GRANTS

Applicant	Description	SWMP Funding	Total Project
Beresford	closure	$ 30,800	$ 56,000
Bowdle	closure	20,000	30,200
Buffalo County	closure	15,000	21,900
Buffalo Gap	closure	14,700	19,600
Colome	closure	7,600	10,201
Doland	closure	4,800	9,750
Faith	closure	4,700	9,500
Iroquois	closure	18,000	24,530
Kimball	closure	21,900	29,300
Lesterville	closure	7,500	12,800
Marshall County	closure	13,900	18,572
Quinn	closure	2,500	5,000
Stratford	closure	24,300	39,025
Timber Lake	closure	15,000	31,350
Turton	closure	7,300	9,750
Municipal Solid Waste Grants		$ 208,000	$ 327,478

RECYCLING GRANTS

AMSS Recycling, Dell Rapids	$ 12,800	$ 23,900
No. Plains Recycling, Sioux Falls	110,000	220,000
R.C. Plastic Research	10,600	17,360
Vermillion, Clay Co. Recycling	70,000	96,250
Winner	4,000	6,490
Recycling Grants	$ 207,400	$ 364,000

WATER DEVELOPMENT DISTRICTS

The Board continued to work closely with the seven water development districts. In February, the Board held a public hearing regarding redistricting of the water development district director areas as required by SDCL 46A-3B-3. Due to a shift in population, the Board had to revise director areas in five of the seven districts. The water development districts supported the new director areas as approved by the Board.

STATE WATER PLAN

The 1982 State Legislature established the State Water Plan to obtain the optimum over-all benefits of the State's water resources for the general health, welfare, safety and economic well-being of the people of South Dakota through the conservation, development, management, and use of those resources. The Legislature placed the re-

sponsibility upon the Board of Water and Natural Resources to develop this plan.

The State Water Plan, as established in SDCL 46A-1-2, consists of two components - the State Water Facilities Plan and the State Water Resources Management System. In order to be considered for the State Water Plan, projects must meet certain criteria established by the Board. These eligibility criteria are used as guidelines for the BWNR, the Department of Environment and Natural Resources (DENR), and the Water Development Districts (WDD) when considering a project for inclusion onto the State Water Plan.

State Water Facilities Plan

The State Water Facilities Plan (SWFP) identifies those projects such as rural, municipal, and industrial water supplies, dam safety, storm water, water conservation, lake restoration/nonpoint source pollution control, solid waste planning, solid waste management, groundwater contamination, pollution prevention or remediation, and wastewater facilities. The Board of Water and Natural Resources is responsible for approving all projects which are placed onto the SWFP. With sufficient funding, the Board can directly finance certain projects. But equally important, the Board can significantly influence federal categorical grant decisions or funding decisions from other state agencies.

In November 1991, the Board approved 62 projects for inclusion onto the 1992 SWFP. During 1992, the Board approved an additional 15 projects for amendment onto the plan. As previously mentioned, the Board directly assisted 25 of these projects by awarding grants from the Consolidated Water Facilities Construction Program.

In November 1992, the BWNR reviewed 72 applications for the state water facilities plan. The Board approved 69 of the applications (TABLE 5). These projects are now eligible to seek state/federal financial assistance as they proceed.

TABLE 5

1993

STATE WATER FACILITIES PLAN

Sponsor	Description	Total Cost
Aberdeen Develop Corp	water/sewer expansion	$ 204,000
Arlington	water treatment	516,000
Armour	watermain upgrade	203,325
Baltic	wastewater treatment	330,700
Big Stone City	water supply	1,125,000
Blunt	watermain upgrade	66,695
Brandon	wastewater treatment	750,000
Britton Develop Corp	water/sewer expansion	188,500
Buffalo Gap	water distribution	195,000
Burke	dredge	206,000
B-Y Water District	system expansion/upgrade	26,000,000
Campbell County	WEB expansion	4,422,323
Centerville	water system upgrade	399,000
Colton	wastewater treatment	526,000
Custer	wastewater lagoon	370,000
DeSmet	water distribution	42,000
East Dakota WDD	Lake Campbell watershed	307,000

Eden	water distribution upgrade	99,668
Flandreau	water supply/treatment	1,210,700
Fort Pierre	storm sewer	205,000
Freeman	sewer/water expansion	621,000
Groton	sewer expansion	138,700
Hayti	wastewater treatment upgrade	260,000
Hill City	water system expansion	63,300
Hurley	water supply	185,000
Huron	sanitary sewer hookup	40,000
Interior	water system	262,500
Kadoka	water supply	542,000
Kadoka	sewer upgrade	101,700
Kimball	water main replacement	508,000
Lake Byron Watershed	sanitary sewer system	1,407,460
Lake Poinsett SD	wastewater expansion	510,000
Lake Preston	water distribution upgrade	700,000
Langford	wastewater treatment upgrade	334,680
Leola	wastewater treatment upgrade	137,200
McCook Lake Izaak Walton	dredge	312,505
Milbank	Lake Farley restoration	450,000
Minnehaha Cons Dist	dredge	312,000
Mobridge	water intake improvements	139,500
Murdo	water distribution upgrade	90,680
N Central RC&D	Foster Creek demo project	424,900
N Sioux City	water/sewer expansion	178,063
Oacoma	water line rehabilitation	79,500
Parkston	water storage tank	280,000
Philip	water storage expansion	372,900
Platte	water system upgrade	97,000
Punished Woman's Assoc.	dredge	220,000
Ramona	water distribution upgrade	200,000
Randall CWD	treatment plant upgrade	930,100
Reliance	lake rehabilitation	65,000
Revillo	wastewater treatment	311,740
Revillo	RWS hookup	130,000
Roberts County	lake restoration	263,297
Salem	drainage diversion	780,000
Sioux Falls	5 sewer projects	4,500,000
Sisseton	water distribution upgrade	207,075
Sisseton	water distribution upgrade	493,400
S Brown Cons Dist	lake restoration	988,765
Spearfish	water supply replacement	400,000
Spearfish	water storage replacement	137,500
Spearfish	wastewater treatment	3,376,000
Sturgis	water system upgrade	486,500
Tea	water system/storm sewer	600,000
Tripp	water main replacement	125,940
Watertown	water system upgrade	250,000
Waverly Township	sanitary sewer	174,660
Webster	water/sewer line replacement	535,000
Wentworth	sewer debt refinance	127,000
Worthing	lagoon sealing	262,000
TOTAL		$61,479,476

State Water Resources Management System

The State Water Resources Management System (SWRMS) identifies typically large, costly water projects that require specific state or federal authorization and/or financing. These projects are placed onto the SWRMS by the Governor and the Legislature from recommendations made by the Board of Water and Natural Resources as necessary goals for water resource management in South Dakota according to SDCL 46A-1-10. The SWRMS serves as the preferred priority list to accomplish optimum water resources management in the State. Once a project is placed onto the SWRMS list, it remains on the list until it is removed by legislative action. In 1992, the Legislature appropriated and the Board approved $1,925,000 in funding for SWRMS projects (Table 6).

TABLE 6

1992 SWRMS FUNDING SUMMARY

Project	Grant Amount
Black Hills Hydrology Study	$ 100,000
Fall River County Rural Water System	50,000
James River Improvement Program	150,000
Lewis & Clark Rural Water System	125,000
Mid-Dakota Rural Water System	1,500,000
	$ 1,925,000

In November, the BWNR reviewed all 24 projects on the SWRMS (TABLE 7). The Board recommended that seven of the projects be removed from the list due to a change in project direction or the understanding that the project was no longer a viable or dynamic project. The Board recommended one new project for inclusion onto the SWRMS list. This project, the Perkins County Rural Water Project, will bring Missouri River water from North Dakota to the northwest corner of South Dakota.

TABLE 7

STATE WATER RESOURCES MANAGEMENT SYSTEM

Project	Project Description
Belle Fourche Irrigation Project	Rehab of Belle Fourche Project
Big Sioux Flood Control Study	Watertown Flood Control Dam
Black Hills Hydrology Study	Hydrologic study of the Black Hills
Brennan Reservoir	Management of water flows in Rapid Creek
CENDAK Irrigation Project	Irrigation project in central SD
Dakota Dunes **	Planned community in Union County
Dakota Lakes Irrigation Research Farm **	Irrigation research project
Fall River County Rural Water System	Proposed rural water system in Fall River County
Garrison Diversion Unit Extension **	Study of effects of North Dakota Garrison unit
Gregory County Pumped Storage Site	Multi purpose water utilization
James River Improvement Program	Study of improvement program on James River
Lake Andes-Wagner/Marty II Irrigation Unit	Irrigation projects in Charles Mix County
Lake Herman Restoration Project **	Lake restoration & watershed management project
Mid-Dakota Rural Water System	Proposed rural water system in central SD
Missouri River National Recreational River **	Stabilization & enhancement of Mo. River Rec area
Mni Wiconi Rural Water System	Proposed rural water system in western SD
Perkins County Rural Water Project *	Proposed rural water system in northwestern SD
Pick-Sloan Riverside Irrigation	Pick-Sloan integration of irrigation
Sioux Falls Flood Control Project	Increased flood protection
Slip-Up Creek	Reservoir near Sioux Falls
Southeastern SD Supply System	Supplemental water supply system
Vermillion Flood Control Project	Flood control study on Vermillion River
Water for Energy Transport (WET) System **	Water for energy transport system
WEB Pipeline Project	Construction of rural water system
West River Aqueduct **	Water supply system for western SD

*project recommended by the Board of Water and Natural Resources to be added to the State Water Resources Management System list.
**projects recommended by the Board of Water and Natural Resources to be deleted from the State Water Resources Management System list.

Lake Restoration/Nonpoint Source Pollution

The South Dakota Clean Lakes and Nonpoint Source (NPS) Pollution Control Programs are designed to assess the status of pollution sources and their subsequent effect on water bodies throughout the State; provide technical assistance to local project sponsors in the design and implementation of individual projects; provide financial support to individual projects through the management of state and federal grants, and provide assistance in monitoring the effectiveness of implementation projects. Each program has general statewide responsibilities in the management of lakes and NPS problems and also focuses on the restoration of specific lakes and the prevention of NPS pollution problems in specific watershed areas.

