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1994 Ergonomics Program Quality Evaluation

Lori Longbotham, Dwight P. Miller

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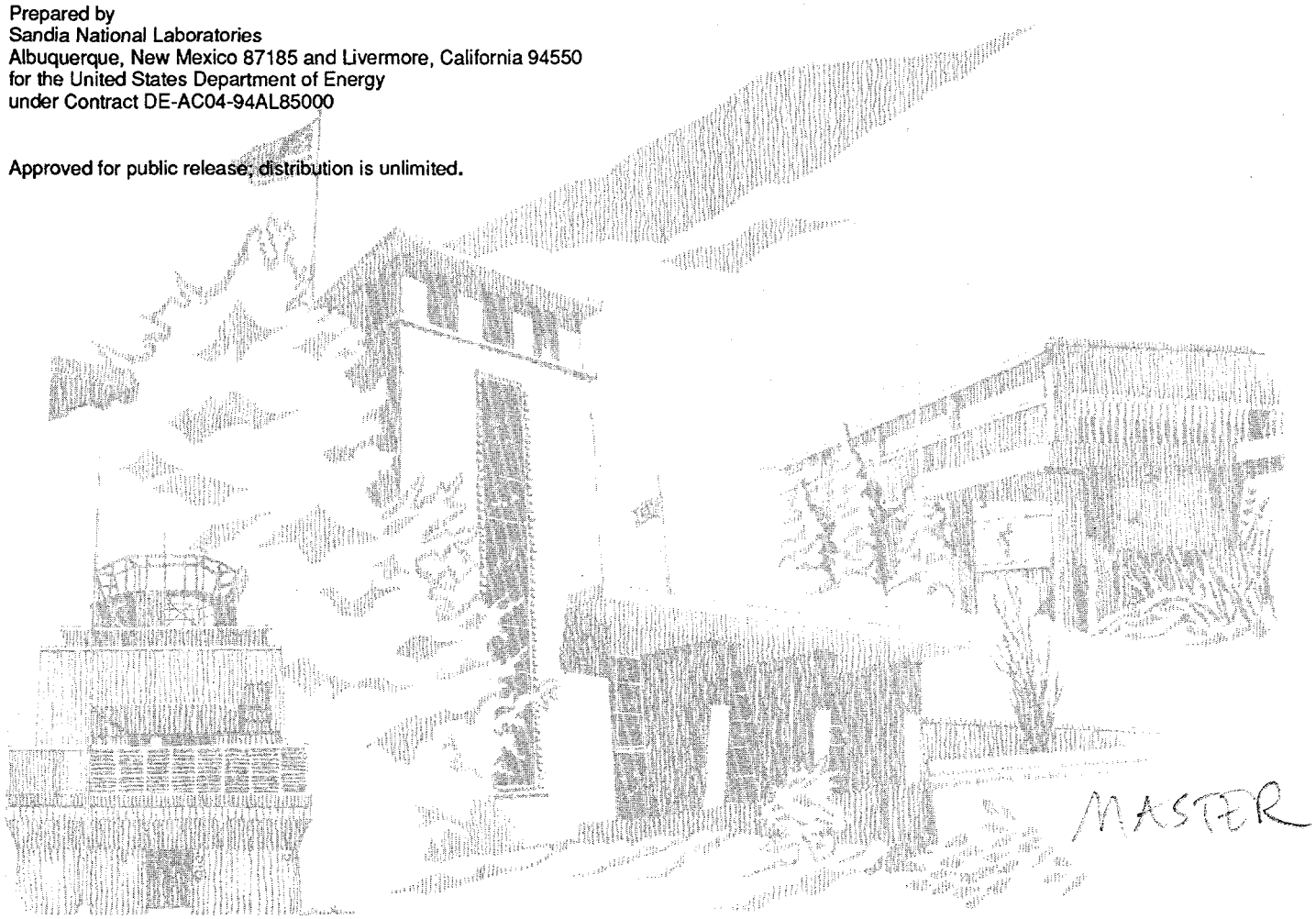

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ABSTRACT

A telephone survey was conducted to evaluate the quality of service provided to the primary customers of the Corporate Ergonomics Group (CEG). One hundred clients who received services between October 1993 and June 1994 were asked questions on their expectations, implementation of ergonomic recommendations, follow-ups, time required, productivity improvements, symptom alleviation, and satisfaction. Suggestions on how processes could be improved were also solicited. In general, recommendations are being implemented, worksite evaluations are going smoothly, and customers are satisfied with the process. The CEG was pleased to learn that half of the people who implemented recommendations experienced improvements in productivity, and four out of five symptomatic customers experienced partial or complete relief. Through analysis of the data and by studying clients' suggestions for process improvement, the CEG has developed a strategy for changing and improving current procedures and practices. These plans can be found in the last section of this report.

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INTRODUCTION

Although ergonomics has been practiced at Sandia National Laboratories for over a decade, it has been a formalized program only since January 1993. A multidisciplinary team of trained professionals that make up the Corporate Ergonomics Group (CEG) perform ergonomics services at both Sandia/New Mexico and Sandia/California. Since no one department handles the entire ergonomics process, the coordination of services is a concern to those responsible for the program. Since there is no corporate policy regarding the enforced implementation of ergonomic recommendations, little is known about how effective the worksite evaluation process is and whether or not ergonomic interventions are actually employed at the worksite. The CEG decided to conduct a follow-up survey to quantify the level of compliance with ergonomic recommendations and evaluate the overall customer satisfaction with services provided by the ergonomics program.

