Uplink

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A deadly cure

Analysis of Nuclear Regulatory data reveals realities of radiation treatment

By Dave Davis and Ted Wendling
The Cleveland Plain Dealer

As a daily assignment, the spill of radioactive phosphorus-32 inside a research laboratory at the Cleveland Clinic wasn't much — a 12-inch story inside. But clinic officials refused to identify a nearby music school that had been contaminated in the incident. They issued a challenge: file a Freedom of Information Act request and try to get the name from the Nuclear Regulatory Commission.

We did. And more than 1000 FOIA requests later, we wrote "Lethal Doses — Radiation That Kills," a five-day series that was published by *The Plain Dealer* in December.

The series could not have been done without access to the NRC's online database NUDOCS. We spent hundreds of hours searching and analyzing the 2 million records on NUDOCS, looking for leads on radiation accidents and victims.

The resulting stories documented the failure of the NRC to protect the public from radiation overexposures and accidents in our nation's hospitals. When we asked NRC officials how many people had died from medical overdoses of radiation, they knew of none. We found more than 40, including two that we identified on the agency's NUDOCS system.

Among the dead was Dwight Golstein, a 9-year-old who died of radiation-induced respiratory failure in 1988 after receiving double-doses of cobalt-60 radiation at Alta Bates Medical Center in Berkeley, Calif. Golstein was undergoing treatments for a tumor in his sinus cavity.

The radiation was a slow killer. After a few months, Dwight's dark skin turned jet black and began to peel, spinal fluid drained from his right ear and his swollen tongue forced its way out of his mouth.

It was as if Dwight had been in an atomic bomb blast. His mother, Barbara, watched him die.

"I made sure to hug and kiss him," Golstein told us. "Dwight's face was disfigured, and his tongue was so fat he looked like a little monster. He really looked grotesque and he knew it, but I wanted him to know that we loved him."

Dwight's final days are etched forever into his mother's memory.

"I told Dwight before he died that it was OK to leave us," Golstein told us. "He was fighting hard. I told him that he was going to go to heaven and live with Jesus and that it was better for him. . . . Three days later, he died."

When we asked the California Bureau of Radiological Health if anyone there knew of Dwight's death, officials said no. They then went to the hospital, where they were told that no overdose has occurred. After reading the series, California officials visited the hospital again. This time Alta Bates officials admitted that they had not been truthful with the agency. A criminal investigation is now underway into what state officials openly call a coverup by the hospital.

And Alta Bates is not unique. We found many hospitals where radiation safety has been under-funded, neglected and, in some places, openly scorned. We found doctors and nuclear medicine technicians who had overdosed patients, sometimes deliberately, and then falsified records and lied to regulators to cover up. And we probed the NRC's shameful investigation of the nation's most serious medical radiation catastrophe, the overexposure of 413 cancer patients who died, and the NRC didn't bother to find out what happened to them.

Many of the patients suffered from terminal cancers. For them, the radiation overdoses of up to 41percent left wounds that would not heal and hastened their demise. But many victims, such as 25-year-old Edna Gail Valentine, an elementary school teacher, were expected to survive their cancers.

Edna was 4 1/2 months pregnant with her first child when she began radiation treatments that were meant to kill any lingering cells left after surgery for

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A deadly cure

Hodgkins Disease. Four months later, both she and the unborn baby were dead.

Her sister, Barbara Hoover, and scores of other families of victims say they were told nothing by hospital and NRC officials.

"They burned her lungs," said Hoover, after reading an NRC report that had not been made available to the family. "They lied to us. They knew what happened all along, and they didn't tell us."

Hoover said she would never forget the last time she spoke to her sister. She had received a call at the school where they both taught. By the time she reached the hospital, they were wheeling Edna into emergency surgery.

"She told me she was afraid," Hoover said. "I said, 'Yeah, I would be too. But everything will be fine. We'll see you when you get out.' " Edna never awoke from the surgery.

After reading about Riverside, NRC Chairman Ivan Selin said he didn't realize what the victims and their families went through. "We haven't helped them and we really should," Selin said. Later, in commenting on their series, he said: "If two reporters can work for a few months and come up with what you got, that's a pretty good indication that we're not doing our jobs." Selin promised major reforms in the agency's medical programs.

