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Water Current

Water Center

University of Nebraska

July 1990

Water Sciences Research Facility Open Here Soon

Purpose

The Water Science Research Facility (WSRF) will provide a convenient working environment for collaborative research on water-related projects. Its location is adjacent to the Institute of Agriculture and Natural Resources (IANR) Water Center and is close to the departments of Agronomy, Entomology, Biological Systems Engineering, Textiles, Clothing & Design, and Forestry, Fisheries & Wildlife (FFW). The WSRF is designed to promote integrated water quality research projects between these various disciplines and additional departments on the City Campus such as Geology, Chemistry, Civil Engineering, and the Conservation & Survey Division (CSD). The facility will not replace, but will complement, departmental analytical capabilities.

Philosophy of Operation

A primary goal of the facility is to provide state-of-the-art laboratories and equipment for water-related research at the University. In order to achieve the goals of the WSRF it will be necessary to restrict the usage of equipment housed in the laboratories. Thus, professionals and technicians employed by the WSRF will be responsible for running the analyses. However, under special circumstances, qualified individuals will have access to direct participation in laboratory analyses. Since the facility is not a training ground for students, instrument experience, completion of courses necessary to understand the instrumentation, and financial

arrangements are required before use. In all cases written permission must be obtained from both the Laboratory Manager and the Director before using instruments within the facility.

The WSRF is for water research—not service. The facility is driven by sponsored research and welcomes new projects to supplement the large analytical commitment from currently funded activities. The laboratory will function as an analytical arm of IANR to provide specialized analyses of specific agrichemical compounds and isotopic tracers.

Thus, advance scheduling of new projects which require the use of laboratory facilities is imperative. The facility will not do analyses for routine ground or surface water monitoring which should be done by state agency or private commercial laboratories. The facility is designed to complement, not duplicate, other existing laboratories at UNL. Thus, it is not a total water analysis facility, and researchers should be aware of the capabilities of the above laboratories when submitting proposals.

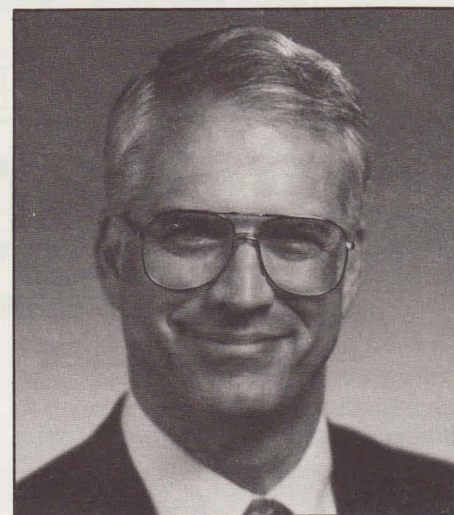
In the early stages of interdisciplinary cooperation with the facility some investigators have included cost of part time laboratory technicians in their research proposals. Thus, pricing for analyses have been partially covered by these technicians. In some cases this may ultimately prove to be the preferred method of covering analytical costs,

☞ (see page 2)

Water Center Director Comes Here From CSRS in Washington, D.C.

Bob G. Volk, a former University of Missouri Agronomy Department chair, has been selected to be University of Nebraska Water Center director.

Volk, an Ohio native, has held a one-year Cooperative State Research Service (CSRS) intergovernmental personnel appointment in Washington, D.C. since Aug. 15, 1989. He reviewed and approved state and Hatch-funded research projects. And he assisted in