A similar, but much more cursory quality evaluation exercise was conducted in the summer of 1992 as a follow-up to 104 worksite evaluations performed during 1991. A summary of those findings can be found in Appendix A. Overall the results from the 1992 study indicated high compliance with recommendations and high levels of satisfaction with the process. Dissatisfaction resulted primarily from long delays in getting ergonomic task chairs delivered. Other reports of dissatisfaction stemmed from little or no implementation of the ergonomic recommendations.

Another motivation in conducting this survey is to learn which processes are effective and how to change those that need improvement. Because our primary customers are line staff that receive our services, we surveyed these clients to investigate how their needs were being met. We appreciate their frank and informative input, and plan to use this information to modify and improve the procedures used in the ergonomics program.

This current study is considered a follow-on to the 1992 study. The questions used in this study were modeled after those in the previous study so that direct comparisons could be made. The CEG plans that future quality evaluations will generate metrics in a similar manner so that comparisons can be made over the life of the ergonomics program.

ABBREVIATIONS AND ACRONYMS

The following abbreviations and acronyms are used throughout this report:

CEG Corporate Ergonomics Group
CTS Carpal tunnel syndrome
MSD Musculoskeletal Disorder
OAA Office Administrative Assistant
VDT Video display terminal
WSE Worksite evaluation

GOALS and OBJECTIVES

Customers

With respect to customer expectations and requirements, three sets of customers were identified. The first was identified as the program owner, Joe Stiegler, Director, Safety and Health Center 7700. The second set of customers comprises those for whom worksite evaluations (WSEs) or chair fittings are performed, and the third comprises those employees' managers. It was decided that this study concerns only the second group, that is, the people receiving the services directly. Future studies may address the other two sets of customers.

Goal

To develop the questionnaire for the quality evaluation, the goals and objectives of the survey were determined. The goal was defined to be: to determine the extent to which the Corporate Ergonomics Group (CEG) is meeting the requirements and expectations of all its customers and users.

Objectives

Four objectives were identified for the survey: 1) get feedback on processes and implementation of the recommendations made by the CEG members; 2) determine the satisfaction level of the customer; 3) determine if the symptoms are being alleviated by the ergonomics changes; and 4) establish continuous quality metrics for determining the extent to which customer expectations and requirements are being met over the life of the program.

METHOD

Survey Development

To develop the questionnaire, the Corporate Ergonomics Group (CEG) listed its most important metrics. These metrics were implementation, time, customer expectations, symptom alleviation, and work productivity. Questions were written for each of these metrics. A list of possible questions was consulted to generate a sample list of survey questions. The list was evaluated, revised, and presented to the CEG for their comments. These comments were then incorporated into the questionnaire.

A statistician from Statistics and Human Factors Department 12323 was consulted for guidance on several portions of the questionnaire. Guidance was provided on how to write questions so that they corresponded with the 1992 survey, in order to directly compare the results. A random number table was created by the statistician for use in selecting roughly half the client population for survey.

Survey Sample

One hundred customers were randomly chosen from a list of 191 customers who received services since October 1, 1993. Customers receiving services after June 15, 1994, were excluded due to insufficient time for implementation of the recommendations. To ensure representation from all corporate divisions, customers were pre-selected from Divisions 4000 and 11000 due to the low numbers of people from these organizations who received evaluations (3).

Organization	Number of Subjects
1000	6
2000	10
3000	7
4000	2
5000	2
6000	7
7000	42
9000	4
10000	11
11000	1
12000	4
13000	4

To ensure data from all of those CEG members actively performing worksite evaluations (WSEs) were included, customers receiving WSEs from those members who had few customers were also pre-selected (7).

Evaluator	Number of Subjects
A	1
B	13
C	1
D	39
E	12
F	10
G	4
H	20

The remaining 90 subjects were selected using a random number table. Subjects that could not be reached within eight working days were replaced by random selection from the original list of 191.

Data Collection

Subjects were telephoned during standard working hours (8:00 am to 4:30 pm) and read the questionnaire (Appendix B). Responses were recorded on a form that was developed for collecting the data (Appendix C). In addition to the questionnaire and the data sheet, the caller had the subjects' WSE recommendation form for reference (example shown in Appendix D).

Only two of the 100 subjects contacted asked to be called at another time. Subjects who were out of the office were left a message and asked to return the call (most calls were returned). Although most subjects were read the questionnaire as written, some of them spontaneously reported their experiences and the caller rearranged the order of the questions to take advantage of the flow of conversation. The question asking for a percentage of increase in work productivity was dropped after 20 calls because very few subjects could give a quantitative estimate. For those subjects who did not go through the ergonomics coordinator, an N/A was recorded for expectations of the coordinator. These subjects estimated the response time as the time from when an evaluation was suggested to them until the evaluation was made.

For those people who reported that ergonomic recommendations were not implemented, an N/A was recorded for questions relating to work productivity, symptom alleviation, and time to implement recommendations. For those subjects not experiencing symptoms at the outset, an N/A was recorded for the questions relating to symptom alleviation.

The subjects' responses to the questions were kept anonymous by using a numeric code on the data sheets. Only the caller, who was not a member of the CEG, knew the names of the subjects. The identification code on the data sheets was subsequently used to inform the original evaluator of further or remaining ergonomic needs of the subject.

Data Analysis

The data were analyzed and descriptive statistics generated manually. Vertical bar charts and pie charts were computer generated using Microsoft Excel. Results are shown in the following section.

RESULTS

The following tables follow the order of the questions in the survey.

Expectations

Question 1: Why did you call ergonomics? The percentages listed below are based on a total of 147 different replies to this question.