For a reprint of the series, call Dave Davis or Ted Wendling at (216) 344-4808.

"They knew what happened all along, and they didn't tell us."

Acquiring information from the Nuclear Regulatory Commissi

By Dave Davis
The Cleveland Plain Dealer

Our series on radiation mishaps in hospitals found numerous flaws with the Nuclear Regulatory Commission, but an unwillingness to provide information was not among them.

The best proof of this I can offer is the agency's online database NUDOCS, an invaluable source of information for reporters who cover the environment, or who occasionally write about hospitals, universities, nuclear power plants, radioactive waste or other related issues.

NUDOCS, agency lingo for Nuclear Document System, holds more than 2 million records gathered by the NRC since 1978.

Within about a week of issuing inspection reports, technical studies, fines and special investigations, NRC officials have the information summarized and entered on the NUDOCS system. NUDOCS also is an excellent source for correspondence, reports and other records generated by other federal and state agencies, as well as outsiders such as environmental groups, concerned citizens and reporters.

For example, a search for records that m "Ohio" brings up 2,010 hits. Plug "death" or "killed" into the NUDOCS search menu and 426 records appear. NUDOCS has 10,141 records generated by the U.S. Environmental Protection Agency, 46 by the Federal Bureau of Investigation and 19 by Vice President Al Gore.

There are 21 records, mostly Freedom of Information Act requests, for which I am listed as the author.

NUDOCS also holds congressional correspondence and transcripts of hearings and important meetings.

Because NUDOCS offers only summaries of documents — ranging from a few sentences to dozens of pages in length — it must be used in conjunction with the NRC's Public Documents Room, which holds the actual records. With the document accession number retrieved from NUDOCS, you can call the Public Document Room's reference desk at (202) 634-3273 and get the records by fax or by mail. The cost is five cents a page.

There is no cost for searching NUDOCS. The NRC doesn't charge for time on the system and the call that connects you is to a toll-free 800 number.

And while NUDOCS was created for use by NRC officials and the libraries that serve as NRC repositories, you can get access. To request a password, simply write to: Gerald F. Cranford, Director, Office of Information and Resource Management, U.S. Nuclear Regulatory Commission, MNBB6219, Washington, D.C. 20555.

'TRAC'ing more complete NRC data

· David Burnham and Susan Long
AC
yracuse University

In recent years, federal agencies such as the Environmental Protection Agency and the Census Bureau have been making computerized databases public.

While these "hand out" databases can provide reporters important, useful information, most of the data files available through federal agencies focus on external situations, and not on the internal workings of agencies.

The central mission of the Transactional Records Access Clearinghouse is to obtain computerized records of federal enforcement agencies and transform them into databases that reveal what these agencies actually are doing.

The TRAC Nuclear Regulatory Commission database, for example, covers the regulation of nuclear power reactors from 1975 to August of 1989. (TRAC currently is updating this database.) The database is available in various formats: a six-volume report series, diskettes suitable for use on either PCs or MacIntosh computers and nine-track computer tape.

TRAC's first step in gathering the NRC data was to obtain a list of the dozens of record systems then used by the NRC. We decided initially to focus on what the NRC called its "766" file. TRAC ·ıested this file under the Freedom of Informa- Act. The massive file, with millions of different ·tries, was reproduced on a tape that we provided for the agency.

Obtaining the raw 766 file was only the beginning of the long process of developing what we call a "knowledge base," an organized collection of information that allows the user to examine the workings of an agency. Although the 766 file contains details of NRC inspections undertaken at both commercial power plants and other licensed facilities such as universities and hospitals, TRAC decided to focus its attention on the 130 commercial plants which came under NRC regulation from its formation in 1975 through August of 1989.

There were, however, a lot of problems. The NRC only provided the sketchiest information on the format and file contents of the tape, and most of the specific codes were not defined. In cases where codes were defined, they didn't always match the information in the file.