The Board of Water and Natural Resources has oversight authority for Environmental Protection Agency (EPA) grants to

Clean Lakes and NPS projects. NPS project applications for EPA Implementation grants are submitted to the Board prior to submission to EPA. The Board has the authority to approve/disapprove project applications and to prioritize the applications prior to grant requests being forwarded to EPA. Table 8 lists EPA Implementation grants awarded for 1992.

TABLE 8

Project	Project Description	EPA Grant	Project Cost
Wall Lake	lake restoration	$80,000	$350,000
Punished Woman's Lake	lake restoration	40,000	175,000
McCook Lake	lake restoration	35,000	165,000
Burke Lake	lake restoration	35,000	150,000
Abandoned Well Sealing	groundwater protection	20,000	55,000
Foster Creek (Stanley Co)	NPS pollution control	107,900	425,000
Big Stone Lake	NPS pollution control	218,859	479,154
Foster Creek (Beadle Co)	NPS pollution control	52,275	370,730
Lake Cochrane	lake protection	12,000	30,000
		$651,034	$2,200,384

The Board is also involved in EPA Development grants. The State receives 319 development pass-through funds. The Board reviews all grant requests for these funds and makes the funding decisions regarding these requests. TABLE 9 lists EPA Development awards made by BWNR during 1992.

TABLE 9

1992 EPA DEVELOPMENT GRANTS

Project	Project Description	EPA Grant
SD Assoc. of Cons Dists	riparian education	$ 2,000
Black Hills RC&D	riparian workshop	18,800
Beadle Co. Cons Dist	land use inventory	6,900
Clay Co. Cons Dist	demonstration project	5,000
Charles Mix Cons Dist	education project	1,500
Faulk Cons Dist	needs survey	400
Lawrence Cons Dist	erosion assessment	4,200
Yankton Cons Dist	conservation education	2,000
		$40,800

1992 WATER DEVELOPMENT LEGISLATION

This section gives a brief summary of the federal and state legislation passed during 1992.

Federal Legislation

The federal fiscal year 1993 energy and water appropriations bill (H.R. 5373) was signed by the President on October 2, 1992. The funding levels for South Dakota water projects are listed in the following table.

Bureau of Reclamation

Construction	
Belle Fourche Unit	$6,352,000
Mni Wiconi rural water system	5,000,000
Oahe Unit	174,000
General Investigations	
Black Hills Water Management Study	100,000
Lewis & Clark rural water system	100,000

Corps of Engineers

General Investigations	
Aberdeen and Vicinity flood control	$ 19,000
Lake Sharpe wildlife restoration	45,000
Sioux Falls flood control project	400,000
James River Environmental	200,000
Lake Oahe wildlife restoration	120,000
Vermillion River Basin	117,000
Big Sioux (Watertown & Vicinity) flood control project	175,000
Construction	
Missouri National Recreational River	56,000
Operation and Maintenance	
Big Stone Lake	199,000
Gavins Point Dam	4,535,000
Big Bend Dam	6,163,000
Cold Brook Lake	255,000
Cottonwood Springs Lake	187,000
Ft. Randall Dam	8,359,000
Lake Traverse	542,000
Oahe Dam	9,388,000

On October 30, 1992, the President signed H.R. 429, the Reclamation Projects Authorization and Adjustment Act of 1992 (Public Law 102-575). Title XIX provides for the federal authorization of the Mid-Dakota rural water system. The law authorizes a $100 million federal project and provides an 85% federal grant and a 15% federal loan for planning and construction costs. A State grant of $8.4 million will cover the balance of the total project costs.

Title XX of the law authorizes construction of the $200 million Lake Andes-Wagner/Marty II Irrigation Unit contingent on the results of a $30 million research demonstration program. The 10-year research demonstration program will address drainage needs in glacial till soils, selenium management techniques, and best management practices for irrigation.

Title X authorizes the Bureau of Reclamation to conduct a planning study to determine the feasibility of incorporating the Rosebud Sioux Reservation into the service area of the Mni Wiconi rural water project. The law amends P.L. 100-516, Mni Wiconi project act, to obligate up to $1.466 million of the $100 million total project cost to construct an interim water system for the White Clay and Wakpamni Districts of the Pine Ridge Indian Reservation as soon as a final engineering report for these facilities is completed.

Other South Dakota provisions included in the law are the establishment of a South Dakota Biological Diversity Trust and a Wetland Habitat Restoration Program.

The trust will be funded by a $12 million federal contribution to select and fund projects that protect or restore South Dakota's biological diversity. The 4-year, $7 million federal Wetland Program is to be established and administered by the Game, Fish and Parks Foundation. A wetland program trust will be operated to preserve, enhance, restore, and manage wetlands and associated wildlife habitat in the state. Additionally, the law clarifies that the Standing Rock Sioux Tribe may develop irrigation under the Garrison Diversion Unit Reformulation Act anywhere on the Standing Rock Reservation, including portions in South Dakota.

State Legislation

The 1992 Legislature enacted the Omnibus Water Development Bill, HB 1346, authorizing the following expenditure of funds from the Water Facilities Construction Fund (WFCF):

- Consolidated Water Facilities Construction Program - $1,750,000 to provide grants for lake improvement projects;
- James River Restoration project - $150,000 grant for implementation of channel clean-out activities and other restoration activities;
- Mid-Dakota Rural Water System - $1,500,000 grant to initiate engineering design work;
- Hydro Upgrade - $100,000 grant to the Board of Water and Natural Resources to develop a non-federal sponsorship proposal to upgrade the Oahe and Ft. Randall hydroelectric facilities;
- Black Hills Hydrology Study - $100,000 grant to provide non-federal cost share for ongoing hydrological studies of the Black Hills;
- Lewis and Clark Rural Water System - $125,000 to continue a feasibility study of a southeastern South Dakota water supply system;
- Fall River County Rural Water System - $50,000 grant for project planning;
- Groundwater Protection Program - $530,000 for the purpose of providing grants to project sponsors under the state groundwater research and education program;
- Solid Waste Management Program - $1,150,000 for the purpose of providing grants to project sponsors under the solid waste management program.

HB1346 authorized the Fall River County rural water system to be included in the state water resources management system.

The legislature directed the sale of the state owned dredges and proceeds to be deposited in the water and environment fund.

The 1992 Legislature approved the Second Century Environmental Protection Act. The Act included sections pertaining to the activities which: Provided for legislative authorization of major water development projects; Changed name of the Water Facilities Construction Fund to Water and Environment Fund (WEF); Transferred the Groundwater Protection Fund to the WEF; Amended existing statutes governing WEF loan terms.

Major Project Authorizations

Following the procedures outlined in SDCL 46A-1-11 through 46A-1-13, Title II provided for the legislative authorization of six (6) major water development projects. In addition to general legislative authorizations, each project authorization section provided a cost estimate and cost indexing; a non-federal

cost share commitment; loan and grant terms as applicable; and required specific appropriation of grant and loan funds. The following outlines the project authorizations:

Project	Type of Authorization	Cost Estimate	St. Cost Share
Mid-Dakota	Const. Grant	$108.4 M	$ 8.4 M
Mni Wiconi	Const. Loan	$100.0 M	$12.25 M
Lake Andes-Wagner/ Marty II Irrigation	Const. Loan	$199.0 M	$ 7.0 M
Sioux Falls Flood Control	Const. Grant	$ 26.9 M	$ 4.55 M
Black Hills hydrology & water management studies	Study grant	$ 20.0 M	$ 2.5 M
James River improvement	Project grant	$ 20.0 M	$ 2.5 M

Water and Environment Fund

The name change to Water and Environment Fund more accurately reflects the range of projects — water, wastewater, and solid waste — and activities — construction, studies, research and education programs — administered under the Fund by the Board of Water and Natural Resources. The changes in loan terms will permit SWRMS loans for construction purposes to exceed the 80% of the non-federal cost share and permit construction loan terms of up to forty years.

WASTE MANAGEMENT

A dedicated funding mechanism to support the Solid Waste Management grant program was established by the SCEPA Act. Funding is provided through a recycling fee of $1 per ton on all municipal solid waste and a waste tire management fee of $1 on each motor vehicle registered and licensed in the State. It is estimated that these fees will generate approximately $1.15 million annually. These fees are deposited in the Water and Environment Fund and the Board of Water and Natural Resources administers the Solid Waste Management grant program.

STATE WATER RESOURCES MANAGEMENT SYSTEM

This section reports the progress of the projects on the 1992 State Water Resources Management System (SWRMS). A brief summary of each project and its status is as follows.

Belle Fourche Irrigation Project (SWRMS 1981)

- The original Belle Fourche Irrigation project was authorized by Congress in 1904 and completed in 1914 to deliver irrigation water to 57,000 acres in Butte County.
- A $48.8 million rehabilitation project received Congressional authorization in 1983.
- Rehabilitation of the delivery system will reduce operation and maintenance costs, conserve water, provide safety features, lessen risk of system failure, reclaim agricultural lands affected by seepage losses, and protect the economic welfare of the area.
- Federal appropriations began in 1984, and the project has received $40,036,000 in federal appropriations through FFY93. Rehabilitation efforts on the Diversion Dam and distribution system are anticipated to be completed in 1995.

Big Sioux Flood Control Study (SWRMS 1989)

- The project will provide flood protection for Watertown, Lake Kampeska, and Pelican Lake through the construction of a dry dam on Mahoney Creek at an estimated cost of $13.4 million.
- The federal interest in constructing a flood control project was investigated and established in a 1987 Reconnaissance Report by the Corps of Engineers.
- Feasibility studies were initiated in 1988 by the Corps of Engineers in cooperation with the City of Watertown, East Dakota Water Development District, Codington County, and the Department of Environment and Natural Resources.
- Legislative appropriations have totaled $150,000 between 1989, 1990, and 1991 to assist local sponsors in meeting the non-federal cost share requirements.

Black Hills Hydrology Study (SWRMS 1982)

- The study objective is to compile the water resource data necessary to make informed management decisions concerning the development of water resources in the Black Hills area related to the expansion of mining, municipal, recreational, and urban water development needs.
- State legislative appropriations for the project have totalled $350,000 from 1988 through 1992 with local project sponsors matching this amount. Additionally, the Legislature provided $75,000 to the Department of Environment and Natural Resources, and the Department utilized $135,000 of its operating budget to drill monitoring wells and establish a stream gauging system to assist the hydrologic evaluations.
- The U.S. Geological Survey has provided $800,000 during the same time period to establish the hydrologic monitoring system and collect data.
- The Black Hills Water Management Study will provide local project sponsors with a tool to assist them in making water development and management decisions. Data gathered during the Hydrology Study will be utilized in the Management Study. Congress appropriated $100,000 in FFY 1991 to initiate the Black Hills Water Management Study by the Bureau of Reclamation. An additional $200,000 was provided during FFY 1992.
- A Black Hills Hydrology Steering Committee was established in 1991. Membership is comprised of individuals representing different areas within the Black Hills and from adjacent areas in Wyoming. The Steering Committee will provide local input into the development of the hydrology and management studies.

