February 20, 1997

Senator Stephen J. Rees
Utah State Senate
319 State Capitol Bldg
Salt Lake City UT 84114

Subject: District Computer Services (Report #94-05)

Dear Senator Rees:

In response to your request, we reviewed the staffing levels at District Computer Services Section (DCS) within the Utah State Office of Education (USOE). The request was generated in part by your concern that staffing has not decreased even though in 1990 DCS consolidated with the Division of Information Technology Services (ITS) in the Department of Administrative Services. Further, you were concerned that one of the largest customer school districts recently decided to stop using DCS and perform its own data processing, which raised questions about the staff necessary given the assumed reduction in work load.

We found that DCS staffing has decreased, both at the time of the consolidation and again shortly afterwards. Further, although DCS and ITS consolidated, the only functions taken over by ITS were the responsibility for telecommunications lines and the actual machine processing of data. DCS is still responsible for all support of districts' data processing. We also found that the decision by Jordan School District to conduct more of its data processing independently is not a total withdrawal of business from DCS. Several computer applications will continue to be done for Jordan at DCS, and Jordan will continue to be DCS's largest customer. Therefore, we do not believe that a recommendation to reduce DCS staffing is appropriate at this time.

Additionally, we believe that a policy decision is needed to guide DCS's future course as it implements new data processing systems based on the use of personal computers (PCs). An issue that must be addressed is whether DCS has the resources to efficiently provide support for both the existing mainframe system and two new PC-based information systems, as is presently intended. The implementation of these new systems will represent a basic shift in the

type of data processing provided by DCS to districts, and may affect the agency's

mission, operations, and even organizational structure. DCS needs to assess staffing with the change in focus in mind. Because implementations are projected for fiscal year 1995-96, a review of the decision to support both types of systems must be made soon.

District Computer Services is the section within USOE that was created to provide centralized data processing for the 40 school districts and 5 area technology centers in the state. Originally, DCS was called the Utah Educational Data Processing Project (UEDP). Started in 1967, it was located first in Salt Lake City School District and later in Granite School District. Around 1973, UEDP was brought under the direction of the State Office of Education and moved into USOE offices. UEDP (later DCS) operated a mainframe computer on-site and provided telecommunications lines to the districts in addition to providing support services such as programming, troubleshooting, training, and printing.

Between 1973 and 1988, several larger school districts decided to leave DCS and provide their own data processing. In 1988, Price Waterhouse was retained to evaluate the possibility of consolidating DCS's hardware and telecommunications functions with the Division of Information Technology Services. A decision was made to consolidate; operations staff from DCS moved to ITS, and DCS's computer was sold. An audit conducted in 1990 by a team headed by an analyst in the Governor's Office of Planning and Budget reviewed the consolidation and recommended further changes. These included changing district billing from a per student basis to a cost-of-service basis. One reason for this recommendation was that DCS was operating at a deficit, in part because of its per-student billing structure.

In 1993, another study commissioned by DCS itself was done, this time to consider alternatives to mainframe computing and to recommend a future course of action for the section. The Kerry Consulting Group recommended pursuing the suggestion made by Price Waterhouse, which was to move toward PC-based or distributed data processing rather than mainframe data processing among the schools, districts, and DCS. DCS is presently involved in writing a fiscal information system for PCs and in moving toward the purchase of a student information system for PCs as well.

Another recent development is that Jordan School District began to remove its data processing from DCS's systems with the intent of conducting most of its own data processing. Prior to Jordan's withdrawal, 30 districts out of 40 were using DCS for student information systems, 24 for fiscal information systems, 36 for criterion-referenced testing and all 40 for norm-referenced testing. Even with Jordan's withdrawal, the majority of school districts in the state still use DCS for at least some of their data processing needs.