The file contained detailed information such as where and when each inspection was conducted, how long it required to complete, who conducted it and whether the inspection resulted in the operator being cited for any violations. From 1975-89 for power plants only, the data indicated that the NRC conducted close to 50,000 inspections · detected about 27,000 violations.

he NRC's records are surprisingly inconsistent, ·metimes showing that a single reactor became operational on several different dates. An accurate list of the name of each commercial nuclear power plant, the utility that owned it and the exact date it was granted its pre-construction license, its construction license, when it became operational and when it was permanently closed down had to be compiled by TRAC to make the 766 file useful. The inconsistencies in the data required double checking the information with the NRC and, in some cases, with the utilities themselves.

The purpose of this intense effort was to provide more than just NRC information about individul reactors. The TRAC data also presents the information in terms of the periods that each reactor goes through during its total life. With TRAC data, it is possible to determine whether an individual reactor had more or fewer violations during the construction period than it did during its operational period.

The basic accuracy of the NRC data, however, was not the only problem. NRC had changed the way it categorized the seriousness of violations several times — starting with a three-category system, moving to a six-category system in the early eighties, and then back to a five-category system. Spotting these changes, not documented anywhere in the raw 766 file, was critical.

We also sought to locate information about what the NRC did after the inspector detected a violation, the place where the 766 file left off. When were penalties assessed, how big were they, against whom were they applied? No one we talked to at the NRC knew of any computerized information on penalties, so TRAC reluctantly began building its own computerized files drawn from internal paper records.

Very late in this process, TRAC discovered that the NRC did in fact have such a file — the Enforcement Action Tracking System (EATS) which was not widely known within the NRC. We obtained EATS under the FOIA. But EATS used a different identification system than the 766 file. The file that TRAC developed from the paper records supplied cross-linking "IDs" so that violations and penalties could be matched. Comparison of these two independent sources of information on penalties allowed further checks of NRC data accuracy.

Knowing the precise number of violations at a particular plant can be interesting. But developing information so that a user can compare the performance of one utility against that of another or determine whether NRC inspectors around the country are enforcing regulations in a uniform way transforms a normal "database" into a "knowledge base," a tool that can provide genuine insights into both the workings of an important federal agency and the industry it regulates.

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TRAC, a non-profit organization, was founded by Burnham, a former New York Times reporter, and Long, a professor of quantitative methods at Syracuse. For more information about TRAC, call (315) 443-3563.

The central mission of the Transactional Records Access Clearinghouse is to obtain computerized records of federal enforcement agencies and transform them into databases that reveal what these agencies actually are doing.

Taking bytes out of the education apple

By Dianna Borsi
MICAR
University of Missouri

Child molesters for teachers. Felons driving the school bus. Racism manifesting itself with more minority students in remedial classes and fewer in gifted programs.

Education stories like these can be done without years of training or rooms full of computer equipment.

Joel J. Smith, an investigative reporter at the *Detroit News*, used nine-track tape to compare Michigan's Department of Corrections database of 550,000 convicted criminals with a Michigan Department of Education database of 97,000 school teachers and 15,000 school bus drivers.

He found roughly 200 convicted felons in the classrooms with another 200 driving school buses. Charges ranged from murder to child molestation. Weighing the right to privacy against the responsibility to protect students, Smith pointed to one case in particular: One teacher convicted of molesting a 15-year-old girl served his time, went and taught in another state, returned and was rehired — once again dealing with young girls. "Shouldn't the school district know about this? They didn't," Smith said.

The Department of Education claimed it checked for criminal records. Later the Department admitted it only checked when applicants for a teaching certificate admitted they'd been convicted of a felony. But when Smith looked at applications, he found that "in every single case, they lied."

After the initial computer match, many names were culled by gender or by first and last name checks. Smith used a stand-alone IBM for the initial matches which turned up the 400 names. With the information copied onto a diskette, he put it on an IBM PC and used Paradox software.

Smith also checked his computer matches using old-fashioned reporting. "I never ran a name that I didn't manually look up and verify if it was the same person. I talked to virtually every person I used," Smith said. In some cases, he simply sent them a letter, and they contacted him.

The final results? Michigan enacted a safeguard law and criminal checks are now run on all schoolbus drivers and teachers.