Brennan Reservoir (SWRMS 1991)

- The proposed Brennan Reservoir would be located on Dry Creek approximately 9 miles southeast of Rapid City. The proposed project would store unused Rapid Creek flows and winter releases from Pactola Reservoir for beneficial use. Additionally, limited flood protection may also be achieved through the diversion of storm flows into the reservoir.
- Water stored in Brennan could also be used to irrigate about 5,000 acres located in the Rapid Valley Water Conservancy District (RVWCD). This would supply over half of the current demands of the RVWCD.
- The 1990 State Legislature provided $25,000 to assist local sponsors in an engineering study of the Brennan Reservoir site. The Brennan Reservoir Preliminary Project Plan report was completed in July 1992.

CENDAK Irrigation Project (SWRMS 1982)

- This irrigation project is designed to supply Missouri River water to 474,000 acres in Hughes, Hyde, Hand, Spink, Beadle, and Faulk counties in central South Dakota. No activity occurred on the project in 1992. South Dakota supports development of the project and will pursue development when federal policies are more supportive of large-scale irrigation projects.

Dakota Dunes (SWRMS 1989)

- The project is intended to provide water and wastewater system construction for the development of a master planned community. In 1992, significant progress was made in business and residential development and road construction. There was no State Water Plan related activity during 1992.

Dakota Lakes Research Farm (SWRMS 1987)

- The project is a 463 acre research site adjacent to the Missouri River near Pierre designed to evaluate different farming techniques and cropping practices on irrigated and dryland crops. Farmer/rancher shareholders in the Dakota Lakes Research Farm corporation own the land and lease it to SDSU, which will conduct the research and disseminate the results. There was no State Water Plan related activity during 1992.

Garrison Extension Study (SWRMS 1981)

- This project is designed to modify North Dakota's Garrison Diversion Unit into a project that could provide flood control and deliver additional high quality water for irrigation, industrial, and municipal uses in South Dakota. The "James River Comprehensive Report, Garrison Diversion Unit" was released to the public in 1989. It gives a summary of all the Garrison Unit James River studies and discusses project alternatives.

Gregory County Pumped Storage Project (SWRMS 1981)

- Hydroelectric Component
  - Gregory County Pumped Storage (GCPS) project is a proposed peak generation hydroelectric facility located in northern Gregory County. In 1988, Federal Energy Regulatory Commission (FERC) issued to the BWNR the preliminary permit for development of the project. The State's preliminary permit expired in August 1991.
- Water Supply Component
  - The project has potential to provide water for irrigation and municipal, rural, and industrial (MR&I) purposes utilizing the hydroelectric project's upper forebay as a water supply source. The Bureau of Reclamation completed a Special Report on the Gregory Unit of the Pick-Sloan Missouri Basin Program, South Dakota in 1992.

James River Improvement Program (SWRMS 1984)

- This program has been designed to provide flood control as well as municipal, industrial, agricultural, recreational, and wildlife benefits.
- In 1986 federal legislation (P.L. 99-662) authorized $20 million for flood control and stream flow improvements.
- A draft Environmental Impact Statement was completed in 1987, which presented four alternate plans of action for the James River: no action; limited channel cleanout; channel restoration; and flood bypass.

- The James River Water Development District adopted a three stage approach to river restoration as a result of public input to the draft EIS. These three stages are as follows: limited channel cleanout; tributary drainage control; and bank stabilization.

- A reconnaissance report was completed in 1989, which established federal interest in conducting feasibility studies for flood protection in lower Elm River-Moccasin Creek basins and the Dry Run Creek basin with provisions for federal funding.

- State legislative appropriations have totaled $960,000 from 1988 through 1992. These funds have been utilized by the James River WDD to implement restoration activities including limited channel cleanout, wildlife enhancement, and recreational development. In addition, funding has been provided through the James River WDD state appropriation to assist the City of Aberdeen and Brown County in meeting cost share requirements for their flood control feasibility study.

- The Corps of Engineers' reconnaissance study of the James River Environmental Initiative was completed in February 1992. Public hearings were conducted in Aberdeen, Mitchell, Huron, and Yankton. The Corps and local sponsors are proceeding with feasibility studies of proposed projects at Huron and Columbia.

Lake Andes-Wagner/Marty II Irrigation Unit (SWRMS 1975,1986)

- The 45,000 acre Lake Andes-Wagner Irrigation project and 3,000 acre Marty II Irrigation project are federally authorized Pick-Sloan Missouri Basin Units located in Charles-Mix County. Estimated construction costs are $175 million and $24 million, respectively.

- In 1985, the Bureau of Reclamation completed a Feasibility Study and Draft Environmental Impact Study on the 45,000 acre Lake Andes-Wagner Irrigation Project.

- In 1992, the State Legislature authorized the construction of the Lake Andes-Wagner/Marty II project and provided a state cost share commitment of $7.0 million.

- During the spring of 1990, local, state and federal agencies developed a 5,000 acre research demonstration program. The research is designed to determine best management practices for irrigating glacial till soils containing selenium which will protect the environment from potential contamination.

- Both the state and federal project authorizations are contingent on the successful completion of the research demonstration program. The research program is a 10 year, $30 million effort.

Lake Herman Restoration Project (SWRMS 1984)

- The purpose of the project was to alleviate the degradation of water quality by the application of best management practices in the watershed, the construction of three sediment control structures on major tributaries to the lake, and riprapping a major portion of the shoreline. Dredging was completed in 1990 with approximately 670,000 cubic yards of sediment being removed. In 1991, a Phase III study was developed to evaluate the effectiveness of the dredging project and sediment control efforts. In addition to the development of the plan of study, data collection instruments were purchased and installed during 1991. Data will be collected in 1992 and 1993.

Lewis and Clark Rural Water System (SWRMS 1989)

- Formerly known as the Southeastern South Dakota Water Supply System, Lewis and Clark RWS will be a bulk delivery system of Missouri River water to commu-

nities and existing rural water systems in southeastern South Dakota, northwestern Iowa, and southwestern Minnesota for domestic use.

- South Dakota membership includes 27 communities and nine rural water systems. Approximately 188,000 South Dakotans would receive water from Lewis and Clark.
- State legislative appropriations have totaled $255,000 to support development of Lewis and Clark during 1990 through 1992.
- Congress provided $100,000 in FFY 1991, and again in FFY 1992, for the Bureau of Reclamation's technical assistance in the feasibility study and project development. The Bureau has been involved in assisting the consulting engineering firm in the environmental assessment aspects of the feasibility report. The Bureau also provided a technical review of the feasibility report prior to its finalization.
- The 1992 State Legislature directed the Lewis and Clark project sponsors to provide (by January 1, 1993) a report detailing the cost of the South Dakota project features, analyzing the participants' ability to pay, and recommending nonfederal matching requirements.
- Current cost estimates for constructing the South Dakota project features are approximately $220 million. Lewis and Clark RWS members are now refining their water demand needs from the system.

Mid-Dakota Rural Water System (SWRMS 1988)

- Mid-Dakota is a federally authorized rural domestic water system which will provide high quality Missouri River water to 30,000 people in Beadle, Buffalo, Hand, Hughes, Hyde, Jerauld, Potter, Sanborn, Sully, and small portions of Spink, Kingsbury, and Aurora Counties. The cost sharing provisions provide for $85 million in federal grants and $15 million in federal treasury rate loans.
- Mid-Dakota received State appropriations of a $100,000 loan in 1988, a $50,000 grant in 1989, and a $75,000 grant in 1990.
- The 1992 State Legislature authorized the construction of a $108.4 million Mid-Dakota project and provided a state cost share commitment of $8.4 million. The 1992 Legislature appropriated $1.5 million to complete engineering design.

Missouri River National Recreational River (SWRMS 1981)

- The 59-mile reach of the Missouri River between Gavins Point Dam, South Dakota, and Ponca State Park, Nebraska, was designated a National Recreational River in 1978 by Section 707 of P.L. 95-625, which amended the Wild and Scenic River Act, P.L. 90-542. Authorized project costs were limited to $21 million. The National Park Service has initiated a 3 to 5 year effort to update the management plan for the MNRR. A Biological Assessment will be completed in conjunction with development of the revised management plan.

Mni Wiconi Rural Water System (SWRMS 1989)

- This federally authorized project will provide high quality Missouri River water to approximately 20,000 western South Dakota citizens in an eight county area extending from Ft. Pierre through the Pine Ridge Indian Reservation.
- The three water supply system members are Lyman-Jones Water Development Association Inc. (SWRMS 1981); West River Rural Water Association Inc. (SWRMS 1981); and Oglala Sioux Water Supply System (SWRMS 1988).
- Project costs:

- $100 million authorization level (Jan. 1987 costs);
- $110.7 million indexed to October 1990;
- 65% of project costs allocated to OST system as non-reimbursable federal costs;
- Non-federal cost share of 35% on non-Indian portion of system which equals $12.5 million at 1987 costs or $13.8 million on the 1990 index.

- The State Legislature provided $300,000 in loans (1983-1988) to West River RWS & Lyman-Jones RWS which were converted to grants by the 1989 State Legislature.
- The 1992 State Legislature authorized the construction of the Mni Wiconi project and approved a state cost share commitment of $12.5 million in loans to provide the entire nonfederal match requirement. To date $2.5 million in state loans have been authorized by the State Legislature.
- Federal appropriations for pre-construction activities totalled $4.15 million through FFY 1992. Congress appropriated $5.0 million for FFY 1993 to complete engineering design and to construct emergency water supply features on the Pine Ridge reservation.
- The required Final Engineering Report and National Environmental Protection Act (NEPA) compliance documents are to be submitted to Congress by March 1993. Construction of the Mni Wiconi project will be initiated in the fall of 1993.