Table 1

Recommended by Someone	20%
Back Problems	16%
Arm Pain / Wrist Pain	16%
Wanted Chairs	14%
Remodeling Office & Receiving New Equipment	3%
Neck Pain	3%
New Hire at Sandia or at a New Site	3%
Eye Strain	2%
Miscellaneous	23%

Question 2.a: What were your expectations of the coordinator handling your initial call? The following percentages are based on a total of 112 responses.

Table 2

Set Up Appointment	24%
None / Not Sure	13%
Help the Person Get a Chair	7%
Act in a Timely Manner / Set Up the Appointment in a Short Period of Time	6%
Do the Evaluation	4%
Miscellaneous	4%
Tell Them What Would Happen	4%
N/A - didn't set it up or set it up through Medical	38%

Question 2.b: How well were these expectations met? The following percentages are based on the responses of 42 people remaining who were neither not sure nor N/A from Table 2.

Table 3

None - 1	**Some - 2**	**Perfectly - 3**
26%	19%	55%

Question 3.a: What were your expectations of the worksite evaluation (WSE) process? The following percentages are based on a total of 142 responses.

Table 4

Evaluate Worksite	35%
Make Recommendations for Improvement to be Implemented by Subject	21%
Tell Subject How to Get a Chair With No Worksite Evaluation	16%
N / A - Someone Else Scheduled WSE for Them	9%
Identify Problems and Correct Them During the WSE	7%
Educate the Person Regarding Ergonomics	4%
Get Rid of Pain	4%
None / Not Sure	4%

Question 3.b: How well were these expectations met? The following percentages are based on a total of 85 responses.

Table 5

None - 1	Some - 2	Perfectly - 3
11%	21%	68%

Implementation

Question 1.a: Ask about each of the recommendations and if each was implemented. This will include adjustments, expenditures, and any changes in work behavior. Use check-off list. The following frequencies are based on a total of 497 responses.

Table 6

	Implemented	Not Implemented	Will Be Implemented	Grand Total
Adjustments	120	33	4	157
Chair	57	13	5	75
Wrist Rest	47	7	2	56
New Equipment	26	16	3	45
Document Holder	23	6	0	29
Behavior Changes	20	3	0	23
Other	9	11	0	20
Phone Rests	13	4	1	18
Glare Screen	13	3	1	17
Foot Rests	12	4	0	16
Change Lighting	6	4	0	10
Large Pens	8	1	0	9
VDT Glasses	1	7	0	8
Exercises/Physical Therapy	2	6	0	8
Inclined Work Surface	3	3	0	6
Total	**360**	**121**	**16**	**497**

Question 1.b: Reasons for Not Implementing Recommendations. The following percentages are based on a total of 120 responses.

Table 7

Subject Did Not/Does Not Have Time	16%
Disagree/Like Current Placement	15%
Haven't Received Recommendations	14%
New Site or Job/Moving	13%
Too Expensive	11%
Rearranged or Adjusted Existing Equipment	10%
Confusion With Ordering	2%
Miscellaneous/No Reason Given	19%

Question 2.a: Was a follow-up done? The following percentages are based on 100 responses.

Table 8

Yes	No
30%	70%

Question 2.b: Would a standard follow-up procedure be of benefit? The following percentages are based on the number of people who answered "No" in the previous question (70).

Table 9

Yes	No
50%	50%

Question 2.c: Was the follow-up a phone call or a visit? The following percentages are based on the number of people who answered "Yes" on Question 2.a (30).

Table 10

Phone Call	Visit
33%	67%

Question 2.d: How satisfied were you with the follow-up? The following percentages are based on the number of people who answered "Yes" on Question 2.a (30).

Table 11

Not Satisfied - 1	Satisfied - 2	Very Satisfied - 3
10%	23%	67%

Work Productivity/Symptoms Alleviated

Question 1.a: Since the implementation of the recommendations, has your work productivity changed? The following percentages are based on a total of 59 responses.

Table 12

Yes	No
49%	51%

Question 1.b: Increased or Decreased? The following percentages are based on the responses of the 29 people who responded positively to the previous question.

Table 13

Increased	Decreased
100%	0%

Question 2. Did the implementation of recommendations relieve the physical symptoms? The following percentages are based on the 47 people who had symptoms and implemented the recommendations.

Table 14

Yes	No
79%	21%

Time

Questions 1.a: After your call, how long did it take to get your worksite evaluation done? The following percentages are based on a total of 81 responses.

Table 15

< 1 week	14%
1 - 2 weeks	43%
3 - 4 weeks	25%
1 - 2 months	14%
> 2 months	4%

Question 1.b: Was that responsive to your needs? The following percentages are based on a total of 81 responses.

Table 16

Yes	No	Somewhat
72%	16%	12%

Question 2.a: How long did it take to complete the implementation of the recommendations? The following percentages are based on a total of 79 responses.

Table 17

1 month	15%
2 months	44%
3 months	22%
4 months	6%
>4 months	13%

Questions 2.b: Was this responsive to your needs? The following percentages are based on a total of 79 responses.

Table 18

Yes	No	Somewhat
44%	28%	28%

Satisfaction

Question 1: How pleased were you with the chair selection and fitting process? The following percentages are based on a total of 62 responses.

Table 19

Not Pleased - 1	Pleased - 2	Very Pleased - 3
19%	33%	48%

Question 2: How smoothly did the worksite evaluation go? The following percentages are based on a total of 100 responses.