Dallas Morning News reporter Joseph Garcia found 200 school employees with felony convictions that no one knew about. Using tapes, Garcia compared the Dallas Independent School District's payroll records with Dallas County Prosecutor data, which contains demographics, the criminal charge and its disposition.

In one case, a custodian was fired when he stopped showing up for work. Garcia discovered the missing janitor was in jail for murder.

Along with dozens of drug offenses, the search turned up three sexual offenders. Garcia discovered in two cases that judges had ruled that t employers — the school district — didn't have to be told.

Again, the applications had asked about convictions, but "by and large, the people just out-and-out lied," Garcia said.

Not every successful computer-assisted education story starts with a tape.

Using XDB on a home computer and information provided on diskette, Reagan Walker of the (Jackson, Miss.) *Clarion-Ledger* found that test scores more closely correlated with the basic poverty level of a school than expenditures per pupil.

Walker looked for correlations using information furnished by the State Department of Education on diskette for a mere $250. The data included test scores by district, school expenditures by pupil, the worth of a mill per district and the number of courses offered by each high school.

She found a strong correlation between the poverty level and low test scores, high dropout rates and low ACT scores. But Walker wanted to know why.

After analyzing the data, she concluded that schools that had less money offered fewer high school courses and less resources to their students. This in turn meant students scored lower on ACT tests and had fewer opportunities for higher education.

Aleta Watson, with nine years of experience on the education beat, uses Microsoft EXCEL spreadsheets on a Macintosh to bring data together and make comparisons.

Her paper, the *San Jose Mercury News*, covers an area that includes nearly 50 school districts. But there is no central repository of education data for the area. Spreadsheets help her draw together information from the various districts and make comparisons.

In 1987 she looked at asbestos in the schools. Loading information from each district into the computer, she discovered how many schools had removed the substance, where asbestos remained, whether it is in classrooms or other areas and what proportion of the schools have asbestos.

A spreadsheet can also reveal hidden segregation. In 1991 Watson used a spreadsheet to look at a school five years after a desegregation court order and found that Hispanics were still more likely to be in remedial classes and less likely to be in advanced placement classes. In building this database, Watson also discovered that half of all Hispanic students have had a D or an F on their report card.

Watson also looked at administrative costs of each district as a percentage of its budget. "It was pretty shocking. Administration wasn't that bi chunk [of the budget]," Watson said. Despite t solid numeric evidence, "People still called and

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Secrets of the superprogrammers

By Dan Woods
The News & Observer
Raliegh, N.C.

Decades ago, in the datazoic era of the 1960s and 1970s, huge mainframes ruled the earth. Behemoths they were, cared for by a priesthood of superprogrammers, who loved to compress every field of every record into the smallest number of bits.

After the personal computer enlightenment in the early 1980s, memory became cheap and processors exploded with power. In this era, ease of use became more important than efficient storage.

The relational database revolution sprang from the premise that the method for asking questions should be independent of the way the data is stored. Structured Query Language was born to help people ask questions of data in an organized way. Instead of the compressed and Byzantine ways superprogrammers stored data, relational databases are stored in flat files, most of it in character form.

With a relational database, asking a new question means writing a new SQL statement. In a [illegible]oic database, asking a new question meant [illegible]ng the superprogrammer to write a new program. Superprogrammers loved this.

For the most part, the superprogrammers have fossilized, and no longer are able to make life difficult for the rest of us. They still exist, though, and frequently surface in state government bureaucracies, which have resisted for years competitive pressures that drove businesses to modernize. In this environment, data tends to be crammed together in wonderfully creative ways.

Superprogrammers must be given their due. Their methods stored the most data in the least space. One of the favorite techniques used by superprogrammers is using bit flags to store Boolean or logical variables. This is elegant because logical variables are those that can be either true or false, bits can be 0 or 1 — a perfect match. It is efficient because one byte can store 8 bit flags. In the era of P.C. enlightenment, one logical variable takes up one byte, which is no problem because storage abounds.