Pick-Sloan Riverside Irrigation (SWRMS 1987)

- This proposal is an attempt to integrate existing irrigators along the Missouri River corridor into the Pick-Sloan Missouri Basin Program. The project would provide irrigators with an opportunity to utilize Pick-Sloan power and the potential to obtain power revenue assistance. No action occurred on this project in 1992 and future activities are uncertain.

Sioux Falls Flood Control Project (SWRMS 1989)

- The proposed project would cost $26,923,000 and would provide Sioux Falls with 100-year protection from flooding on the Big Sioux River and Skunk Creek through modification of current flood control features.
- The existing project was authorized in 1954 and the Corps of Engineers completed construction of the flood control project in 1965. Existing flood control structures provide protection from flooding frequencies of 43 years or less.
- FFY 1992 appropriations of $280,000 were authorized for the Corps of Engineers for pre-construction activities.
- A feasibility report will be completed in 1993 to determine the most cost-effective level of protection for the City. The State Legislature has provided $120,000 for the State's cost share of the feasibility report.
- State authorization of the project was approved in 1992 including a state cost share commitment of $4.55 million in grants.
- Construction is expected to begin in FY 1996. The federal government will provide a maximum contribution of 75 percent of the total project costs assigned to flood control. The non-federal sponsor is required to provide a minimum contribution of 25 percent. The benefit-cost ratios are 1.4 on the Big Sioux River and 1.9 on Skunk Creek.

Slip-Up Creek (SWRMS 1981)

- This project includes a dam, reservoir, and pumping plant on Slip-Up Creek; a pumping plant on the Big Sioux River; and pipelines connecting the river pumping plant to the reservoir and the city's water

treatment plant. The purpose of the project is to store Big Sioux River waters for municipal use by the City of Sioux Falls and for recreation and fish and wildlife activities. No significant action took place on the project in 1991.

Vermillion Flood Control Project (SWRMS 1987)

- The project objective is to address the flooding problems, which have become much more severe in the Vermillion River Basin area over the last 30-40 years.
- The 1988 State Legislature provided $50,000 to study the feasibility of flood control structures.
- The 1990 State Legislature approved the formation of the water development district, and director elections were held in November 1990.
- A federal appropriation for $100,000 was secured for FFY 1991. A Corps of Engineers General Investigations Federal appropriations of $145,000 was secured for FFY 1992.
- The Corps of Engineers Vermillion basin flood control reconnaissance report is to be completed in early 1993.

Water for Energy Transport (WET) System (SWRMS 1981)

- This project is a proposal to transport treated municipal wastewater from nine Black Hills municipalities to Wyoming for use in a coal slurry pipeline. No activity has occurred on this project since 1988. The future of the project is linked to the development of the coal industry in Wyoming and the need to transport the coal substantial distances.

WEB Pipeline Project (SWRMS 1981)

- This project is a rural domestic water system that provides Missouri River water to 32,000 people in Walworth, Edmunds, Brown, Spink, Day, Campbell, McPherson, Faulk, Potter, Beadle, Clark, Hand, and Marshall counties in South Dakota and Emmons and Dickey counties in North Dakota.
- The project was authorized for construction by the Rural Development Policy Act of 1980. In 1988, Congress authorized an increase in the appropriations ceiling to $117 million for the project.
- Project construction was initiated in 1983, and the first customer was served in 1986.
- Construction of the federally authorized WEB project was completed on September 30, 1991, and a project dedication was held in October 1991. Federal appropriations for the project totalled $111.95 million, including $20.6 million in loans. Non-federal funding totalled $7.25 million, for a total project cost of $119.2 million.
- The project has over 5,000 hook-ups providing direct service to rural homes, farms, pasture taps, and residents of 21 towns. Additionally, water is provided to 53 bulk users providing service to towns and other public water supply systems.

West River Aqueduct (SWRMS 1977)

- The West River Aqueduct was a proposed project to deliver 20,000 acre-feet of Missouri River water to Energy Transportation Systems, Inc. (ETSI) for use in a coal slurry pipeline and 10,000 acre-feet of water for delivery to rural communities and water systems in western South Dakota. No future action is expected until new interest develops in coal slurry pipelines.

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
WATER AND ENVIRONMENT FUND
STATEMENT OF REVENUES, EXPENDITURES, AND CHANGES IN FUND BALANCE
For the Fiscal Year Ended June 30, 1992

REVENUE:		
Investment Interest	$ 437,414	
Loan Repayments - Principle	84,683	
Loan Repayments - Interest	137,295	
Interest on Bond Defeasance	19,800	
WERF		91,049
Groundwater Protection Fees	487,695	
TOTAL REVENUE		$1,257,936
EXPENDITURES:		
Legislative Line Items:		
James River Stage 1 R-92	$ 22,945	
Vermillion Rive Basin R-92	19,072	
Lake Andes-Wagner R-92	14,386	
James River Restoration R-93	20,715	
James River Restoration R-94	140,449	
Mid Dakota RWS R-94	36,565	
Big Sioux Flood Cntr. - Sioux Falls R-94	50,000	
James River Restoration R-95	20,294	
Mid Dakota RWS R-95	57,426	
Hydro Upgrade R-95	27,942	
Big Sioux Flood Cntr. - Watertown R-95	29,324	
Black Hills Hydrology R-95	75,000	
Southeastern SD WSS R-95	75,000	
Lake Andes Wagner/Marty II R-95	41,233	
Consolidated Program	820,384	
WERF	83,986	
Groundwater Protection Grants	430,212	
TOTAL EXPENDITURES	$1,964,933	
OTHER FINANCING SOURCES:		
General Fund Transfer In	$1,775,000	
Reimbursement from Westport for Grant Overpayment	1,000	
TOTAL OTHER FINANCING SOURCES (USES):	$1,776,000	
EXCESS OF REVENUE AND OTHER FINANCING SOURCES OVER (UNDER) EXPENDITURES AND OTHER FINANCING USES.	$1,069,003	

(INCREASE) DECREASE IN FUND BALANCE RESERVES:	
Reserve for Appropriations	
Consolidated Projects - 92 Appropriation	($1,750,000)
Mid Dakota RWS - 92 Appropriation	(1,500,000)
James River Restoration - 92 Appropriation	(150,000)
Lewis and Clark RWS - 92 Appropriation	(125,000)
Black Hills Hydrology/Wtr Mngt. Study - 92 Appropriation	(100,000)
Hydro Upgrade Project - 92 Appropriation	(100,000)
Fall River County RWS - 92 Appropriation	(50,000)
Solid Wst. Management Program 92 Appropriation	(1,150,000)
88 Consolidated Program Reversions	42,667
Legislative Line Item Reversions	26,099
Legislative Line Items - 92 Expenditures	630,351
Consolidated Projects - 92 Expenditures	820,384
Groundwater Protection Fund	(81,023)
Fund Balance 7/1/91	232,096
Fund Balance 6/30/92	($2,185,423)

There was $1,150,000 authorized for the Solid Waste Mngt. Program grants which is to be funded through the Solid Waste Fees which were set up during the 92 Leg. Session. As of June 30, 1992, no fees had been collected. Another source of funds that had not been realized as of June 30, 1992 is the sale of dredges, which was earmarked for $1,000,000. Also, $736,000 is to be provided to the fund through State Building Authority Refinancing. These funds were not in the fund as of June 30, 1992.

The Fund Balance includes $233,158 unobligated funds for the Groundwater Protection Fund.

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
WATER AND ENVIRONMENT FUND
BALANCE SHEET
For the Fiscal Year Ended June 30, 1992

ASSETS:	
Cash	$ 7,231,700
Loans Receivable - Current Portion	1,347,469
Loans Receivable - Long Term	3,621,235
Loans Receivable Westport	2,000
WERF - Accounts Receivable	34,210
TOTAL ASSETS	$12,236,614
LIABILITIES:	
Accounts Payable	$651,518
FUND BALANCE:	
Reserved for Appropriations	$10,149,284
Reserved for Long Term Loans Receivable	3,621,235
Unreserved	(2,185,423)
TOTAL FUND BALANCE	$12,236,614

South Dakota Waste Tire Study

In fulfillment of Section 27 of House Bill 1001

December 1992

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EXECUTIVE SUMMARY

The 1992 South Dakota State Legislature, in the Second Century Environmental Protection Act (HB 1001) directed the Department of Environment and Natural Resources (DENR) to conduct a study and make recommendations to the 1993 Legislature on a waste tire abatement program.

This directive required that five specific elements be addressed:

1) The number and distribution of waste tires existing and generated,

2) The development of markets for recycling and processing of the waste tires,

3) Methods to establish sources for waste tire users,

4) The permitting of tire collection sites, haulers and processing facilities, and

5) Methods for cleanup of existing waste tire stockpiles.

Known, existing stockpiles in the state contain approximately 2,000,000 tires. At present, approximately 700,000 tires are added to the waste stream in South Dakota each year. Precise figures are unavailable, but indications are that about 100,000 cut tires and 100,000 whole tires per year were landfilled in the past twelve months. The remaining 500,000 are stockpiled or are disposed of illegally. In addition to the 700,000 tires in the waste stream, some 100,000 passenger car and truck tires are kept from the waste stream each year through recycling as used tires, regrooved tires, retreads, or remanufactured tires.

Of the known stockpiles, more than half are concentrated at Brown County Landfill and two private tire stockpiles, all in the eastern half of the state. In general, almost all of the stockpiles of significance are located east of the Missouri River. Likewise, based on population and usage of tires, two thirds of the waste tire stream is generated east of the Missouri River.

Tires present environmental concerns for the following reasons:

1) Tire stockpiles are breeding grounds for mosquitoes, as well as harboring rats and other disease vectors.

2) Tire stockpiles are a potential fire hazard, and release toxic gas emissions and oily residue when burned in uncontrolled conditions.

3) Whole tires discarded in landfills tend to work to the surface; this disrupts landfill cover, exposes decomposing garbage waste to the environment, and increases the chance of fires.

Markets currently exist in South Dakota for approximately 2.6 million tires per year and will exist for an estimated minimum of 4.5 million tires per annum by 1997. Stockpiles persist now because the disposal, reuse, and recycling of waste tires still represents a cost, rather than a profitable resource.