Table 20

Not At All Smoothly - 1	(Fairly) Smooth - 2	Very Smooth - 3
3%	34%	63%

Question 3: How was the process overall? The following percentages are based on a total of 100 responses.

Table 21

Poor - 1 (Not Satisfied)	Good - 2 (Satisfied)	Very Good - 3 (Very Satisfied)
8%	47%	45%

Suggestions and Comments

Question 1. What suggestions or comments do you have on ways to improve the ergonomics process?

A total of 152 comments were offered. Grouped into categories of similar sentiments, the breakdown by frequency is as follows:

28	Time factors in process are too long
15	Ergonomics needs more publicity
10	People in the process need more communication
11	A follow-up would have been helpful
9	Have all chairs and equipment in one room
9	Need more information on what to order
9	Very pleased
7	Process is burdensome
6	Ordering recommended equipment was confusing
6	Need a pamphlet on proper techniques
5	Want freer choice of chairs--don't push cheaper models
5	Need more guidance in chair fitting
5	Increase services to lab employees
4	The process is a waste of time and money
4	Smooth process
3	Too many people involved in the process
2	Need more explanation of recommendations
2	Have more equipment available
2	Behavioral recommendations hard to learn
2	Wanted something different from what CEG provided
2	Coordinator scheduling is difficult

The remaining suggestions and comments had frequencies of one (only heard once) and can be found in Appendix E.

Question 2. Is there anything that would have made this process easier for you?
A total of 39 comments were offered. Grouped into categories of similar sentiments, the breakdown by frequency is as follows:

13	Communication between people involved needs improvement
8	Time involved in process was excessive
7	Paperwork associated with ordering was difficult, inconvenient
2	The ergonomics program should provide funding for recommendations

The remaining suggestions and comments had frequencies of one (only heard once) and can be found in Appendix E.

Question 3. Are there any further ergonomic needs that you would like to have brought to the attention of the CEG member who performed your worksite evaluation?

Thirteen subjects responded positively to this question. Their needs were communicated to the respective CEG members. Most of the needs were follow-up issues.

DISCUSSION and CONCLUSIONS

Survey Process

Although approximately 60 hours were spent collecting the data on the telephone, the survey process was fairly efficient and went smoothly. The most difficulty was found reaching people, but once they were contacted, the interview process took 5-10 minutes. Anonymity of the responses led to frank discussions of the quality of the worksite evaluation (WSE) performance and overall satisfaction levels. Future iterations of this evaluation would benefit from a closer examination and redesign of the question on percentage of change in work productivity. The lack of knowledge of the ergonomics program on the part of the caller had both benefits and drawbacks. The main benefit was that the caller could record unbiased interpretations of the answers given by the subjects. The main drawback was that not having detailed knowledge of the ergonomics processes prohibited an informed discussion of suggestions for improvement

Expectations

The customers' reasons for calling for a WSE were mixed. Over one third of the reasons (37%) dealt with physical symptoms, the large majority of which were back (44%) and upper extremity (42%) problems (see Figure 1). This compares to 57% and 29% respectively for the 1992 study, indicating that backs are still number one, but upper extremity disorders are gaining in proportion. Subjects by and large did not know what to expect when they called the Ergonomics Coordinator, indicating that the Ergonomics Program could benefit from some increased exposure and advertising on who to call and what to expect. Expectations for the WSE were more firm; 68% of the callers who had expectations about the WSE process had their expectations perfectly met. This indicates that the Coordinator is doing a good job of explaining to the caller what will happen regarding a WSE.

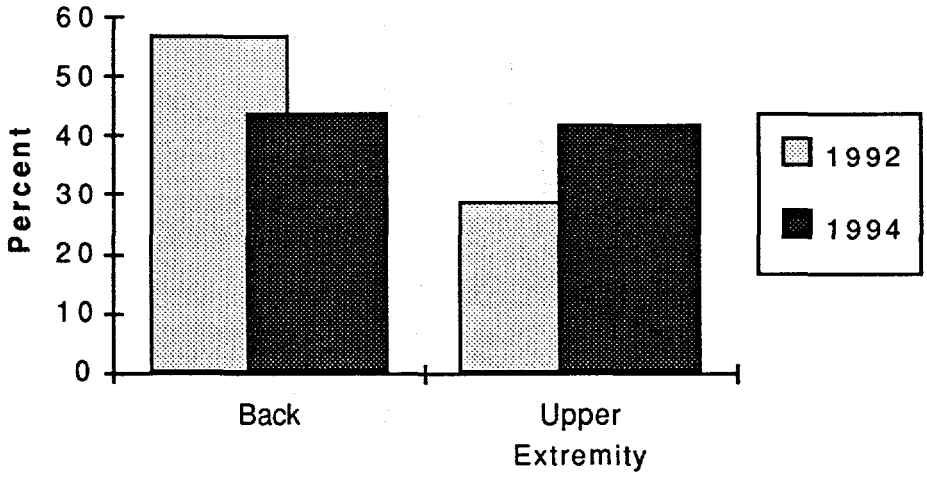

Figure 1. Location of Symptoms

Implementation

Over three quarters (76%) of the ergonomic recommendations either were implemented or are planned to be implemented (see Figure 2). Although this is a good percentage, there is room for

improvement. In the 1992 study, 27 of the 29 recommendations (93%) were implemented at least partially at the time of the survey. The current subjects averaged about 5 recommendations each, for a total of 497. The most prevalent ergonomic recommendation was to make adjustments to the existing equipment (32%), followed by purchase an ergonomic task chair (15%), and purchase a wrist rest (11%).