Superprogrammers also would store numbers such as dates in portions of integers. I recently encountered a two-byte date field that had the following format:

Bits 0 through 7 were the year
Bits 7 through 10 were the month
Bits 11 through 15 were the day
[illegible]he bits are numbered from 0 to 15 starting at t[illegible]ft.)

This is a super-compact way to store dates. Each date is stored in a two-byte integer, rather than in a six-byte string of characters, like most dates (i.e., YYMMDD).

Despite their efficiency, these fields are an unholy nuisance! Unless you write Assembly Language code, the lingua franca of the superprogrammer, (or it's modern equivalent, C) it seems that bit flags or two-byte dates will be impossible to use with a language like FoxPro, Paradox or XDB.

Fear not, however. Such fields are accessible to those unskilled in the ways of the superprogrammers. For even though superprogrammers can squish data together in ingenious ways, they cannot stop numbers from being numbers, and therein lies the solution.

A byte that contains 8 bit flags, for example, is a number from 0 to 255. If we look at the first 16 values in binary, hexadecimal and decimal notation, we can see a way out of our dilemma.

Binary	Hex.	Dec.	Bit 7 on	Bit 6 on	Bit 5 on
0000 0000	0 0	0			
0000 0001	0 1	1	x		
0000 0010	0 2	2		x	
0000 0011	0 3	3	x	x	
0000 0100	0 4	4			x
0000 0101	0 5	5	x		x
0000 0110	0 6	6		x	x
0000 0111	0 7	7	x	x	x
0000 1000	0 8	8			
0000 1001	0 9	9	x		
0000 1010	0 A	10		x	
0000 1011	0 B	11	x	x	
0000 1100	0 C	12			x
0000 1101	0 D	13	x		x
0000 1110	0 E	14		x	x
0000 1111	0 F	15	x	x	x

(Remember the bits are numbered from 0 to 7, starting at the left. Also, in hexadecimal A = 10, B = 11 etc. up to F = 15.)

How do we determine if an individual bit of this character is 0 or 1? First, treat the byte as a number. In FoxPro that means reading the byte in as a one-character field, then using the ASC function to translate it to a number. The number field will have to be 3 bytes long in FoxPro, because 8 bits can store a number from 0 to 255.

If we look at the byte as a number we can see some interesting things. Bit 7, the rightmost bit, is on — meaning 1 — when the number is odd, and off — meaning 0 — when the number is even. Bit 6, the second from the right, is on when the remainder after dividing the number by 4 is greater than 1. Bit 5 the third from the right, is on when the remainder after dividing by 8 is greater than 3. Bit 4 is on when the remainder after dividing by 16 is greater than 7.

Another way of talking about the remainder of

For the most part, the superprogrammers have fossilized, and are no longer able to make life difficult for the rest of us. They still exist, though, and frequently surface in state government bureaucracies.

number y is to use the term modulus. Number x **modulus** y is the remainder of x after dividing the number by y. If x is less than y then x is the same as its modulus with respect to y. In FoxPro this function is written **MOD(x,y)**. **MOD(7,4) = 3** because 7 has a remainder of 3 after being divided by 4. **MOD(8,16) = 8** because 8 has a remainder of 8 when divided by 16. **MOD(4,2) = 0** because 2 divides evenly into 4.

We can then write the following FoxPro **IF THEN** statements to decode the bit flags in a single byte field called **BITFLAG**:

```
IF MOD(BITFLAG, 2) >0          THEN Bit 7 is on
IF MOD(BITFLAG, 4) >1          THEN Bit 6 is on
IF MOD(BITFLAG, 8) >3          THEN Bit 5 is on
IF MOD(BITFLAG, 16)>7          THEN Bit 4 is on
IF MOD(BITFLAG, 32)>15 THEN Bit 3 is on
IF MOD(BITFLAG, 64)>31 THEN Bit 2 is on
IF MOD(BITFLAG, 128)>63        THEN Bit 1 is on
IF MOD(BITFLAG, 256)>127       THEN Bit 0 is on
```

This code will leave any number of bit flags a smoking ruin. We use the same technique to decode the compact dates, which are stored as follows in a two-byte, unsigned binary integer we'll call **TWOBDATE**. When stored as a binary number, **TWOBDATE** has the following structure:

```
yyyyyyymmmmddddd
```

where y are bits indicating the year, m indicate the month, and d the day.