The existing (1992) tire markets in the state are, in order of number of tires used:

1) Tire derived fuel (TDF)	2,500,000 tires
2) Retreaded tires	80,000 tires
3) Used tire resale for vehicles	24,000 tires
4) Regrooved tires	3,000 tires

Tire derived fuel is used at the current (1992) rate of 25,000 tons (2.5 million tires)

per year at Otter Tail Power Company's Big Stone Power Plant in Big Stone City. Otter Tail may expand TDF use to 4,000,000 tires per year (40,000 tons), and possibly higher, by 1995.

Whole tire burning for energy recovery is also being considered at the South Dakota State Cement Plant in Rapid City. The factors of economics, surety of supply, and public acceptance are critical to the development of this potential market.

One of the major potential markets on the horizon is in asphalt products modified by addition of recycled rubber, in the form of either rubber chips or crumb (ground) rubber. The Intermodal Surface Transportation Efficiencies Act (ISTEA) requires the use of asphalt modified with recycled rubber in the construction of highways in the state. Recycled rubber can be used in three forms to satisfy requirements of ISTEA:

1) asphalt-rubber cement [crumb rubber in the asphalt binder],

2) rubber modified asphalt concrete (RUMAC)[rubber chips as aggregate in the mix], or

3) asphalt-rubber spray seal coats.

South Dakota Department of Transportation (SDDOT) expects to fulfill the ISTEA requirements by the use of asphalt-rubber as asphalt cement material. No use of RUMAC is anticipated, due to technological problems with recycling and the projected lifetime of the pavement under weather conditions typical of South Dakota. The lifetime projections for asphalt-rubber cement are much better, but the ability to recycle pavement made with asphalt rubber is still questionable.

SDDOT plans to use asphalt-rubber (A-R) as cement exclusively to fulfill the ISTEA requirements. In this application, the asphalt-rubber is used as the binding material in the wet mix. Market volume is nonexistent in 1992, but is projected to be 300,000 tires per year by 1997 in South Dakota.

The total market represented by the requirements of ISTEA is approximately 3,000 tons per year, or the equivalent of 300,000 tires. The costs of using any of the asphalt and rubber products are expected to be nearly twice those of conventional asphalt products.

The following table indicates potential markets available in South Dakota by 1997:

1) Tire derived fuel	4,000,000 tires
2) Whole tire combustion	750,000 tires
3)a Asphalt-rubber cement	300,000 tires*
b RUMAC	0 tires*
c Asphalt-rubber seal coats	0 tires*
4) Retreaded tires	100,000 tires
5) Used tire resale for vehicles	24,000 tires
6) Regrooved tires	3,000 tires
Total Market Potential 1997 =	5,177,000 tires

* Total use of recycled rubber in road construction is 300,000 tires. Current plans by DOT are for A-R cement use only.

In summary, the stockpiles of waste tires in South Dakota are not attributable to a lack of market volume, but to cost effectiveness. Current stockpiles could be emptied and a no-stockpile status could be achieved within one to two years, if proper market development conditions were encouraged or mandated.

Upon the development of more precise information regarding sources of supply, South Dakota could establish a tire supply information network by cooperation with the South Dakota Solid Waste Management Association (SDSWMA), and neighboring states.

Waste tire storage and handling requires a Solid Waste Permit. A general permit for storage and handling of waste tires available. No rules or permitting requirements are in effect for haulers.

In view of the above, the recommendations of this report are:

1) Allow use of Solid Waste Management Program grants for TDF facilities and for energy recovery uses.

2) Amend solid waste rules (ARSD 74:27) to ban landfilling of tires or to require tires and tire products to be placed in monofills.

3) Request SDDOT to research and calculate life cycle costs for the projects conducted to meet ISTEA requirements.

4) Encourage state, county, and local government purchases of retread tires whenever practical.

5) Encourage the use of waste tire resources for energy recovery applications to the maximum extent practical.

6) Require the Bureau of Administration (BOA) to use recycled rubber products to the maximum extent practical.

INTRODUCTION

Nationally, the waste tire problem has been recognized for some time. The Environmental Protection Agency (EPA) estimates that some 2,000,000,000 tires are in stockpiles across the United States, and 242,000,000 are being added to the waste stream each year. Millions more are scattered in ponds, fields, gullies, shelterbelts, salvage yards, and other places.

In South Dakota, the problem is no less severe. Estimates range from 2.0 to 4.5 million (2,000,000 to 4,500,000) tires in stockpiles, with 700,000 added to the waste stream each year.

From the records of the Office of Waste Management and the South Dakota Municipal League's 1992 Wastewater and Solid Waste Survey, at least 2,000,000 tires can definitely be located within the state.

Reuse, salvage, and recycling of waste tires in South Dakota is limited by market conditions and public perception.

Nationally, the EPA has recognized the magnitude of the problem and has issued a number of guidelines and publications on dealing with the problem. EPA has also been instrumental in guiding the provisions of the Intermodal Surface Transportation Efficiencies Act (ISTEA), which requires the use of recycled rubber in construction of highway systems, beginning in fiscal year 1994.

South Dakota, too, has recognized the problem. The State Legislature required in House Bill 1001 (1991) that the Department of Environment and Natural Resources (DENR) study the tire problem and submit a report to the Legislature by January 1, 1993. This requirement is incorporated in the South Dakota Codified Laws (SDCL), 34A-6-65. This report is submitted to fulfill the legislative requirements.

GEOGRAPHIC DISTRIBUTION OF WASTE TIRES

Existing Stockpiles- Based on the Municipal League's Solid Waste and Wastewater survey of 1992, and records of inspections from the files of the Department of Environment and Natural Resources, the following facilities have stockpiles of tires as shown in TABLE I.

Limited time and personnel have precluded site visits and field confirmation, except in a few cases.

Some major landfills, such as Pierre and Rapid City, have been accepting sliced tires for land disposal for some time, and have not accrued any tire stockpiles. Small town facilities have historically burned at the dumpsites to reduce volume. This practice has usually included tires and has prevented buildup of waste tire stockpiles. Open burning of tires will be illegal under the solid waste regulations, effective October 9, 1993.

TABLE I
TIRE STOCKPILE LOCATIONS

Bon Homme County Landfill	400
Brown County Landfill	500,000
Chamberlain	600
Canton	500
Day County Landfill	1,000
De Smet	150
Doland	150
Huron	5,000
Ipswich	200
*Lead	250
*McLaughlin	200
Marshall County Landfill	200
Mitchell Landfill	100,000
*Murdo	1,000
National Tire Services	50,000
Oakleaf Salvage	700,000
Philip	350
Pukwana	1,000
Roberts County Landfill	7,500
South Dakota Waste Recycling	500,000
Walworth County Landfill	7,000
Yankton	500
Approximate total	2,000,000

The facilities marked with an * are in the western half of the state.

The following facilities and locations also have stockpiles of tires, but the number of tires onsite has not been determined:

Agar	Alpena	*Belle Fourche
*Bison	Blunt	Bryant
*Buffalo	Clear Lake	De Smet
Eureka	Geddes	Glenham
Highmore	Hosmer	*Isabel
*Kadoka	*Kennebec	*Martin
Platte	*Wall	Waubay
*Winner	Springfield	

The facilities listed below have less than 100 tires present.

Brookings	Centerville	Corsica
Elk Point	Haarstad Landfill	Lane
Milbank	*Morristown	Onida
Redfield	Vermillion	*White River

In addition, the following types of facilities or businesses are likely to have some waste tires on hand:

Auto salvage yards	Tire dealerships
Service stations	Farmers / Ranchers

Mines, construction sites/yards, other industrial sites

The vast majority of the reported waste tire stockpiles lie in the eastern half of the state, as do all of the major stockpiles.

Waste Tire Generation- No specific figures are available statewide for the numbers of waste tires generated in particular areas. EPA estimates that nationwide, from 0.94 to 1.03 tires are generated per person per year.

It is therefore probable that the tires generated are in direct proportion to the population of any given area. On this basis, 205,000 to 215,000 would be generated annually in the West River area. In the East River portion of the state, 480,000 to 490,000 waste tires would be generated.

Spot checks with tire dealers across the state tend to confirm these approximations.

POTENTIAL SOLUTIONS

A number of solutions have been proposed to abate the problem of waste tires. Consistent with the Solid Waste Management Hierarchy, options for handling the problem are categorized as follows:

1) Volume reduction at the source

2) Recycling and reuse

3) Use for energy production

4) Landfill disposal or combustion for volume reduction

For the purposes of this report, the following subdivision of this hierarchy is necessary for clarity:

1. Volume reduction at the source

2. Recycling and reuse

   a) Whole tire recycling and reuse

   b) Processed tire recycling and reuse

3. Use for energy production

   a) Whole tire fuel

   b) Tire derived fuel

   c) Tire pyrolysis

4. Landfilling or combustion

   a) Controlled incineration

   b) Open burning

   c) Mixed waste landfilling

   d) Monofilling

VOLUME REDUCTION

Waste volume reduction is effectively handled by the tire manufacturers by the design and promotion of extended life tires. With currently designed radial steel-belted tires, lifetimes are commonly 40,000 miles. Proper inflation, periodic rotation, and good care could increase tire life to 60,000 to 80,000 miles. For most recycling purposes, however, steel belted tires and radial tires are more difficult and expensive to recycle.

EPA does not believe that any design breakthroughs are likely which will significantly increase the figures cited here. Thus the potential for reducing the source of the waste tire problem is somewhat limited.

RECYCLING AND REUSE

Whole Tire Recycling and Reuse

Most motorists replace an entire set of tires when one or two tires are damaged or badly worn. This often results in an unnecessary source of waste tires.

Whole tire recycling takes several forms, including used tire resale, regrooving, retreading, and remanufacturing. Reuse is the sale of used tires for mounting as is, without processing in any form. Regrooving is the cutting of new tread into the carcass of the tire. This necessarily results in less rubber over the belting, but adequate tread for traction. Retreading involves buffing the carcass down to a smooth surface, then applying new rubber to the tread area and revulcanizing the tire. Remanufacturing is similar to retreading, but new rubber is also applied to the sidewall area of the tire. Finally, some tires are used in non-vehicle applications, such as rip-rap and traffic barriers. Each of these

reuse schemes has a definite place in the tire market, but none adequately address the problem of 700,000 tires added to the waste tire flow each year.

Used Tire Resale- Many cities have used tire sales outlets, and almost every service station has a few usable tires for sale. Public acceptance of this practice is slow, as most people have safety concerns with buying a partially worn tire. Of a total of 285,000,000 tires removed from vehicles in the United States in 1990, about 10,000,000 were resold as used tires. No figures are available for South Dakota, but based on national averages, it is estimated that about 24,000 tires are reused each year.