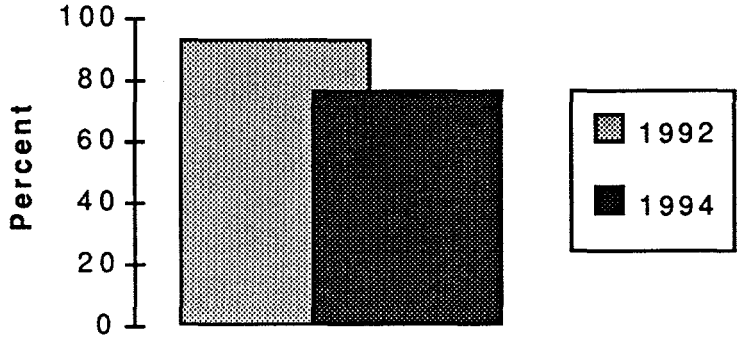

Figure 2. Percent of Recommendations Implemented

The top reasons for not following the recommendations were that the customers did not have the time (16%), they disagreed with the recommendation (15%), they were about to move locations (13%), and implementation was too expensive (11%). The Corporate Ergonomics Group (CEG) expected to find that the last reason would be most prevalent. Learning that clients did not implement ergonomic recommendations because they were too busy, or that they disagreed with the analysis is cause for concern. This finding suggests to the authors that awareness training is needed for both management and staff. The rationale for the recommendations and the importance of preventing musculoskeletal disorders (MSDs) must be communicated to Laboratory staff and management. An alternative interpretation would be that Laboratory personnel have an elitist attitude toward receiving recommendations from the CEG worksite evaluators. The large percentage moving or preparing to move is validated by the CEG representative from a Facilities organization who claims that during the survey period nearly 25% of the Sandia population moves office locations each year!

A couple of subjects claimed that they had not received a copy of the recommendations, accounting for 17 (14%) of the reasons for not implementing. However, the Coordinator has on file a copy of the list of recommendations, making these claims suspect. If they truly did not receive the memos, mail room or administrative problems may account for it.

Because there is no formal procedure in place for following-up a WSE, only 30% of the subjects experienced a follow-up. Most of these (two-thirds) were follow-up visits to the worksite rather than phone calls. Of the 30 people receiving follow-ups, 27 were either very satisfied (20) or satisfied (7) with the process. Those who did not receive a follow-up were split 50/50 on

whether a follow-up would be of benefit to them. We interpret these findings to suggest that the overwhelming positive response to follow-ups may be due to the positive psychological effect of having someone demonstrate concern for their well-being. Those not receiving follow-ups saw little need for another visit because either the recommendations were not yet implemented or all recommendations were implemented and there was no perception that a second visit would be beneficial.

Work Productivity and Symptom Alleviation

The 59 subjects who had implemented all or most of the recommendations were split down the middle regarding a change in work productivity (49% vs. 51%). Those who claimed no change in productivity admitted that they now work with less pain or discomfort. All (100%) of 29 subjects who said productivity had changed said it had increased. Estimates on amount of increase were vague, but the author interprets the responses to be on the 5% to 10% level. These results are consistent with data from the insurance industry, and encouraging for the ergonomics program. If a 5% increase in productivity can be attained for 50% of Laboratory personnel receiving ergonomics help, over $2,125,000 can be recovered by the ergonomics program in increased output alone (not counting medical costs savings).

Four out of five (79%) of the subjects who had symptoms and implemented the recommendations claimed they had relief from the physical symptoms. These data are also very encouraging. The primary purpose of the ergonomics program is to prevent MSDs associated with work. These data suggest that the program is effective. Data on medical costs associated with MSDs are difficult to obtain or estimate. However, a study was performed in 1992 to estimate medical costs associated with carpal tunnel syndrome (CTS) surgeries for Sandians. The study concluded that the average cost of a bilateral CTS case (medical plus lost-time) was about $13,000 (Yeh, 1992). SNL experienced 18 CTS cases in 1993 and 15 in 1994. Estimating an average of 16 CTS cases per year, and an 80% effectiveness factor, Sandia could save $166,000 per year if each of the affected employees took advantage of the WSE process. If loss of productivity were accounted for, the estimated savings could increase by a factor of 3 or 4.

Time

Most people calling the Ergonomics Coordinator felt that the one to four weeks it took for a WSE to be performed was responsive to their needs (72%). Those reporting dissatisfaction (16%) were mostly clients with symptoms who had to wait one to two weeks, despite being put high on the priority list. Most recommendations were implemented within two months of the WSE, however some chair orders and other deliveries took six weeks, creating only a 44% satisfaction level with the responsiveness. Another 28% thought the timing was somewhat responsive, but a full 28% were not happy with the time it took to get things done. It should be pointed out that the CEG worksite evaluators do not implement recommendations; that is left to the client. Many of these dissatisfactions stem from the client or the client's Office Administrative Assistant (OAA) not knowing how to order equipment or accessories. Others stem from clients comparing product delivery time with Just-in-Time orders that can be filled within a week.

Satisfaction

Subjects were generally happy with the chair fitting and selection process (81% pleased or very pleased). Those that were not pleased had to wait for an appointment, had to go several places to try out different chairs, or were upset about the need to have a WSE to get a chair. Ninety-seven of the 100 subjects thought the WSE went smoothly or very smoothly. The remaining three are probably the same three who did not really want a WSE to take place (they just wanted a new chair). Ninety-two were either satisfied or very satisfied with the overall process. This is commendable performance, considering the WSE process was just recently refined and that 8 CEG members from 7 different departments are conducting the work.