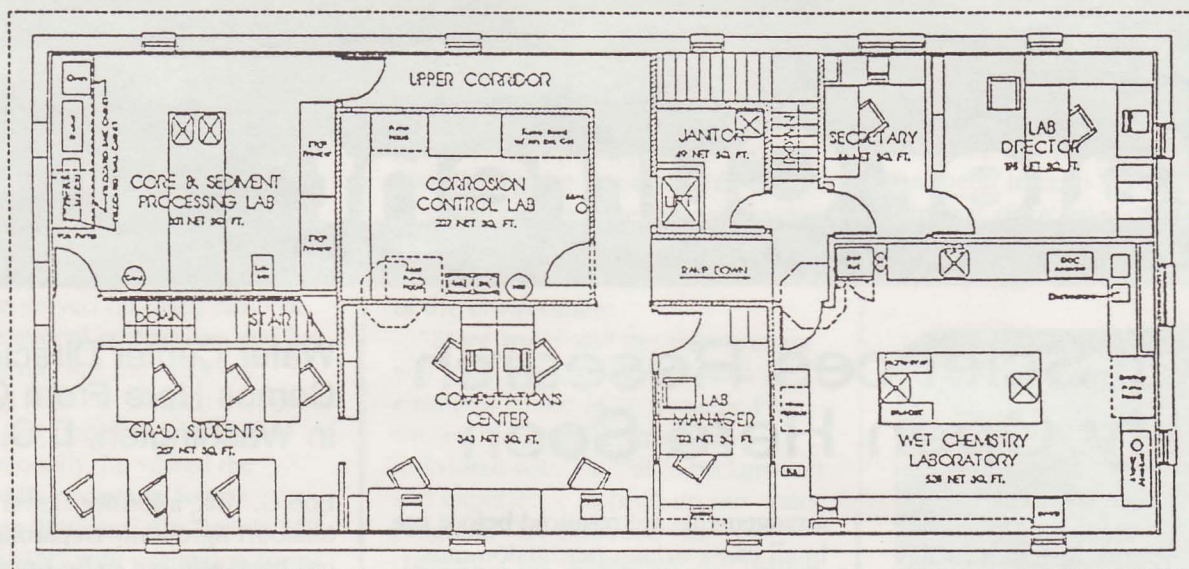
Bob G. Volk
Water Center Director

directing the Water Quality Competitive Grants program, coordinated review panels and coordinated funded projects and departmental reviews.

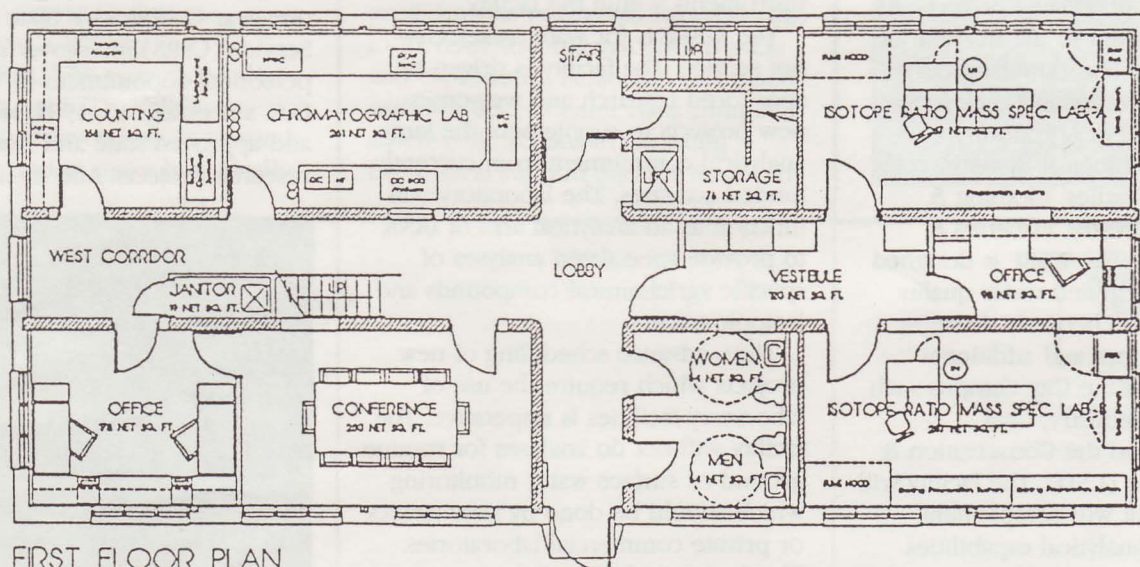
The University of Nebraska Board of Regents approved Volk's appointment at its June 23 meeting here.