Regrooving- Regrooving of worn tires is also practiced for truck tires. This practice requires buffing off the old tread and cutting of new tread, without adding any sort of recap. The result is a thinner wearing surface, but adequate tread for traction. A potential problem of regrooving is that thinning of the undertread may result in moisture penetrating and eventually destroying the steel cords. This practice is mostly used for farm trucks and other farm vehicles which get limited usage at low speed. On most farm vehicles, the major cause of tire failure is sidewall failure due to rotting.

New Deal Tire, of Groton, South Dakota regrooves selected truck tires for use on farm trucks. Regrooving is not used for passenger tires. A by-product of the regrooving process is crumb rubber suitable for other uses.

New Deal Tire has the capacity of regrooving approximately 3,000 truck tires per year.

Retreading- Retreading (recapping) of tires is the most common use for whole, used car and truck tires. Recapped tires are buffed to a smooth surface and a new tread area applied and vulcanized. Then the tread is grooved to simulate a new tire. Nationwide, in 1990, some 33,500,000 out of 285,000,000 tires were retreaded. Again, no figures are available for South Dakota. Based on national averages, it is estimated that up to 80,000 retread tires are purchased annually in South Dakota.

The Tire Retread Information Bureau (TRIB) states that each retreaded tire saves more than four gallons of oil over the manufacture of a comparable new tire. Each retread tire contains more than 75 % post-consumer recycled materials. The TRIB also acknowledges that consumer opposition to purchase of passenger tire retreads is a major obstacle. Also, some states forbid the use of retread tires on the steering axles of some vehicles.

EPA has recognized that retreading is the highest and best use of waste tires. Since 1989, EPA has mandated a purchase preference for retread replacement tires on government equipment. Recent information indicates that the lifetimes of retreaded tires often exceed those of new tires.

Based on national averages and spot checks with retreaders across the state, it is estimated that approximately 80,000 retreaded tires are used in South Dakota each year. The primary customers are truck operators and governmental agencies. EPA published procurement guidelines in 1988, which require federal agencies and all state and local government agencies and contractors which use federal funds to purchase retread tires or retreading services to the maximum extent practicable.

Competitiveness of cheap foreign tires, difficulty of retreading radial tires, and lack of public acceptance have hampered market

growth, and can be expected to limit future market growth.

South Dakota has seven retreaders on record, according to the American Retreaders Association.

Non-vehicle use- Large whole tires have found limited use as playground equipment, traffic barriers, feed bunkers, stock watering tanks, riprap, and similar uses. For the most part, these uses are limited to larger size tires. At least four businesses in South Dakota manufacture feed bunkers and/or stock tanks. To date, the impact in waste tire tonnages is not significant.

In addition to the uses for large whole tires, passenger tires and smaller truck tires have been used as weighting for tarps on pit silos, haystacks and for fencing and farm barricade uses. Again, the impact on the waste tire stream is insignificant.

Processed Tire Recycling and Reuse

A number of schemes have been developed for the recycling and reuse of processed tire waste. Processed tires can be split and punched, chipped, shredded, or crumbed.

Splitting and Punching- Splitting and punching requires removal of steel bead removal and any steel belting, then cutting or punching of the rubber to the desired shape. For this reason, steel belted tires are usually not suitable for splitting/punching operations.

Common products of splitting and punching operations are door mats, rollers, rubber disks, shoe soles, truck bed liners, doormats, muffler hangers, shims, washers, anti-vibration mounts, and other specialty products. The market and demand for materials is very small. There are no known splitting and punching operations in South Dakota. It is doubtful that any processors will develop a business here within the foreseeable future.

Chipped Rubber- Chipped or shredded tire rubber can be used in a variety of products. Some of the most promising include lightweight aggregate, rubberized asphalt (RUMAC), sport surfaces, and playground surfacing.

Minnesota and other states have experimented with using tire chips as a lightweight aggregate for use in road building in swampy areas. This lightweight aggregate is placed as a substrate fill material substitute for gravel. The primary benefit is reduction of compaction beneath the fill area. Results to date have been satisfactory, with reported cost benefits in areas where gravel is not readily available. It is anticipated that no markets of substantial size will develop in South Dakota, due to widespread availability of inexpensive gravel in the eastern half of the state, and lack of swampy terrain in areas where gravel is scarce.

Rubber modified asphaltic concrete- (RUMAC) is made by substitution of rubber chips for gravel aggregate in production of asphalt for roads, parking lots, and other surfaces. This use does not require the removal of steel, fiberglass, or polyester cord material from the tires. The South Dakota Department of Transportation (SDDOT) has experimented with this in a section of Saint Patrick Street Bypass near Rapid City. This market is potentially large, as the Intermodal Surface Transportation Efficiencies Act (ISTEA) requires use of rubber in asphalt, beginning in 1994. In order to qualify as rubber modified asphalt, a minimum of 20 pounds of rubber are necessary per ton of mix, or 1 percent of the total composition.

The South Dakota Department of Trans-

portation plans to meet the ISTEA requirement by the use of asphalt-rubber cement, described elsewhere in this report. Thus the use in South Dakota in the foreseeable future is expected to be exceedingly small.

Other Chipped Tire Recycling

Rubber and polymer mixes are available for paved running tracks and walking trails. Cost data is scarce, but it appears that long lifetime may offset high initial cost. Additionally, the cushioning effect is a beneficial effect. Rubber Teck, Inc. of Beresford is currently setting up to manufacture this product.

Playgrounds and similar areas have been surfaced with a rubber "gravel" similar to the lightweight aggregate. This use requires removal of steel reinforcing materials by chipping to less than 1/2 inch and magnetic separation. The rubber chips may then be colored with long lasting dyes. Advantages include cleanliness, lack of abrasive character, long lifetimes, and cushioning and drainage characteristics. High initial cost discourages more widespread acceptance. There are no known use of rubber playground gravel in South Dakota.

Crumb Rubber- Crumb rubber can be obtained as a by-product of several of the other recycling and reuse schemes described above, or can be manufactured as a primary product in itself. A variety of uses have been developed. The most important use, in terms of market is the use for rubber-asphalt, described in a separate section.

Crumb rubber can be partially devulcanized, and mixed with virgin rubber or other materials to produce rubber products such as floor mats, bed liners for trucks, shoe soles and such products as railroad crossings. Used in this way, it is often referred to as reprocessed rubber. The cost of crumb rubber ($240 to $260 per ton) is a fraction of the cost of virgin rubber, but reprocessed rubber tends to be more brittle and less flexible than rubber made entirely from virgin materials. Market development has been slow, due to the flexibility and wearing characteristics of reprocessed rubber products.

Crumb rubber markets, with the exception of rubber-asphalt cement are virtually nonexistent on South Dakota.

Rubber Asphalt- As discussed previously, the ISTEA act requires the states to use asphalt modified with recycled rubber in a portion of all federally assisted highway projects in the state. South Dakota Department of Transportation has chosen the use of rubber asphalt cement, the so-called "wet method" to meet this requirement. In this process crumb rubber is ground to 80 mesh (approximately .007 inch diameter) particles and added to the asphalt cement "wet" mix. This wet mix is blended with aggregate to produce the asphalt product,which is then spread and compacted to make asphalt pavement.

ISTEA requires asphalt with recycled rubber to be used at the rate of 5 percent of all asphalt placed in 1994, increasing by 5 percent per year until 1997. This uses the equivalent of 300,000 tires by 1997 and for every year thereafter. Clearly, this represents a major market, using more than 40 percent of the waste tire stream by 1997 and thereafter. However, long term life cycle costs, and recycling ability, are not well documented. Health effects on workers from breathing fumes are not well researched.

SDDOT reports that rubber-asphalt cement will cost an estimated $220 per ton as opposed to ordinary asphalt cement at $ 120. Cost and utilization information is summa-

rized in Table 2, below.

TABLE II - Anticipated Rubber Asphalt Use by Year

Year	ISTEA % Required	Tons of Rubber Asphalt	Tons of Rubber	Number of Tires Used	Cost Increase (from 1992)
1994	5	4,500	750	75,000	$ 450,000
1995	10	9,000	1,500	150,000	$ 900,000
1996	15	13,500	2,250	225,000	$ 1,350,000
1997	20	18,000	3,000	300,000	$ 1,800,000
1997+	20	18,000	3,000	300,000	$ 1,800,000

The use of waste tires as raw material for paving operations could be accomplished because:

1) The projected market volume is generally quite stable.

2) The stretches of road to be made with recycled rubber products can be selected to be those nearest to targeted tire stockpiles.

3) Most references available point to increased road life, partially offsetting the increased costs.

4) This use is not inordinately dependent on proximity to major industrial centers as a marketplace.

South Dakota DOT has limited experience with the use of asphalt rubber as a binder in asphalt pavements. It is probable that some experimentation and training will be necessary prior to the establishment of large road construction contracts.

Based on the availability of large stocks of waste tires, it is highly probable that any projects will be in the East River portion of the state, at least in the first few years of ISTEA implementation.

ENERGY RECOVERY

Third in the solid waste hierarchy is the use of solid waste for energy recovery. Energy recovery is the only well developed market now, and in the foreseeable future, capable of fully handling South Dakota's waste tire stream.

Whole Tire Fuel- Whole tires can be used as fuel at certain types of boilers and cement kilns. Whole tires used as fuel generate 12,000 to 16,000 BTU per pound, or about 250,000 BTU per tire.

The State Cement Plant at Rapid City could use whole tires providing that a suitable feeding mechanism is built. The technical staff of the cement plant estimates that the plant could use 750,000 tires per year as fuel, or about 7500 tons of tires to replace 15% of the coal tonnage now used. Fed into the rotary kiln, the tires would save approximately 13,400 tons of coal, and result in more even heating and improved efficiency of the kiln.

Ash from the tires would be incorporated into the clinker and eventually into the port-

land cement product. Inclusion of ash from tire fuel would not have any negative effect on the quality of cement. Also, steel from tire beads and belts would substitute for iron ore currently added to the cement mix.