Comparisons with Previous Quality Study

In comparison with the 1992 study reporting 1991 data, more adjustments are being recommended (32%) vs. 20% in 1991, fewer new chairs are being recommended (15% in 1994 vs. 22% in 1991), fewer foot rests are being recommended (3% vs. 11%), and fewer glare screens are being recommended (2% vs. 11%). The percentage of recommendations for wrist rests is identical at 11% for both studies. Some changes within the Sandia and Ergonomics program cultures may explain these differences. With the introduction of the Steelcase Criterion chair as the standard office chair, there is less need for recommending an ergonomic task chair. Also, adjustments to existing workstations and systems furniture work surfaces are being implemented via Facilities Express Department 7911. These adjustments (mostly downward) obviate the need for foot rests. Video display terminal (VDT) monitor glare is currently being handled predominantly by eliminating the source of the glare or repositioning the monitor, obviating the need for glare screens.

In comparison with the 1992 study (see Figure 3), where 87% of the 30 people called were satisfied or very satisfied with the overall process, 92% of the 100 subjects called in 1994 were satisfied or very satisfied. Whereas 70% of the subjects from the 1992 study experienced some relief from their physical symptoms, 79% experienced relief in the 1994 study. Although the percentage of symptoms due to back pain in the two surveys has dropped (65% in 1992 vs. 24% in 1994), the percentage of hand, wrist, and arm symptoms remained virtually identical (23%).

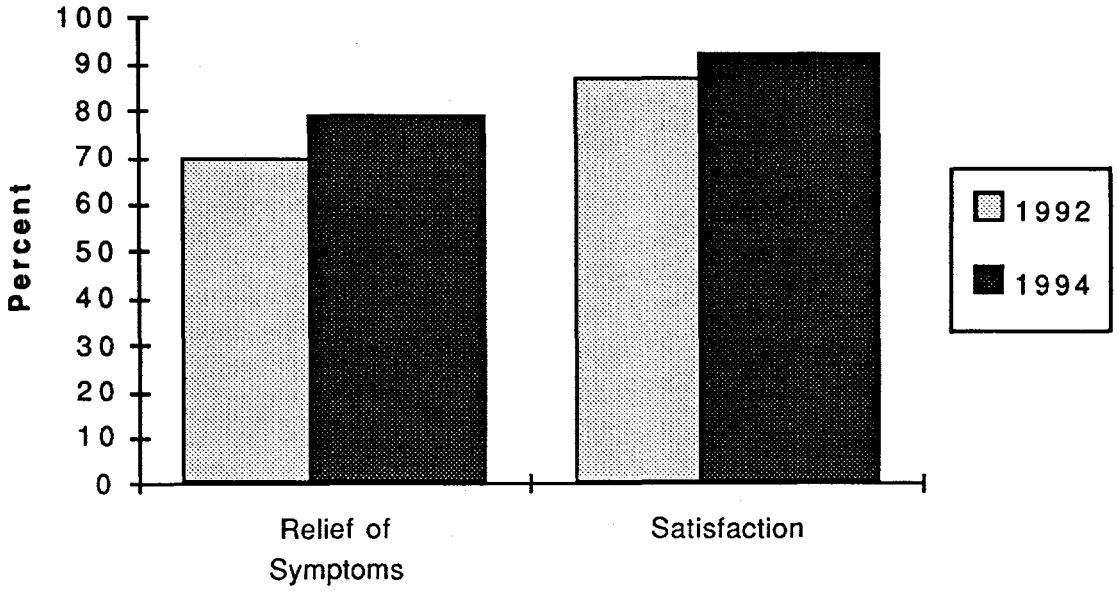

Figure 3. Comparison of 1992 and 1994 Results

Reference

Yeh, Eric M. H., Upper Extremity Injuries, Sandia National Laboratories, July 19, 1993. Unpublished

PROGRAM CHANGES BASED ON SURVEY RESULTS

The Corporate Ergonomics Group (CEG) has reviewed the 1994 study results and has discussed potential programmatic changes at three different CEG meetings. The consensus of the CEG was to make the following changes within the next fiscal year:

1. Ownership of the chair selection and procurement process will be transferred from the CEG to a corporate-level function, probably operated through one of the Facilities organizations (7800 or 7900). Dwight Miller, the Ergonomics Project Manager has worked on the Furniture Process Reengineering Team to promote the transfer of ownership.

2. Several plans have been developed to enhance publicity for the CEG and its services:

a) A sub-team of the CEG has been given responsibility for publicity and training. This group will develop a comprehensive publicity campaign and schedule.

b) A brochure on video display terminal (VDT) ergonomics has been borrowed from Lawrence Berkeley Laboratory for adaptation and publication at Sandia. In addition to ergonomics advice for computer users, the brochure advises the reader of other services and lists who to call.

c) A *Lab News* article will be negotiated with the *Lab News* staff for publication in FY95.

d) Several notices will be placed in the Sandia Labs Weekly Bulletin announcing/reminding employees about the services the CEG provides.

e) Department briefings on Office Ergonomics, designed for presentation at Safety and Security meetings includes a section on CEG services and contacts.

f) The Ergonomics Colloquium series, started in March 1994 will continue with nationally known speakers on topics of interest.

g) A decision was made to participate in Sandia Day in October of 1994. A display was set up with ergonomic workstations, chairs, and a videotape. Magigrip jar openers were handed out with the CEG logo and the ergonomics coordinators' phone numbers.

h) Jim Henderson of 3000 will be contacted to explore the possibility of getting some ergonomics awareness training into new-hire orientation. The new-hire secretaries already receive ergonomics training--why shouldn't staff members?