☞ (see page 5)


Water Science Laboratory




SECOND FLOOR PLAN



FIRST FLOOR PLAN

(Research Facility) 

so the facility director is willing to be flexible in this matter. After the first six months of actual operation, when operational costs can better be estimated, a price list for commonly requested analyses will be drafted. The price list will be reviewed by the WSRF Advisory Committee which includes the following investigators: Mohamed Dahab (Civil Engineering), Eric Durrance (Geology), Ken Frank (Agronomy - Soils Laboratory), Gary Hergenrader (FFW), Mary Spalding (CSD), Darrell Watts (Biological

 (see page 4)

July 1990

Water Center

Vol. 22 No. 3

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Associate Director

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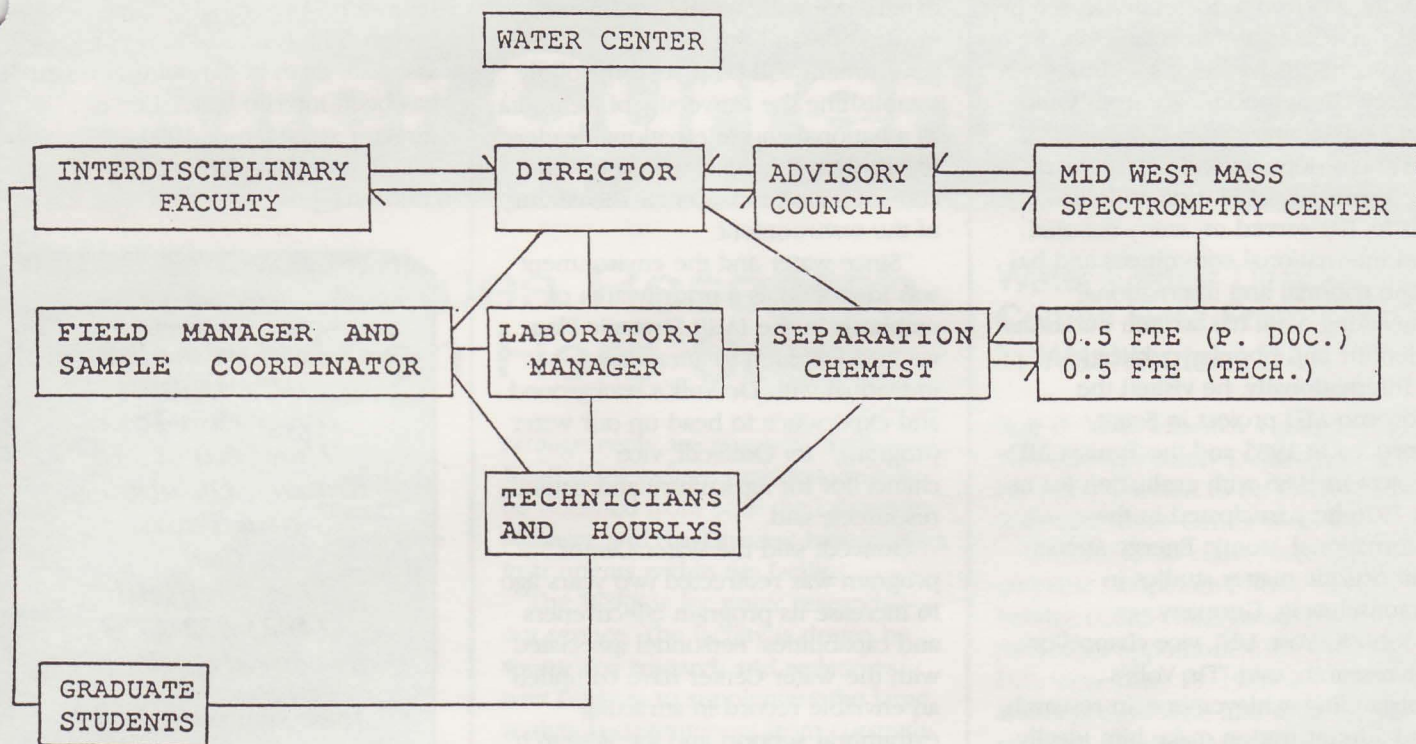
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Wilma Daddario
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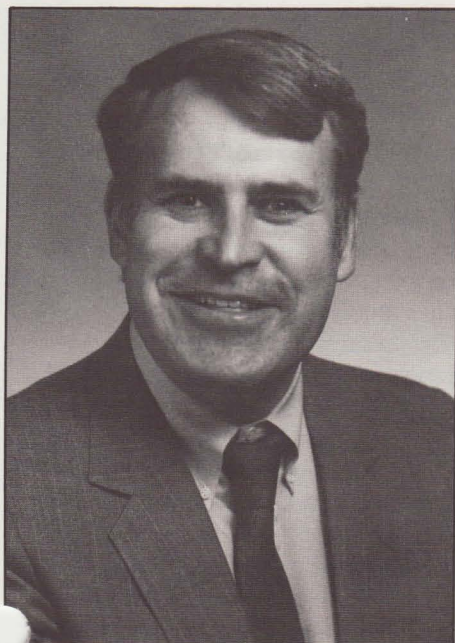
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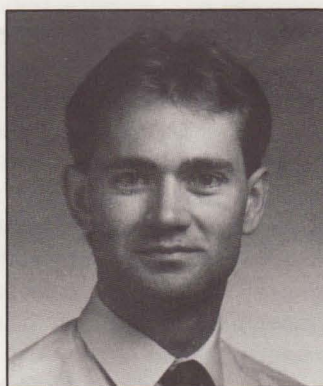
Organizational Chart for IANR Water Science Laboratory