DCS is currently staffed by 30 full-time equivalent employees, with an annual budget of $3.7 million for fiscal year 1995. Staff are divided into an administrative group, a district

liaison group of education specialists and control technicians, and an operations group of programmers and two operations staff who monitor the printing operation. Funding is a combination of Uniform School Funding for personnel costs and revenue from billing the school districts for their costs incurred in providing the data processing.

Two Changes at DCS Have Resulted in Staffing Decreases

As a result of a partial consolidation with ITS and an internal reorganization of USOE data processing, DCS staffing has decreased from 51 in early 1989 to 30 at the end of fiscal year 1994. Further, although DCS and ITS consolidated, the only functions taken over by ITS were the responsibility for telecommunications lines and the actual machine processing of data. All staff support of districts' data processing still takes place at DCS.

DCS Transferred 11 Staff to ITS in 1989

There were a number of changes resulting from the 1989 consolidation between DCS and ITS. According to the articles in the memorandum of agreement governing the consolidation, DCS transferred 11 operations staff to ITS, effective July 1, 1989. Second, the work load directly associated with school districts that had been done on DCS's computer was transferred to ITS's mainframe computer. Third, the telecommunications network was transferred to ITS. The revenue associated with the computer work load was also transferred from DCS to ITS. The consolidation was to take effect March 1, 1989; the staff were transferred at the change in fiscal years.

Staffing plans show that the transfer of staff from DCS to ITS took place in July 1989. DCS staffing dropped from 51 to 40 FTEs at that time, with a commensurate decrease in the personnel budget. The staff who went to ITS were operations staff and programmers who worked directly with the computer itself. DCS retained two operations positions responsible for working with the printers left at DCS and providing courier service.

The work load transferred to ITS involved the computer processing of all data for the fiscal, student, and testing programs for the districts. Data storage as well as data processing was moved to ITS's computer. Telecommunications connections and lines became the province of ITS when the transfer occurred.

Discussions occurred between DCS and ITS as to which agency would bill districts for

particular services. DCS staff told us that because they felt that districts were interested in detailed billings by application, they developed a program that provided a detailed listing of costs incurred by districts. As a result, billing for processing time is sent out by DCS, along with the billing for printing, scanning, and forms costs. These funds are then transferred from DCS to ITS on a monthly basis. ITS bills districts directly for telecommunications costs.

A Second Staff Reduction Occurred as Well

Shortly after the hardware responsibilities were assumed by ITS and the 11 staff transferred, a reorganization occurred within the data processing area of the USOE. The decision was made to have the internal or agency data processing group within DCS split off and report directly to the USOE comptroller. This change removed a group of ten staff from DCS's organizational structure, bringing DCS to its present FTE count of 30. The personnel budget for the ten staff was also transferred when the staff became a separate agency data processing group. This group provides operational data processing support and LAN service to the USOE itself.

The following figure summarizes the authorized staffing and personnel budget as taken from the agency's annual work program staffing plan, or Schedule 6, for five fiscal years spanning the consolidation and second staff reduction.

Figure I Staffing Levels FY 89-93		
Fiscal Year	**Authorized FTEs**	**Budgeted Salary & Benefits**
1988 - 1989	51	$1,801,875
1989 - 1990	40	1,526,632
1990 - 1991	41	1,549,785
1991 - 1992	30	1,334,373
1992 - 1993	30	1,387,373

As can be seen in the figure, staffing decreased from 51 prior to the consolidation to 30 after the second reduction, and the related salary and benefits budget decreased by almost $415,000.

DCS Offers Different Services Than Does ITS

The consolidation between DCS and ITS was not a total merging of the two agencies. All district liaison work is still done by DCS. ITS provides the computers that process the data and the lines for communication between districts' computers and the mainframe computer at ITS, while DCS provides all software-related support. Thus, the consolidation did not mean that ITS has taken over all of DCS's functions.