4. The Ergonomics Coordinator will use a prioritization procedure to perform triage on callers. Factors such as number of hours per day on high-risk machines and current symptoms will help determine which callers get immediate service and which can wait a week or two. The integration subteam will develop the procedure as one of its high-priority tasks for FY95.

5. Additional clerical staff and/or reorganization of work in the Occupational Medicine Center will improve the speed at which worksite evaluation (WSE) recommendation memos get typed and published.

6. To improve the chair-fitting process while still under ownership of the CEG, a general rule will be employed to have the same person who has performed the WSE perform the chair fitting. This will speed up the process and amplify the consideration of work and work environment in chair selection.

7. So that inappropriate expectations are not generated, a CEG member performing a WSE will let the client know that the recommendations will take between a week and 10 days to publish. The CEG member will then strive to get them published in 3-4 working days, delivering higher than expected performance for most customers.

8. When large groups need WSEs, a surveillance procedure will be used to prioritize the scheduling based on relative risk. This procedure should eliminate long delays for people needing urgent ergonomics services. The remaining lower priority worksites should receive attention only after the clients themselves have phoned in for ergonomics help. This approach is consistent with getting the workers actively involved and avoiding the stigma of trying to help someone who does not think they need it.

9. Eventually (in FY95 or FY96) a represented employee will be added to the CEG. This will help with buy-in for ergonomic solutions when suggested to line organizations.

10. To improve communication and set up realistic expectations with its customers, the Ergonomics Coordinator will send out a notice to future clients and their managers announcing an upcoming WSE. The notice explains how long a WSE usually takes, what will happen, who pays for it, and approximate costs.

11. To simplify equipment ordering, CEG members will specify model numbers and sources when recommending equipment for clients. A catalog for ergonomics accessories will be developed. It may be part of the Office Furniture Catalog.

12. The Ergonomics Coordinator will have a procedure by which she can differentiate standard WSEs, WSEs for large groups, and special projects. This will help categorize the needs and apply appropriate response modes to the problems.

13. Office WSEs will no longer be required to obtain an ergonomic task chair.

Appendix A
Quality Evaluation Study Results—1992

The following statistics summarize the results of 104 worksite evaluations performed during 1991.

There were 85 evaluations performed for persons with symptoms. Table 1 summarizes the most frequent complaints or symptoms (some persons had multiple symptoms, therefore the occurrences total to more than 85).

TABLE 1. MOST FREQUENT SYMPTOMS

SYMPTOM	NUMBER OF OCCURRENCES
BACK PAIN	55
HAND/WRIST PAIN	20
NECK PAIN	10
SHOULDER PAIN	8
EYE STRAIN	4

Table 2 summarizes the types of work or tasks that were evaluated for personnel with symptoms (some persons had more than one task, therefore the occurrences total to more than 85).

TABLE 2. TASKS ASSOCIATED WITH SYMPTOMATIC PERSONNEL

TASK	NUMBER OF OCCURRENCES
SITTING/VDT	78
ARM/HAND	8
PUSH/PULL	7
LIFTING	4
REPETITIVE MOTION	4
PINCH GRIP	3

Table 3 summarizes the most frequent recommendations to correct ergonomic deficiencies.

TABLE 3. RECOMMENDATIONS TO CORRECT ERGONOMIC DEFICIENCIES

RECOMMENDATIONS	NUMBER OF OCCURRENCES
BUY ERGONOMIC CHAIR	60
ADJUST WORKSTATION OR CHAIR	56
NEW WORKSTATION	22
FOOTREST	31
WRIST SUPPORT	31
GLARE SCREEN	30
MODIFY EQUIPMENT	16
MODIFY PROCEDURES	12
KEYBOARD SHELF	7
EQUIPMENT MAINTENANCE	5
LIFTING TRAINING	4
REDESIGN HAND TOOLS	1
TASK GLASSES	1

In addition to these recommendations to correct ergonomic deficiencies, there were recommendations that were related to medical treatment and therefore were not listed, e.g. writ splints and physical capacity assessment for determination of work restrictions.

Appendix B
Quality Evaluation Study Instrument—1994

Introduction:

My name is Lori Longbotham. I am a summer student working in Safety Engineering. I am calling to do a follow-up on an ergonomic worksite evaluation performed by _____ on _____. It will take approximately 5 min. Am I calling at a good time?
(If not a good time: May I call you back? When would be a good time to call?)
(If they do not want a call back at all: This information is important to the Corporate Ergonomics Group. PURPOSE.)
The purpose of this follow-up is to find out how well the process worked for you, what was done after the worksite evaluation, and what suggestions you might have for improvement.

Expectations -

1. Why did you call ergonomics? (verify the reason for call)

2. What were your expectations of the coordinator handling you initial call?
   How well were these expectations met?

None	Some	Perfectly
1	2	3

3. What were you expectations of the worksite evaluation process?
   How well were these expectations met?

None	Some	Perfectly
1	2	3

Implementation -

1. Ask about each of the recommendations and if each was implemented. This will include adjustments, expenditures, and any changes in work behavior. Use check- off list.

2. Was a follow-up done?
   If no: Would a standard follow-up procedure be of benefit?
   If yes: Phone or Visit? How satisfied were you with the follow-up?

Not Satisfied	Satisfied	Very Satisfied
1	2	3

Work Productivity/Symptoms Alleviated

1. Since the implementation of the recommendations, has your work productivity changed? Increased or decreased? Approximately how much? (Need answer in a percentage.)
   Suggestions for deciding whether it has changed: Are you able to type/sit/etc. for longer periods of time? Are you at work more time each month? Do you notice the discomfort you were experiencing earlier?