TWOBDATE is converted from a two-byte integer to a FoxPro decimal number using NineTrack Express or some other tape conversion utility. The FoxPro number would have to be five bytes wide because two bytes, or 16 bits, can store a number from 0 to 65535.

The year field is stored in bits 0 through 7. That leaves 9 bits of the 16-bit number remaining. Nine bits can store a number from 0 to 511. The year bits, in essence, are storing the number of 512's in the 16-bit number. (That's equivalent to the three leftmost digits of a 9-digit decimal number storing the number of millions.) To find out the number o 512's in the number we take the number, subtract its remainder with respect to 512, and then le by 512. Thinking of this in millions rather t 512's may make it clearer. The number of millions in a number is the number minus the first 6 digits, divided by a million. This formula extracts the year from the first 7 bits:

```
year=(TWOBDATE-MOD(TWOBDATE,512))/512
```

We handle the next two fields in a similar fashion. For the month, bits number 8 to 11, we note that there are 5 bits to the right, which can store from 0 to 31. That means the 8th to 11th bits are counting the number of 32's in the number. We eliminate bits 0 to 7 by taking the number modulus 512. The formula to extract the month is therefore:

```
month=(MOD(TWOBDATE,512)-
      MOD(TWOBDATE,32))/32
```

The day is easy. We simply take the number modulus 32.

```
day= MOD(TWOBDATE,32)
```

Putting this all together with other FoxPro functions to convert the entire two-byte date into a FoxPro date, we come up with the following command:

```
REPLACE ALL FOXDATE WITH
      CTOD(STR((MOD(TWOBDATE,512)-
      MOD(TWOBDATE,32))/32)+"/"+
      STR((TWOBDATE-MOD(TWOBDATE,512))/
      512,2,0))
```

Take that, superprogrammers!

Taking bytes out of the education apple

Continued from page four

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said there was too much administration," she said.

Jonathan Eig of the *Dallas Morning News* used spreadsheets to prove racial lines still exist in school. But in this case, Eig used information that was gathered by the federal government but not yet analyzed and released.

"We scooped the agency," Eig said. Using the Justice Department's Civil Rights Division surveys, he found racial differences among the districts in his area in remedial and gifted classes, corporal punishment and graduation rates.

But while the Department requires all schools to gather the information, it collects information from only a few. To obtain the data for this award-winning 1991 series, Eig had to write Freedom of Information letters to the Department and various schools in his district.

Then, using a spreadsheet, he proved a great gulf still divides students.

For example, he found that at schools with predominantly black students, teachers had less experience and few had master's degrees. He also found that the numbers of minorities in remedial classes were up while the numbers of minorities in gifted and talented classes were down — and that minorities got corporal punishment more often. This held true for blacks and Hispanics but not Asians.

Looking at the information by district, he discovered that the oft-criticized Dallas Independent School District was more even-handed than suburban schools in many ways. In suburban schools, minorities were more likely to end up in special education classes.

The articles sparked a parents movement and started people talking about the issue, Eig said.

Reporters don't have to be computer experts or full-time investigative reporters to turn out hard-hitting computer-assisted education stories. Even beginning reporters can deal with data tha would stump a reporter without a computer.

Bits, bytes and nibbles

Journalists frequently call MICAR to ask: "How do I know what databases are out there?"

While the government spends a lot of money maintaining its databases, it makes little effort to tell the public what's available.

Two places to start looking are the Federal Database Finder and the State Database Finder by Mathew Lesko. These sources scratch the surface.

However, once you understand the philosophy behind CAR — that every government agency, from the federal to the local level, which maintains computer records has, in essence, an obtainable electronic database — you get an appreciation for how difficult it is to come up with a comprehensive listing.

But it looks like reporters in Minnesota might get lucky.

Andris Straumanis, a doctoral candidate at the University of Minnesota's school of journalism, has been cataloguing some of the more than 2,000 databases located in state government agencies throughout Minnesota.