An illustration of how service is provided may be of use in clarifying the roles these agencies play. When a district wants to run its payroll on the state fiscal information system, someone from the district calls a control technician at DCS and asks her to initiate payroll. The technician types in the control commands that start the payroll sequence of computer programs running. The programs have been written and are updated by DCS computer programmers; the computers themselves are located at ITS. After the preliminary reports are run at DCS, checks are performed by the DCS technician and district personnel, then the final programs and reports are run, again initiated by a DCS control technician. This results in paychecks and specific reports being printed. All contact is between the district and DCS. The computer information that was entered into the computer terminals at the district is transmitted over lines provided and maintained by ITS to the mainframe computer at ITS. The information is processed on ITS computers, at the command of DCS staff. Printing may occur on printers at ITS, DCS, or even the district office.

The same general process is followed by districts and DCS staff for all applications. Software applications are run on ITS's mainframe computer by DCS staff for the districts. Programs in use were written by DCS programmers, and any changes or modifications to the software are also done by DCS programmers, with the education specialists often acting as liaisons between DCS and the users. Requests for reports to be run are usually taken by the control technicians, who are the "front line" service people for the districts. Troubleshooting is handled by various staff, usually education specialists first, with the involvement of programmers and/or control technicians as needed. Other DCS services include special programming at the request of a district; districts are charged for special programming if it is something that will benefit them but no other districts. Otherwise, staff costs come out of the appropriated funds.

DCS provides a fiscal information system (FIS), a student information system (SIS), and testing services to any school district in the state. At present, 27 districts use DCS's SIS, all 40 use the norm-referenced testing and 36 use the criterion-referenced testing services. In addition, 23 districts use a broad range of FIS services, with one additional district using

primarily just payroll and general ledger programs in the FIS. The mainframe systems were written and are updated by DCS programmers.

In general, ITS provides an essential but largely unseen service, and there is little contact between districts and ITS staff. The telecommunication lines that data pass through are installed by and maintained by ITS, and the data are stored on and processed by ITS's computer. Some printing is also done on ITS's printers, then picked up by DCS staff for delivery to the districts. If something goes wrong with the telecommunications lines, users can call a "help line" at ITS for assistance. In our phone calls to districts, we found that although district personnel were well acquainted with DCS personnel, often on a first name basis, they could not name anyone at ITS with whom they worked. District personnel indicated they called the ITS "help line" when they have a problem with computer lines, and simply talked to "whoever answered."

Jordan's Decision Will Affect DCS Only Moderately

Because of a concern that Jordan School District's withdrawal from the state system would result in a great decrease in work (thus staffing needs) at DCS, we reviewed the withdrawal. We found that although Jordan School District is in the process of removing much of its data processing from the state system, there will be significant work still done at DCS for the district. Even with the removal of many fiscal and student programs, Jordan will remain the state's largest customer district, according to our estimates. Finally, the revenue will be lost mainly by ITS, not DCS.

Several large volume, time-consuming applications will continue to be done at DCS for Jordan School District. Remaining applications include personnel and payroll, testing and test scoring, the substitute teacher system, teacher certification, and a curriculum tracking system. These applications and their associated forms or microfiche costs accounted for over $200,000 or 29 percent of Jordan's total fiscal year 1994 usage. If the costs and usage for these applications remain fairly close to last year's levels, Jordan will remain the largest user on the system. The next highest user, Washington School District, was billed a total $94,000 last year for all applications it used.

Because the personnel and payroll applications are time consuming for the control technician who has responsibility for Jordan's fiscal applications, that staff person will experience relatively little change in duties when Jordan's reduction occurs. The technician responsible for Jordan's student applications estimated she will experience about a 20 percent

reduction in work load when Jordan takes its student applications off the state system. At the control technician level, then, considerably less than one full-time equivalent employee (FTE) is estimated to be affected by Jordan reducing its use of the system. At the programmer level, we found that about 28 percent of one FTE's time was involved in programming special requests for Jordan School District last year, out of eight programmers. The education specialists also indicated to us that only a few days of their time each year had been devoted to Jordan, since that district's own staff provided the training that the education specialists normally provide for districts.