Air quality concerns also deserve discussion. Each plant is different in terms of heat distribution and duration at the burn site, but in general, no harmful effect on air emissions is expected. Results available to date indicate that, overall, the compiled air emissions data from combusting scrap tires/TDF as a supplemental fuel for energy recovery does not show an adverse impact on air emissions. In general, emissions of NO_x and SO_2 decrease. In the case of the state cement plant, which uses low BTU coal, particulates would likely also decrease.

In order to show financial viability for installing such a tire fuel feeding system, the plant would need a guaranteed supply of 750,000 tires per year at no cost to the plant. This quantity exceeds South Dakota's ability to produce waste tires, so it would be necessary to import tire fuel from other states to supplement local supply. A feed system designed to accommodate a variety of other substitute fuels may make tire use more feasible.

At this point, the use of whole tires as fuel is a major potential market. It is not known whether other boilers in the state could use whole tires.

Tire Derived Fuel (TDF) - Tire derived fuel is used at the current (1992) rate of 25,000 tons per year at Otter Tail Power Company's Big Stone Power Plant in Big Stone City. The 25,000 tons is equivalent to 2,500,000 passenger car tires. Tires are cut into one inch by one inch chunks and the metals are removed by magnets. Then the TDF is mixed with coal and fed to the burners.

TDF produces more than 13,500 BTU's per pound, about a quarter million BTU's per tire. Otter Tail reports that the lack of stable, quality suppliers is the main barrier to expansion of TDF use. Even so, it has been proposed by the staff at Otter Tail to expand tire use to 4,000,000 tires per year, and possibly higher, by 1997.

As is the case with whole tire fuel, environmental concerns are common. Specifically, concerns have been expressed about air quality preservation and solid waste (ash) as a result of burning TDF rather than coal. In general, emissions of NO_x and SO_2 decrease when using TDF at utility boilers.

Other coal fired boilers in the state could also use TDF in the future. It is not known whether other coal fired facilities may consider TDF use.

Tire Pyrolysis- Pyrolysis is best described as burning of tires in the partial or total absence of oxygen. It is a form of destructive distillation, thermally decomposing the rubber of tires into combustible gas, oil, and a form of carbon black known as char. The technology is well developed and proven, but is limited to capital intensive operations requiring a large number of tires.

Different schemes of pyrolysis have been developed, but most use whole or chipped tires heated in a closed vessel. The petroleum portion of the rubber is converted by heat into a combustible gas. The combustible gas stream is used as a fuel to complete the process, which in turn produces oil and char. In general, the combustible gas stream is too high in carbon monoxide to be sold to natural gas users.

The oil produced consists of a light and a

heavy fraction. The heavy fraction is comparable to Number 6 fuel oil. The light fraction is about one quarter benzene and/or toluene by weight. Often the oils are mixed so that they are only usable in industrial heating applications.

The char is a particulate captured by electrostatic precipitation or cyclone particle collectors. Usually, the char occurs in particles too coarse to be used in most manufacturing processes.

The supply of waste tires in South Dakota is inadequate to sustain a pyrolysis plant.

LANDFILLING OR COMBUSTION FOR VOLUME REDUCTION

Last in the solid waste hierarchy is landfilling or combustion to reduce volume. Legal restriction in South Dakota statutes and solid waste regulations severely limit these options.

Controlled Incineration- Like whole tire and TDF energy recovery options, controlled incineration for volume reduction is highly dependent on supply of a large number of waste tires. The primary problem with this method is capital costs and no recovery of any value. In locations where enough tires are present to allow the investment of capital, a market for energy recovery is available.

No controlled incineration facilities are known in the nation.

Open Burning- Historically, many small town dumps in the state burned tires along with municipal solid waste. Open burning of tires is now prohibited by the solid waste regulations of South Dakota. This prohibition is stated specifically in the Administrative Rules of South Dakota (ARSD) 74:27:13:17(8).

It is probable that some small towns will continue to burn at their open dumps at least a few tires each year. As of October 9, 1993, federal regulations will prohibit open burning of anything other than infrequent burning of agricultural wastes, silvicultural wastes, diseased trees and debris from emergency cleanup (40 CFR 258.24, October 9, 1991).

Past burning practices allowed have limited the number of waste tire stockpiles in rural portions of the state.

Mixed Waste Landfilling- Many landfills and open dumps have historically landfilled whole tires. Buoyancy of whole tires often led to surfacing of the tires after the facility closed. Current regulations (ARSD 74:27:13:17(8)) require that tires be shredded or sliced in a manner which minimizes the potential for resurfacing. Tires must be quartered or cut into disks to prevent resurfacing.

South Dakota statutes (SDCL 34A-6-64) requires that the DENR promulgate rules for processing tires for landfilling. Landfilling of tires not properly processed is prohibited as of July 1, 1995. At the current time, the largest landfill accepting sliced tires for mixed waste landfilling is the Rapid City facility.

Tires placed in mixed waste landfill units are not recoverable.

It is probable that mixed waste landfilling will slow or stop as the facilities become aware of future markets.

Monofilling- Waste tire monofills or monocells are discrete landfill units where only tires (shredded or whole) are placed. If and when a suitable market develops, the tires can be mined. Monofilling of waste tires is not currently practiced in South Dakota. Some landfill facilities have considered this as an alternative, but have opted for surface

storage in anticipation of developing markets. It is doubtful whether the practice will become common, as tire markets are currently available at lower projected cost than burial and subsequent recovery.

LEGISLATIVE AND REGULATORY REQUIREMENTS AND IMPACTS

Federal Statutes and Regulations

Federal laws and regulations have been fairly silent on the issue of used tires until recently. In years past, waste tires were not as widely perceived as a problem. There were a number of reasons for this, including those listed below:

1) Widespread open burning at landfills eliminated many tires,

2) Retreading of passenger tires was far more prevalent,

3) Problems with landfilled tires resurfacing were not as well documented,

4) Reuse of tires was more prevalent, and

5) Environmental problems were not well documented.

Retread tire guidelines

On November 17, 1988, the Environmental Protection Agency (EPA) issued guidelines for procurement of retreaded tires and retread services for federal vehicles "where practicable" (40 CFR 253). This has encouraged the federal and state agencies to get and use retreaded tires, but has not significantly reduced the waste tire stream. Due to low costs of imported tires and difficulty retreading radial tires, the use of retreads is "practicable" only for truck tires.

Intermodal Surface Transportation Efficiencies Act - "ISTEA"

This act was passed as H.R. 2950 and became officially Public Law 102-240 (December 18, 1991). Section 1038, entitled "Use of Recycled Paving Material" contains the requirement that asphalt materials modified with recycled rubber be used on a certain percentage of all roads funded with federal money. In order to qualify for the purposes of this act, the minimum content of recycled rubber is 20 pounds per ton or 1 percent of the total weight of asphalt material applied. The director of the South Dakota Department of Transportation must certify that the percentage requirement is met. The utilization requirement is set at five percent of total asphalt in 1994, and increasing by five percent per year, until 1997, then remaining at 20 percent thereafter.

The South Dakota Department of Transportation places about 1,500,000 tons of asphalt each year, so it is possible to construct the following chart of required material:

TABLE III - Recycled Rubber In Asphalt - Anticipated Use by Year

Year	ISTEA % Required	Tons of Rubber Asphalt	Tons of Rubber	Number of Tires Used
1994	5	4,500	750	75,000
1995	10	9,000	1,500	150,000
1996	15	13,500	2,250	225,000
1997	20	18,000	3,000	300,000
1997+	20	18,000	3,000	300,000

Clearly, this act will have a major effect on the waste tire market and usage of waste tires, using more than 40 percent of the waste tires generated each year.

ISTEA offers an "out" for states under certain conditions. If an inadequate quantity of waste tires exist within the state, the act authorizes the Secretary of the USDOT to suspend the recycled rubber requirement. This is not likely to affect South Dakota, since more tires are generated in the state than are to be used for road construction. Market projections indicate that adequate numbers of tires will exist within the state to meet the ISTEA usage requirement.

State Statutes and Regulations

A listing of pertinent statutes and regulations is included in Appendix B of this report. At this time, the DENR is in the process of developing appropriate regulations for the disposal of tires. No regulations are proposed for waste tire haulers.

On January 16, 1992, DENR issued a general permit, authorized under state laws and regulations. This permit is potentially applicable to all persons handling and storing waste tires and tire derived products. Permit number GPWT 92-03 is officially known as General Permit to Handle and Store Waste Tires Under the South Dakota Solid Waste Program.

The general tire permit sets conditions, procedures, location requirements, design restrictions, record keeping and compliance requirements, as well as other restrictions necessary to protect the environment and help ensure proper operation.

No regulations or licensing requirements are in effect or anticipated for waste tire haulers. Illegal tire dumping is not considered to be a major problem in South Dakota.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the information contained in this study, a cumber of conclusions are apparent. For clarity, these will be presented by category.

Distribution of tires- Of the known and reported data, virtually all of the stockpiled tires are concentrated in a few areas located in the eastern half of the state. Similarly, it appears that more than two-thirds of the waste tires are generated in the eastern half of the state.

At least 2,000,000 tires are in stockpiles now and the number is increasing by up to 700,000 per year.

Markets- Markets exist now (1992) for at least 2,500,000 tires annually, and are projected to be up to 5,200,000 by 1997. Notwithstanding market existence, it is apparent that tire use or disposal must still be considered a cost item, not a self sustaining profit market.

Development of a central marketing information database is vital to cost-efficient and sensible analysis of disposal options.

Recycling and reuse markets are available, but are cost effective for only certain numbers or certain types of waste tires. Use of waste tires as road construction materials will be a major force in reducing the numbers of tires landfilled or otherwise disposed of each year.

Use of waste tires for energy recovery is a viable option. Environmental concerns with energy recovery facilities are not appreciable. Currently, energy recovery facilities use more than the number of tires produced in the state.

Landfill disposal is the least desirable legal option for disposal of waste tires.

Stockpile Reduction- Encouragement of existing markets and the development of road construction use of recycled rubber can deplete stockpiles of waste tires across the state within a short time, probably within five to eight years.

Laws and Regulations- Federal regulations now in existence are a major force in reduction of waste streams of tires for land disposal. Current federal regulations address retreading of tires, and elimination of some pollution problems attributable to past disposal practices. Current federal laws mandate use of recycled rubber as road building material.

State regulations address environmental practices for tire disposal, and allow financial grants for some tire recycling and reuse activities. The state laws do not currently allow grants to be made available for energy recovery facilities using waste tires.