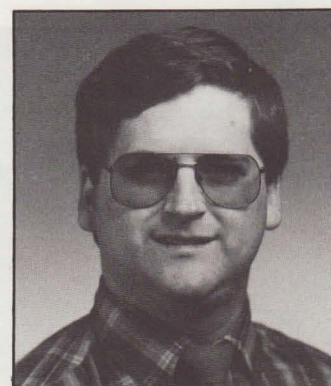
Lab Staff



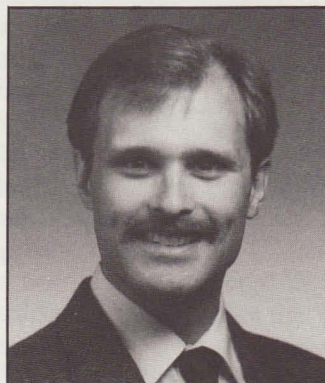
Roy Spalding
Director



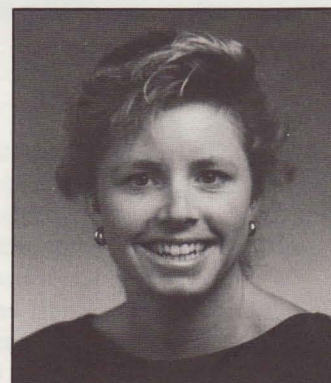
Mark Burbach
Field Manager and
Sampling Coordinator




David Cassada
Separation Chemist



Dan Snow
Laboratory Manager



Shelly Unger
Administrative Secretary

(Research Facility) 

Systems Engineering), and outside advisors Greg Junk (ISU), and Mike Thurman (USGS).