Finally, as mentioned, most of the revenue generated by Jordan's use of the state system will be lost by ITS, not DCS. Of the approximately $694,000 billed by DCS to Jordan in fiscal year 1994, $585,000 or 84.3 percent was for processing time and related costs, the revenue for which is passed through to ITS. When Jordan's reduction in service use is complete, the reduction in revenue is therefore going to be mostly from ITS's account.

Because staffing has decreased at DCS, and the staff are still responsible for providing all software support to the majority of school districts in the state (even with the reduction in work due to Jordan School District), and because of the upcoming changes at DCS, we cannot recommend any decrease in staffing at this time. However, the two special projects and the accompanying shift in focus from mainframe to PC data processing have staffing implications that will be discussed next.

Upcoming Changes at DCS Require Reassessment of Staffing

In response to consultants' recommendations, DCS is involved in two major special projects that will provide PC-based data processing systems to school districts in both fiscal and student information applications. DCS programmers are currently rewriting the mainframe fiscal programming for personal computers, while the student information staff are involved in the purchase process for new PC-based student software. The agency plans to provide districts the choice of moving to the new systems or staying on the mainframe systems. We believe that this plan needs to be carefully considered and a policy decision made by the State Office of Education and the Board of Education as to whether supporting both computing environments is the best use of resources, especially in light of staffing changes that may be needed to support the PC systems and related networks.

Mainframe data processing means that a central computer stores and processes all data for

users. Districts call DCS staff and request they initiate data processing and report generating, and these things are done centrally. Results are frequently printed at a central location and then sent out to the requesting district. With PC-based or distributed processing, districts would have PCs at their sites and would input data, initiate processing, and store data on their own machines. If the districts acquire printers, printing can also be done at the users' sites. Distributed processing offers greater independence and flexibility to

users and should also reduce time spent in completing data processing jobs, since the DCS "middle man" is eliminated.

Studies Recommended Decentralization

In 1988, a study done by Price Waterhouse to evaluate whether DCS should consolidate with ITS stated that "if USOE were relieved of its data center custodian role, it could focus on orderly, sensible, coordinated decentralization, when and if appropriate." It further stated that "the last 15 years has demonstrated a trend in distributing data processing away from centralized mainframes." The study went on to recommend that USOE and ITS "explore creative means to consolidate." As previously discussed, the consolidation occurred.

In 1993, a study done by the Kerry Consulting Group addressed "the pros and cons of the 'best scenario' for serving the administrative data processing needs…of Utah's forty school districts." This study recommended that DCS should migrate to a decentralized environment as had been previously recommended in the Price Waterhouse study; recommended steps included buying a site-based or PC student application system and developing business applications in-house for the new decentralized environment.

In addition to the recommendations of outside consultants, DCS staff had also conducted some research and surveys that led them to the conclusion that pursuing network and PC options for decentralized data processing was a necessary step for the agency to take. According to the education specialist heading the fiscal rewrite project, staff conducted an informal survey of districts who used the fiscal information system and found out that there were those who wanted to go with on-site systems and those who wanted to stay with the mainframe. However, records of staff planning meetings show that DCS staff felt that PC systems would be the preferred systems in years to come because of the way the data processing industry was moving, and the consultants' recommendations support that view.

Shortly after the report by the Kerry Consulting Group came out, DCS staff began setting in motion the initial processes to develop a new fiscal information system internally and purchase a new student information system. These will be discussed in the next section.

Staff Are Working on Developing and Acquiring PC Software

During the course of this audit, a team of DCS programmers and education specialists was working on rewriting the mainframe business applications for PCs. Additionally, another team of staff programmers and education specialists was involved in the procurement process for a

PC-based student information system. At the end of our fieldwork, a number of proposals had been received from software vendors and were being reviewed by a selection committee composed of representatives from various school districts and DCS staff.