The Minnesota Database Directory, tentatively set for publication in the spring of 1993, is designed specifically to be a reference tool for journalists.

The idea for the directory arose out of two conferences on the use of electronic public records hosted by the Minnesota Journalism Center. Maybe journalism professionals and students in the other 49 states could get together and do the same.

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***The News & Record* in Greensboro, N.C., recently won** a victory in the ongoing battle for access to computerized information.

This month a judge finally ordered Guilford, N.C., county officials to turn over to reporters property tax listings stored on computer tape.

The News & Record first sought access to the records last March but balked when county officials said the 164,000 records would cost $8,200.

"They were asking a nickel a record, which was the same cost they charge for individual paper records," said Lex Alexander, investigative/database reporter for *The News & Record*.

When *The News & Record* challenged the cost, county officials changed their tune and argued the records weren't public — at any price.

On Feb. 5, a judge rejected the county's argument that making the records public would violate state law prohibiting public officials from releasing information about individual income. The judge did not, however, settle the issue of cost.

"The agreement is a little weird," said Alexander. "They will give us a copy of the tape now, and if the court rules the cost is some price we don't want to pay, we return the file."

North Carolina Public Records Law includes electronic records but does not clearly define what constitutes "reasonable cost," said Alexander.

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The Freedom Forum and Arizona State University's Walter Cronkite School of Journalism are sponsoring the fourth annual seminar for reporters and editors in computer-assisted journalism March 4-6.

Morning sessions will feature nationally known journalists, including Donald Barlett, two-time Pulitzer Prize-winning investigative reporter and coauthor of the *Philadelphia Inquirer* series "America: What Went Wrong;" Larry Sanders, database editor of *USA Today*; John Ullmann, former projects editor of the *Minneapolis Star-Tribune*.

Afternoons will be devoted to hands-on work with online databases, CD-ROM and 9-track tapes.

The seminar is open to newspaper staffs in Arizona, New Mexico, Colorado, Utah and Nevada, but other applicants will be considered if space is available.

For more information contact Ed Sylvester at (602) 965-4210.

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MICAR will hold a week-long seminar in computer-assisted reporting May 23-28. This is the famous MICAR "boot camp" in which students learn the process of downloading and analyzing data stored on nine-track magnetic tape through hands-on training.

Seminar topics include: the facts behind magnetic tape storage, relational database theory, Structured Query Language, testing for data validity and the law regarding electronic records.

Students return to their newsrooms ready to apply what they've learned and begin producing stories.

Extensive computer knowledge isn't required. The first day of class includes computer basics and getting around in DOS. But because of the grueling pace, only the highly motivated are encouraged to attend.

Class size is limited to 12 to ensure individualized attention. Cost varies according to circulation size or market share.

For more information, contact MICAR, 120 Neff Hall, Columbia, Mo., 65211, (314) 882-0684.

POSITIONS OPEN
MISSOURI SCHOOL OF JOURNALISM

The world's first School of Journalism is seeking to fill faculty positions for the Fall 1993 school term. Located in Columbia, ranked by MONEY magazine as the second most livable city in the country, the School offers B.J., M.A. and Ph.D. degrees and has five sequences which combine a strong professional training program with an active research program. The Missouri School of Journalism is accepting applications for the following positions:

Assistant Professor, full-time, tenure track or renewable contract appointment, to teach computer-assisted reporting and coordinate outreach activities to the profession. Significant media experience and advanced degree preferred. Appointment at higher rank possible for candidate with extensive background. Professor Sandra Scott, Search Committee Chair, School of Journalism, Box 838, University of Missouri, Columbia, Mo., 65205.

Assistant Professor or Instructor, full-time, tenure track or renewable contract appointment, to be teaching editor for the city desk of the *Missourian*, the community daily published by the school. Significant professional experience, creativity and interest in teaching required. M.A. degree preferred. Computer-assisted reporting skills a plus. Send cover letter, curriculum vitae and list of 3 references to Professor Yves Colon, Search Committee Chair, School of Journalism, Box 838, University of Missouri, Columbia, Mo., 65205.

Screening begins February 1st and will continue until positions are filled.

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