Instrumentation

Isotope Mass Spectrometry — Two light gas isotope ratio mass spectrometers designed by Measurement and Analysis Systems, Inc. are available. One of these instruments will be dedicated to the precise determination of the hydrogen/deuterium (H/D) ratio of water in research projects investigating the use of this natural tracer in hydrologic systems. The other mass spectrometer will be used primarily for the determination of the isotopic ratio of nitrate-nitrogen ($^{15}\text{N}/^{14}\text{N}$) in studies investigating nitrate contamination of ground water and the fate and transport of nitrogen in the environment. In the future, it may also be used for the determination of $^{18}\text{O}/^{16}\text{O}$ ratios of water in conjunction with the H/D analysis. The isotope ratio mass spectrometry laboratories will have high vacuum apparatus necessary for preparation of samples for isotopic analysis. (See floor plan for location of instruments and laboratories.)

Chromatography and Mass Spectrometry — A combination gas chromatograph-mass spectrometer (GC-MS) instrument with a mass selective detector (MSD) is available. The GC-MS will be primarily used for the analysis of trace pesticide residues and degradation products in soil and water samples. A large portion of the research utilizing GC-MS analysis will be involved with the fate and transport of pesticide leachate from treated fields into ground water and surface water systems. Several gas chromatographs fitted with a variety of detectors are available. The lab will be used for analysis of pesticides residues, degradation products, and volatile compounds resulting from the degradation of other agrichemicals. An ion chromatograph (IC), located in the chromatography lab, will be used primarily for the determination of inorganic anions (including nitrate and nitrite) although it may be utilized for the analysis of other compounds.

Additional instruments — Supporting instrumentation and apparatus will be housed in the wet chemistry lab used both for water analysis and for sample preparation for other parts of the facility. Instruments located in this lab include atomic absorption (AA), and UV-Vis spectrophotometers, total organic carbon (TOC) analyzers. The organic carbon analyzers can be used to determine both dissolved and particulate carbon in water samples. The spectrophotometers are standard analytical equipment for water quality analyses and can be used to determine a wide variety of analytes. The AA spectrophotometer will be primarily for the analyses of metals in water samples while the UV-Vis spectrophotometer can be used for inorganic ions as well as for many organics.

Although the facility is capable of running several inorganic analyses, this is an outgrowth of past contracts in the 1970s and the equipment has not been upgraded. Those researchers requiring standard organic scans and analyses are recommended to inquire at the Geology Department and the Agronomy Soils Laboratory.

Supporting Laboratories

Wet chemistry — Normal small chemical apparatus and equipment will be located here as well as distillation and extraction apparatus used for isotopic and pesticide analysis.

Core processing — Sediment and cores from agrichemical leachate studies will be prepared and extracted here. This lab will have stainless steel work surfaces for core preparation and freezers for the proper storage of cores and sediments. Equipment includes a sediment grinder and sieves, and leaching, centrifuge, and filtration setups for the extraction of pesticide residues and nitrates.

Corrosion control — This lab supports both the core processing and the wet chemistry. Both water and sediment samples will be prepared here for trace metal and isotopic analysis using highly corrosive acids. The isolation of this room is necessary to prevent corrosion and deterioration of the expensive analytical equipment

located in the core processing and wet chemistry labs. This laboratory contains two air circulating hoods and a perchloric acid hood.


Counting — This lab will be primarily used for the determination of radioactive elements, particularly uranium and its daughter isotopes — thorium, radium, radon, etc. It will contain a Canberra multichannel analyzer fitted with alpha silicon surface barrier detectors, a liquid scintillation detector, alpha/beta detector, and helium analyzer. Research projects which utilize these instruments will involve the use of naturally occurring radio active isotopes as environmental tracers as well as the study of radioactive materials in the environment.

Midwest Mass Spectrometry Laboratory (MMSL) — Cooperative agreements are in place between the MMSL and the WSF for the MMSL to provide methods development and confirmation by high resolution mass spectrometry.