Initial implementation for the student system should be in the fall of 1995, with complete implementation for any interested district by the following year. The fiscal rewrite is projected to take about two years from the time the programmers began writing the source code programming, which was April 1994. Although DCS staff indicated to us that the intent is to make these systems so "user friendly" that most districts will want to move to them, they believe that there will be some districts who are not interested in making the switch. So although they hope to become much more PC and network oriented, some mainframe computer work will remain.

The present work on the two projects has necessitated the implementation of a so-called "soft freeze" on mainframe software modifications so that attention can be focused on the rewrite and purchase. Staff indicated that a soft freeze means that only essential maintenance is being done to mainframe programs to keep them operational. Therefore, programming and liaison staff in particular have been devoting more time to the new systems projects and less time to ongoing mainframe maintenance. The lead programmer for the student applications reported to us that he and another programmer are spending between 10-50 percent of their time on the purchase project, depending on the phase the procurement is in. The lead education specialist for the student system purchase project estimated he has been spending between 25-60 percent of his time on the project, again in relation to the phase the procurement is in. The four fiscal programmers are all involved in the rewrite for PCs. They were each spending about a third of their time on this project when our fieldwork ended; DCS management indicated to us that this time commitment has since increased to about 50-70 percent. The lead education specialist for the rewrite estimated he has been spending between 25-75 percent of his time on the project, with less time involved during the time fiscal year end work had to be done on the mainframe.

As DCS moves toward implementation of PC-based systems, long range staffing implications need to be dealt with. These issues will arise because of the change in focus to distributed processing. Staffing issues will be discussed in the next section.

Policy Decision Is Needed to Guide Future Course of Action

DCS staff have told us they intend to support and maintain both the new PC-based software and the existing mainframe systems so that districts will have the choice of staying with the mainframe or moving to PC-based, distributed processing. We believe that this plan needs

careful evaluation, with a policy decision made by the State Office of Education and the Board of Education as to whether DCS should continue to provide mainframe processing in addition to distributed processing. This decision must include staffing considerations, since the direction the agency takes will affect how it is staffed.

In the course of our discussions with DCS staff, several of them indicated to us that once the PC systems were operational, they would continue to support and maintain the mainframe systems. Because of the present soft freeze on mainframe enhancements, work would be needed to get the systems current again, especially in the payroll system if changes occurred in IRS regulations. One programmer indicated that there would always be "bugs" to get out or new requirements from the Legislature requiring programming adjustments. Staff indicated they felt strongly that they needed to offer districts the choice of staying with the mainframe or moving to the new systems.

Most people involved with either the fiscal rewrite or the student purchase project admit that until full implementation of these systems, the mainframe systems will need to be kept running. During the phasing in of the new systems, there will be a period of "double work," according to the Kerry Consulting Group representative, since staff will need to keep the mainframe running while attending to the break-in period for the new software. Once the new systems are fully operational, however, decisions need to be made about supporting one or both types of systems.

The Addition of the PC-based Systems Raises Questions About Staff Resources. Supporting both the mainframe and PC systems raises questions about the resources necessary to accomplish this support. Along with this, as more districts move to the newer technology of distributed processing, the issue of reducing mainframe staff needs to be addressed.

If both types of systems are to be maintained, consideration must be given to whether the current staff can handle the responsibilities of both. Maintaining both systems with present staffing will mean that additional work load will be placed on current staff. Alternately, the agency could hire staff with PC and network background to support the new systems. The 1994 Legislature approved three new full-time positions for DCS, of which two would have responsibility for network support, and one would have responsibility for assisting with the development of a statewide student data base clearinghouse. (This clearinghouse is intended to be a central data base of student information, allowing for electronic record transfer among schools.) Once these positions are filled, management would need to determine whether any other network positions are needed.