2. Did the implementation of recommendations relieve the physical symptoms?

Time -

1. After your call, how long did it take to get your worksite evaluation done? Was that responsive to your needs?
   YES _____ NO _____ SOMEWHAT _____

2. How long did it take to complete the implementation of the recommendations? Was this responsive to your needs?
   YES _____ NO _____ SOMEWHAT _____

3. How pleased were you with the chair selection and fitting process?

Not Pleased	Pleased	Very Pleased
1	2	3

Satisfaction -

1. How smoothly did the worksite evaluation go?

Not At All Smoothly	(Fairly) Smooth	Very Smooth
1	2	3

2. How was the process overall?

Poor	Good	Very Good
1	2	3
(Not Satisfied)	(Satisfied)	(Very Satisfied)

Suggestions/Comments -

1. What suggestions or comments do you have on ways to improve the ergonomics process?

2. Is there anything that would have made this process easier for you?

3. Are there any further ergonomic needs that you would like to have brought to the attention of the CEG member that performed your worksite evaluation? I will pass this information along to _____.

Appendix C
Data Collection Sheet

Record # _____

DATA SHEET

Expectations

1. _____
   _____
   _____

2. _____
   _____
   _____

None Some Perfectly
1 2 3

3. _____
   _____
   _____

None Some Perfectly
1 2 3

Implementation

1.

#	YES	NO	COMMENTS
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

2. YES _____ NO _____
   Comments _____
   PHONE _____ VISIT _____

Not Satisfied 1 | Satisfied 2 | Very Satisfied 3

Work Productivity/Symptoms Alleviated

1. YES _____ NO _____ N/A _____
   Increase _____ Decrease _____ Percent _____

2. YES _____ NO _____ N/A _____
   Comments _____

Time

1. Time _____
   YES _____ NO _____ SOMEWHAT _____
   Comments _____

2. Time _____
   YES _____ NO _____ SOMEWHAT _____
   Comments _____

3. N/A _____

Not Pleased	Pleased	Very Pleased
1	2	3

Satisfaction

1.

Not At All Smoothly	(Fairly) Smooth	Very Smooth
1	2	3

2.

Poor	Good	Very Good
1	2	3
(Not Satisfied)	(Satisfied)	(Very Satisfied)

Suggestions/Comments

1. _____
   _____
   _____
   _____

2. _____
   _____
   _____
   _____

3. Forward to the Evaluator: _____
   _____
   _____
   _____

Appendix D
Work Site Evaluation Recommendation Form

Sandia National Laboratories

Albuquerque, New Mexico 87185-1045

date: February 13, 1995

to: [redacted]

from: Dwight Miller, 7733, MS1045

subject: Ergonomic Worksite Evaluation for [redacted] WSE # [redacted]

As you know, an ergonomic worksite evaluation was recently performed for a member of your organization.

Employee Name: [redacted]
Worksite evaluation performed by: **Dwight Miller, 7733**
Triggered by: **Employee request**
Date evaluation performed: **February 8, 1995**

Recommendations	Approx. Cost	Manager's Response
1. Call David O'Brien of 7911 (4-0541) to discuss modification of the station to better accommodate your needs	$?	☐ I will implement the recommendations I can't comply. Here's why.
2. Install LifeGuard software to prevent long uninterupted sessions on the computer	site license done	
3. Order biwing-style keyboard support so that mouse or trackball is at same level as kybd. Install via CSR--org.7911	$150	
4. Consider using a trackball--see attached lit.	$85	
5. Readjust chair-back and armrests out of adjustment	$0 done	

Please note that the column on the right is for you to fill out. Once you have done this, please sign this form, make yourself a copy, and send the original back to Maggie Ferguson in 7733/MS 1045. Please do this within 30 days.

If you have any questions, please call me at 845-9803. Thank you!

Manager's Signature: _____ **Org:** _____ **Date:** _____

Copy to:
MS 1045 Maggie Ferguson 7733
MS 1045 Dwight Miller 7733
[redacted] [redacted]

Appendix E
Additional Customer Suggestions and Comments

The following comments were received in response to open-ended questions on the customer survey. Each response was received only once. Responses that were received from more than one survey participant are summarized in the Results section of the report.

Question 1. What suggestion or comments do you have on ways to improve the ergonomics process?

- Don't make such a big deal about symptomatic cases because if it's called incident, less people will want it done
- Funding for the organization to use to implement the recommendations
- Maybe train the evaluators more before they begin evaluating on their own; make sure they are confident and know what they are doing
- More contact with the acting physician at Medical
- Never got a copy of the recommendations
- The instrument used to check angles is annoying
- Useful only for people reconfiguring space
- Require WSE for all employees, especially new hires

Question 2.

- It made him uncomfortable having the evaluator sitting right next to him, looking over his shoulder
- The evaluation addressed only certain aspects of her job, not her job as a whole
- Ordering process was confusing
- Not having to go through WSE to get a chair
- Never got fit for a chair, just told what to order
- Didn't know how to adjust chair and it resulted in severe hip pain
- Not useful because there is still not enough room in the office
- Things are too expensive and that inhibits people
- Having a closer place to do a chair fitting
- A chance to sit in the chair they want to order for longer than a minute or two
- Not having to go through two chair fittings
- Fewer interruptions in getting the WSE done and the worksite set up
- Had to intervene to get the recommendations sent to her and to get appointments set up

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