Personnel

Personnel housed in the IANR Water Sciences Research Laboratory (See Organizational Chart) include a Director, a laboratory manager, a field and sampling coordinator, an organic separation specialist, and an administrative secretary. In addition to his present duties as Associate Director of the Water Center, Roy Spalding will direct the Water Sciences facility. The laboratory will be staffed with competent and qualified individuals. Mark Burbach has been hired for the position of Field and Sampling Coordinator. He has several years experience in planning field activities, installing sampling devices in both the saturated and unsaturated zone, and in coring deep sediments.

Last January a Laboratory Manager (Daniel Snow) and Organic Separation Chemist (David Cassada) were hired. Both are highly qualified. Snow has finished all his course work for a Ph.D. in geochemistry at UNL and has a M.S. degree in geochemistry from Louisiana State University. Cassada completed his M.S. degree at UNL in chemistry in 1986 and has four years

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Drip Irrigation and Weather Modification Explained on Water Tour

The annual Nebraska Irrigation Tour will travel to western Kansas, Oklahoma and Texas, Aug. 5 through 10, and will include a visit to the Gigot farms, the largest single-family pivot development in the U.S., according to the tour director.

Les Sheffield, University of Nebraska-Lincoln farm management specialist, said other highlights of this 19th annual irrigation tour include seeing two different drip irrigation methods to produce corn at the Northwest Kansas Research and Extension Center.

Also in Kansas at the Western Kansas Groundwater Management District No. 1 in Scott City, a weather modification project will be explained. And, at the Southwest Kansas Research and Extension Center, Low Energy Precise Application (LEPA) and a linear move pivot will be discussed.

At Garden City the Reeve Cattle Co., with a 13,000-head cattle feedlot and 4,500 acres of irrigated land with its own natural gas wells, will be a stop for the two-bus tour.

Sheffield said this vertically-integrated operation produces Tilapia

tropical fish to sell to restaurants. A grain alcohol plant built in 1982 produces 2.4 million gallons of alcohol a year. A by-product stillage is used here in place of water in cattle feed and a by-product is also fed to cattle and to the Tilapia fish.

An option to a limited number of tour participants, Sheffield said, is attending "Texas" a drama presentation at Palo Duro Canyon, 25 miles from Amarillo, with an evening barbeque at Palo Duro Canyon State Park before the performance.

On down the road at the Bushland USDA Conservation and Production Research Lab, in cooperation with Texas A & M, presentations on irrigation and water management research and wind energy research with the "Big Machine" will be given.


At the Halfway Agricultural Research Station, Texas A & M, that is tied in with the High Plains Research Foundation, LEPA Irrigation Research will be discussed by Bill Lyle, inventor of LEPA. Also a multi-function Tumatic lateral move system for seed and irrigation, a LEPA continuous-move pivot system and a plot sprayer for

accurate application of chemicals will be viewed.

"Another highlight of this tour," Sheffield said, "is a visit to the Charles and Geraldine Schlabs Farm at Hereford, Texas. Schlabs hasn't missed one of our irrigation tours in the past 10 years. A catered noon luncheon will be featured at the Schlabs' farm.

In Lubbock Texas Sam E. Curl, dean of the College of Agricultural Sciences at Texas Tech University, will discuss "Challenges in Texas Panhandle Agriculture in the 90s." At the High Plains Underground Water Conservation District No. 1, Wayne Wyatt will present an overview of the groundwater status there and give a presentation on experimental chemicals for crops.

For more information about this tour, call Sheffield at (402) 472-1773. These annual tours are sponsored by the Nebraska Water Conference Council (NWCC), the Water Center and IANR. NWCC is composed of about 90 representatives of groups interested in Nebraska irrigation and water. □

(Research Facility) 


experience as a gas chromatographer-mass spectrometrists and computer linkage technician at the Eppler Cancer Institute at the University of Nebraska Medical Center. Also in January, Shelly Unger was hired as Administrative Secretary/Technician. In addition there is a vacant position for an Isotope Ratio Mass Spectrometrists which may be filled at the post doctoral level.