Second, training and background issues need to be considered. Current staff have received training in the new data base management software being used in the fiscal rewrite and have

become familiar with the Windows approach used in much of PC software. However, the staff are still primarily mainframe oriented in their experience and training. Management must determine whether the training provided to current staff is enough for them to deal with the various support and maintenance issues that will arise as the new systems become operational.

We believe that DCS management, with the help of USOE human resource management staff, should determine whether any positions need to be restructured to reflect a focus on PCs and networks rather than mainframe processes. Districts which used to have DCS take care of many of their data processing needs will learn how to do much of their own data processing. Consulting activity may well constitute a larger proportion of DCS staff work load, with less hands-on work such as initiating programs, editing reports, printing and mailing out reports, labels, and so on. Our feeling that management needs to consider whether staff positions need to change coincides with the 1994 Legislative Session recommendation of the Legislative Fiscal Analyst which states that the "Board of Education [should] also redefine responsibilities of the current computer services staff."

Finally, the issue of a possible reorganization must be dealt with. As distributed processing becomes more prominent, DCS may find itself in a position where a reorganization is needed. At present, the agency is organized into three main areas: administration, a district liaison group composed of the education specialists and control technicians under an unfilled assistant manager position, and an operations/systems group of programmers and printer operators under an assistant manager. With distributed data processing, this organizational structure may need to change in response to the change in focus of the staff. Management needs to assess whether an organizational structure that splits the responsibilities between mainframe and PC/network areas, or some other new structure, would be more effective. Again, this decision must be based on whether both systems will continue to be supported.

Staffing Assessment Should Include Work Load Measures

To assist in the decisions needed to determine staffing and organizational needs, DCS management should take steps to develop a baseline of work load data that would be used to assess how the new PC systems will affect employee work load and change the responsibilities of existing positions.

We found that, like many service oriented organizations, DCS has focused more on providing service to its customers, the districts, than it has on developing needed assessment tools that allow management to determine how efficiently and effectively service is being provided. Because the agency is poised on the brink of change, we believe that now is a good time for DCS management to set in place needed management control tools to assess its present

and future staffing patterns.

Input, output, and outcome measures are all needed. Input measures include such things as staff time spent on different tasks. Among the information we believe would be helpful to management are such things as how much time is currently spent on mainframe programming versus the recently developed off-line OASIS programming, and how much time is involved in maintaining the FIS and SIS versus the testing system (which is not scheduled to undergo major changes as are the first two). Then, estimates could be made of how much programming will be required to maintain the new systems, and how much, if any, upgrading of the mainframe programs should occur after the new systems are operational. DCS could also assess what changes will occur in the control technicians' work load with more districts doing their own data entry, program initiation, and printing. Once this information is available, DCS management would be in a better position to make decisions about future staffing needs.

Output measures include such things as the number of different reports needed by districts, the number of report cards and schedules generated and printed, and the number of training sessions held by DCS staff. Outcome measures include the level of satisfaction of users; DCS needs to assess how well districts are being served. To accomplish this objectively, we suggest that the USOE internal auditor should conduct a customer satisfaction survey on a periodic basis. Accumulating input, output, and outcome measures and analyzing them should assist DCS management in determining staffing efficiency and effectiveness as the focus and mission of the agency change.

Recommendations:

Because staffing has decreased twice at District Computer Services and because of the special projects that are occupying staff in addition to ongoing assignments, we do not believe that a recommendation to reduce staff is appropriate at this time. However, staffing issues need to be addressed as indicated in the last part of our report; recommendations related to this area follow.

1. We recommend that the Utah State Office of Education and the Board of Education revisit the decision that DCS should support both mainframe and PC information systems after assessing the resources needed to provide this support.

2. We recommend that District Computer Services Section management assess current and future staffing needs in light of the upcoming implementation of PC-based information systems and put in place work load measures and any other needed assessment tools.

We hope this letter provides you with the information you need on this issue. A response from District Computer Services of the State Office of Education is attached. If you have any questions or need additional information, please let me know.

Sincerely,

Wayne L. Welsh
Auditor General

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