Recommendations

Based upon the information and conclusions presented herein, DENR recommends the following:

1) Allow use of Solid Waste Management Program grants for TDF facilities and for energy recovery uses.

2) Amend solid waste rules (ARSD 74:27) to ban landfilling of tires or to require tires and tire products to be placed in monofills.

3) Request SDDOT to research and calculate life cycle costs for the projects conducted to meet ISTEA requirements.

4) Encourage state, county, and local government purchases of retread tires whenever practical.

5) Encourage the use of waste tire resources for energy recovery applications to the maximum extent practical.

6) Require the Bureau of Administration (BOA) to use recycled rubber products to the maximum extent practical.

Appendix A

Tire Disposal Options and Potential Solutions

TIRE DISPOSAL OPTIONS AND POTENTIAL SOLUTIONS
FROM THE FILES OF DENR, OFFICE OF WASTE MANAGEMENT

November 12, 1992

HEIERARCHY	TECHNOLOGY	PRODUCTS	BARRIERS, DISINCENTIVES	LEGAL BARRIERS, INCENTIVES	SUBSIDY	WASTE TIRE REDUCTION 1992	WASTE TIRE REDUCTION 1997
I - VOLUME REDUCTION AT SOURCE	IMPROVED TIRE DESIGN	NEW TIRES	High cost, fuel consumption, car handling, ride, noise.	None	None	0	0

TIRE DISPOSAL OPTIONS AND POTENTIAL SOLUTIONS
FROM THE FILES OF DENR, OFFICE OF WASTE MANAGEMENT

November 12, 1992

HEIERARCHY	TECHNOLOGY	PRODUCTS	BARRIERS, DISINCENTIVES	LEGAL BARRIERS, INCENTIVES	SUBSIDY	WASTE TIRE REDUCTION 1992	WASTE TIRE REDUCTION 1997
IIA - WHOLE TIRE RECYCLING	RETREADING	TRUCK, CAR TIRES	Usually viable for truck tires only. Consumer attitudes, limited price differential in car tires.		Government Preferences	80,000	100,000
	REGROOVING	FARM TRUCK TIRES	For truck tires only; may damage belting; market acceptance limited.		Carcass charges	3,000	3,000
	REUSE OF TIRES (UNPROCESSED)	USED TIRES	Matching, sorting costs; consumer preference, safety concerns.	Implied liability	No disposal fee	24,000	24,000
	REMANUFACTURING	TRUCK, CAR TIRES	Cost differential minimal. More expensive than retreading. Consumer attitudes, safety concerns.	Forbidden on some steering axles.	Carcass charges, grants	0	10,000
IIB - CUT TIRE RECYCLING	SPLITTING, PUNCHING	ROLLERS, MUFFLER HANGERS, DISKS, SHOCK MOUNTS	Very limited market volume; waste product; only for non-steel tires.	None	Carcass charges, grants	0	0
IIC - CHIPPED TIRE RECYCLING	RUBBER AGGREGATE	LIGHTWEIGHT AGGREGATE	Much more expensive than gravel; primarily for swampy terrain.	None	Disposal fee, direct subsidy, grants.	0	0

TIRE DISPOSAL OPTIONS AND POTENTIAL SOLUTIONS
FROM THE FILES OF DENR, OFFICE OF WASTE MANAGEMENT

HEIERARCHY	TECHNOLOGY	PRODUCTS	BARRIERS, DISINCENTIVES	LEGAL BARRIERS, INCENTIVES	SUBSIDY	WASTE TIRE REDUCTION 1992	WASTE TIRE REDUCTION 1997
IIC - CHIPPED TIRE RECYCLING	RUBBER SURFACING AGGREGATE RUBBERIZED ASPHALT (RUMAC)	PLAYGROUND RUBBER SURFACES ROAD SURFACES	High cost, removal of wire, public acceptance. Twice as expensive; life is uncertain; reecycling questionable; no national specifications.	None Required by I.S.T.E.A. highway act	Carcass charges, grants Required use, grants	0	0
IID - CRUMB RUBBER RECYCLING	REPROCESSED RUBBER	MATS, BED LINERS	High cost, fine grind, removal of wire, low structural strength, does not use whole tire.		Carcass charges, grants.	0	?
	ASPHALT RUBBER	ASPHALT BINDER; SEAL COAT	Nearly twice as expensive; life is uncertain; recycling questionable, no national specifications.	Required by I.S.T.E.A. highway act	Required use, grants.		300,000
	REPROCESSED RUBBER	RAILROAD CROSSINGS	High cost, removal of wire, low structural strength, does not use whole tire.		Carcass charges, grants		0

TIRE DISPOSAL OPTIONS AND POTENTIAL SOLUTIONS
FROM THE FILES OF DENR, OFFICE OF WASTE MANAGEMENT

November 12, 1992

HEIERARCHY	TECHNOLOGY	PRODUCTS	BARRIERS, DISINCENTIVES	LEGAL BARRIERS, INCENTIVES	SUBSIDY	WASTE TIRE REDUCTION 1992	WASTE TIRE REDUCTION 1997
III- ENERGY PRODUCTION	TIRE DERIVED FUEL	ENERGY - 12,000 BTU/LB	Transportation, cutting and metal removal, low energy costs for coal, public acceptance.	Permitting requirements. Potential pollution problems.	Disposal fees, grants	2,500,000	4,000,000
	WHOLE TIRE COMBUSTION	ENERGY FOR CEMENT PLANTS	Transportation, low energy costs for coal, capital costs, uncertain supply, public acceptance.	Permitting requirements.	Disposal fees, grants	0	750,000
	TIRE PYROLYSIS	CHAR, CARBON BLACK	Uncertain markets, high capital costs, uncertain supply, not demonstrated.	Permitting requirements.	Disposal fees, grants		0

TIRE DISPOSAL OPTIONS AND POTENTIAL SOLUTIONS
FROM THE FILES OF DENR, OFFICE OF WASTE MANAGEMENT

November 12, 1992

HEIERARCHY	TECHNOLOGY	PRODUCTS	BARRIERS, DISINCENTIVES	LEGAL BARRIERS, INCENTIVES	SUBSIDY	WASTE TIRE REDUCTION 1992	WASTE TIRE REDUCTION 1997
IV - COMBUSTION	OPEN BURNING	NONE	Fines, complaints, air pollution.	Open burning is illegal.	None	0	0
	CONTROLLED INCINERATION	NONE	High capital cost, separate handling, no product, public acceptance.	Permit requirements.	Carcass charges.		
IV - LANDFILLING	MIXED WASTE LANDFILLING	NONE	No market, no possibility of recovery, surfacing, uneven compaction.	Permitting requirements. Statutes.	Disposal fees.	?	0
	MONOFILLING	NONE	Very limited market, surfacing, uneven compaction,	Perrmitting requirements	Disposal fees, grants.	0	?

Appendix B

Tires In South Dakota
A Quick Look at the State Laws

TIRES IN SOUTH DAKOTA

A QUICK LOOK AT THE STATE LAWS

34A-6-64. Disposal of tires. Disposal of tires at sanitary landfills in this state is prohibited beginning on July 1, 1995, unless the tire has been processed in the manner established in rule by the board.

34A-6-65. Recommendations concerning waste tire abatement program. The department shall conduct a study and make recommendations to the Legislature by January 1, 1993, concerning a waste tire abatement program which includes the following:

(1) The number and geographic distribution of waste tires generated and existing in the state;

(2) The development of markets for the recycling and processing of waste tires;

(3) Methods to establish sources of waste tires for users of waste tires;

(4) The permitting of waste tire collection sites, waste tire processing facilities and waste tire haulers; and

(5) Methods for the cleanup of existing stockpiles of waste tires.

34A-6-66. Promulgation of rules for waste tire stockpiling and processing facilities. Upon completion of the study pursuant to S 34A-6-65, the department shall determine the number of stockpiling facilities that are necessary; and the board shall promulgate rules pursuant to chapter 1-26 for waste tire stockpiling and processing facilities. The rules shall include the following:

(1) The prohibition of burning within one hundred yards of a tire stockpile;

(2) The maximum height, width and length of a tire stockpile;

(3) Plans to control mosquitos and rodents;

(4) A facility closure plan;

(5) Specifications for fire lanes between stockpiles;

(6) Limitation of the total number of tires allowed at a single stockpile site;

(7) Criteria for the issuance of permits to qualified waste tire stockpiling and processing facilities. No waste tire stockpiling or processing may be done without a permit; and

(8) Appropriate waste tire processing methods.

34A-6-83. Tire solid waste management fee on motor vehicles -- Collection. There is hereby imposed a solid waste management fee of twenty-five cents per tire, not to exceed one dollar per vehicle on each motor vehicle registered and licensed in this state. Before any vehicle is registered as a commercial or noncommercial motor vehicle pursuant to chapters 32-5 or 34-9, the county treasurer shall collect the solid waste management fee; and before any vehicle is registered as a commercial motor vehicle pursuant to chapter 32-10, the secretary of revenue shall collect the solid waste management fee.

34A-6-84. Payment of tire management fee by owner of motor vehicle -- Date due -- Exemption for United States and Indian tribe property. The solid waste management fee imposed by S 34A-6-83 shall be paid by the owner to the county treasurer or secretary of revenue at the registration and licensing of the motor vehicle, and the fee shall be remitted to the state treasury by the county treasurer or secretary of revenue on the same day as other registration and licensing fees are due and payable. Motor vehicles which are the property of the United States or the Indian tribes are not subject to the fee imposed by S 34A-6-83.

34A-6-85. Deposit of fees in water and environment fund -- Expenditures and grants from fund -- Grant preferences. All fees received pursuant to SS 34A-6-81 to 34A-6-84, inclusive, shall be deposited in the water and environment fund, and except as provided for in S 34A-6-88, their expenditures shall be limited to the solid waste source reduction, recycling and waste management program established in S 46A-1-83. Grants from this fund shall be administered by the board of water and natural resources in accordance with the rules established for solid waste management grants in S 46A-1-84. The board shall offer a grant preference to tire management projects utilizing fees originating pursuant to S 34A-6-83. The board shall offer a grant preference to any municipal solid waste landfill facility using volume-based fees reflecting full and true disposal costs. At least fifty percent of the total amount recovered from the fees imposed pursuant to SS 34A-6-81 to 34A-6-84, inclusive, shall be awarded as recycling grants.