History

The WSRF is located in the renovated Wildlife Laboratory Building adjacent to Natural Resources Hall, East Campus. The Wildlife Laboratory was constructed in 1919 and was used initially to hold livestock as part of the Agricultural Diagnostic Laboratory. When the Veterinary Science Complex was constructed in the 1970s, the Diagnostic Laboratory was moved, but the structurally sound and centrally-

located building was retained. However, in the spring of 1985 the University Institutional Animal Care and Use Committee (IACUC) determined that the facilities did not meet federal requirements and the use of the building for holding mammals was discontinued. Recently it has been used by Forestry, Fisheries & Wildlife for wildlife research including rodent and fisheries studies and has served as a storage and shop area.


Renovation of the Wildlife Laboratory to a Water Science Research Facility began during the fourth week of January 1990. Completion is expected during the first part of August 1990. The lab should be fully operational sometime during the fall of 1990. The WSRF occupies approximately 6,000 sq. ft. and contains six separate laboratories, several offices, and a conference room (see floor plan). IANR funds amounting to approximately \$400,000 were used for the renovation. □


(Director) 

Volk said, "Nebraska has a rich history in water research and I am delighted to be a part of this successful program." He said that future programs of the Water Center will continue to build on the excellent foundation that has been established.

Nebraska has an outstanding record of research and extension water quality programs, he said. And recently acquired grants and a continuation of expansion of Nebraska Research Initiative funds, makes this an exciting time to be in water research, Volk said.

Completion of the new laboratory facilities will enable the Water Center to increase its capacity to analyze soil and water samples and respond to an increased demand for low-level pesticide analysis, Volk said. President Bush's initiative in protection of our

 (see page 6)

(Director) 

water resources is creating many opportunities in water research, he said.

Volk received a doctorate degree in soil sciences from Michigan State University. His bachelor's and master's degrees in agronomy are from Ohio State University.

He has done agriculture research at the University of Florida at Belle Glade, has served on many national and international committees and has done national and international consulting. Volk has written numerous scientific and popular publications.

Internationally, he visited the Morocco AID project in Settati, Morocco in 1985 and the Tunisia AID project in 1986 with evaluation teams. In 1976 he participated in the International Atomic Energy Agency soil organic matter studies in Braunschweig, Germany.

John K. Yost, UNL vice chancellor for research, said "Dr. Volk's outstanding achievements in research and administration make him ideally

qualified to provide bold and visionary leadership for the Water Science Center supported under the Nebraska Research Initiative."

Yost said Volk's combination of experience with several land-grant universities and the federal government will be pivotal in solidly establishing the University of Nebraska as a national and international leader in problem-solving research in water contamination as we enter the century of the environment.

"Since water and the environment was identified as a priority area of emphasis in the IANR Strategic Plan, we are delighted to attract an individual with Dr. Volk's background and experience to head up our water program," Irv Omtvedt, vice chancellor for agriculture and natural resources, said.

Omtvedt said the Water Center program was redirected two years ago to increase its program effectiveness and capabilities. Personnel associated with the Water Center have compiled an enviable record in attracting extramural support and the Research

Institute has provided a strong support base to be more responsive to emerging needs.

Volk will assume his duties Aug. 1. He succeeds Roger Gold, who went to Texas A & M University, College Station, Tex. Dale Vanderholm, associate dean of agricultural research, has been interim Water Center director since Jan. 1, 1990.

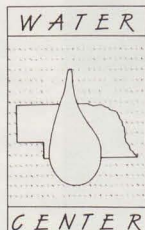
Volk is married and has four children. ☐

AUG. 5-10

**Join us on the
19th Annual
Irrigation Tour.
This year it's to
Kansas, Oklahoma,
and Texas.**

**Call
Les Sheffield
(402) 472-1773
for details.**

(see story on p. 5.)



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