

Testimony of

Stephen E. Fienberg

**Maurice Falk University Professor of Statistics and Social Science
Department of Statistics
Center for Automated Learning and Discovery
Center for Computer and Communications Security
Carnegie Mellon University**

and

**Chair
Committee to Review the Scientific Evidence on the Polygraph
National Research Council
The National Academies**

Before the

**Subcommittee on Energy
Committee on Energy and Natural Resources
U.S. Senate**

September 4, 2003

Mr. Chairman, and Senators. I am pleased to appear before you this morning. I am Maurice Falk University Professor of Statistics and Social Science, in the Department of Statistics, the Center for Automated Learning and Discovery, and the Center for Computer and Communications Security, all at Carnegie Mellon University. I also served as the Chair of the National Research Council's Committee to Review the Scientific Evidence on the Polygraph. Accompanying me today is Dr. Paul Stern, who served as the Study Director for the committee. The committee's report, *The Polygraph and Lie Detection*, which was released last October reviewed the scientific evidence underlying the use polygraphs for security screening of employees at the national laboratories. It also considered the potential alternatives to polygraph testing for the detection of deception. My testimony today is based on that report and its implications for the Department of Energy's policy on polygraph screening..

My draft proposed testimony was prepared before I was aware of the testimony of Deputy Secretary McSllarrow,. But he had the courtesy to alert me to the changes he planned to propose this morning and thus I will attempt to react to this shift in policy.

When one devotes the better part of two years to an enterprise, such as my colleagues in the NRC committee did to the preparation of our report on the polygraph, having the import of ones work distorted or ignored, as appeared to be the case when the Department of Energy issued its proposed regulations in April, is disheartening at best. Thus I am especially gratified by the remarks of Deputy Secretary McSllarrow this morning, since they not only represent a shift in thinking at the Department of Energy but one that appears to be strongly influenced by parts of our report.

The NAS-NRC Committee Report

The committee's report begins by setting the current debate over the efficacy of polygraph testing in the context of the mystique that surrounds it—this includes a culturally shared belief that the polygraph is nearly infallible. As we note in the report, the scientific evidence strongly contradicts this belief.

Let me now briefly summarize the committee's principal conclusions:

1. The scientific evidence supporting the accuracy of the polygraph to detect deception is intrinsically susceptible to producing erroneous results.
2. In populations of naïve examinees untrained in countermeasures, specific incident polygraph tests can discriminate lying from truth telling at rates well above chance, though well below perfection. But the accuracy of the polygraph in screening situations is almost certainly lower.
3. Basic science gives reason for concern that polygraph test accuracy can be degraded by countermeasures.

4. The scientific foundations of polygraph screening for national security are weak at best and are insufficient to justify reliance on its use in employee security screening in federal agencies.

5. Some potential alternatives to the polygraph show promise, but none has been shown to outperform the polygraph and none is likely to replace it in the short term.

I have appended the Executive Summary of the report to this testimony as it contains the specific wording of these conclusions and details explaining how the committee reached them.

The DOE Proposed Regulations from April, 2003

In April of this year, the Department of Energy released new draft regulations on its program of polygraph testing of eight classes of federal employees and contractors who have access to classified information. The new regulations would continue a policy that was set in place in 2000 but suspended in 2001, pending the report of the NAS-NRC committee. Thus it might be natural to ask what in the report is of direct relevance to the proposed regulations.

Let me return to the specific wording of the committee's recommendation on the matter of security screening:

Polygraph testing yields an unacceptable choice for DOE employee security screening between too many loyal employees falsely judged deceptive and too many major security threats left undetected. Its accuracy in distinguishing actual or potential security violators from innocent test takers is insufficient to justify reliance on its use in employee security screening in federal agencies.

How did DOE square these conclusions with its plan to continue the polygraph policy unchanged? It said that the polygraph, though "far from perfect, will help identify some individuals who should not be given access to classified data, materials, or information." This may be true, but two other things about polygraph screening are also true that should have given DOE pause.

First, for every such individual identified, hundreds of loyal employees will be misidentified as possible security threats. Our report make clear that, given DOE's own expected rates of security violations, someone who "fails" the DOE polygraph screening test has over a 95 percent chance of actually being a truthful person. Unfortunately, the DOE doesn't have any other scientific tool to fall back on to distinguish the security violators from the innocent people falsely accused.

Second, any spy or terrorist who takes the DOE's polygraph test is far more likely to "pass" the test than to "fail" it—even without doing anything to try to "beat" the test. Efforts at so-called countermeasures are likely to increase further the chances that a

committed spy or terrorist will “beat” the test. This is the most serious problem with polygraph screening, especially in these times of terrorist threat: the possibility that security officials will take a “passed” polygraph too seriously, and relax their vigilance.

The original DOE regulations give every indication that the agency has just this sort of overconfidence in polygraph tests that give “passing” results. The proposed regulations say, “DOE’s priority should be on deterrence and detection of potential security risks with a secondary priority of mitigating the consequences of false positives and false negatives.” The committee found little scientific evidence to support the effectiveness of the polygraph in this regard. Moreover, it concluded that the consequences of false negative tests—tests that deceivers “pass”—should have top priority, because it is those test results that leave the nation open to the most serious threat, from people whose continued access to sensitive information is justified because they “passed the polygraph.”

By continuing to rely on polygraph screening just as before, the DOE in its original response to our report was doing more for the *appearance* of security than for the reality. Fortunately, the new proposals rely less on the polygraph than before and thus have moved towards a position that could be viewed as consonant with the conclusions in our report. Let me highlight some of these changes.

The New DOE Position

While I have had only a limited amount of time to assess the changes signaled by Deputy Secretary McSlarrow’s testimony there are at least six key features that are worth highlighting as they relate to issues addressed in our report.

1. DOE proposes to do fewer tests, both by restricting the mandatory periodic testing to restricted groups of employees with access to top secret material, as well as subjecting other groups of employees to only random testing. The movement away from mandatory periodic testing of very large numbers of employees is to be applauded. Just what the number of tests expected to be carried out annually is unclear, but as many as half of the employees previously subject to polygraph testing at the national labs would still appear to be subject to the possibility of polygraph testing. Moreover, whatever the numbers would be under the new proposals, there will still be large numbers of false positives and a large potential for false negatives, and the department has only partially addressed how it will deal with the attendant problems these pose.
2. DOE proposes to do less with the results of polygraph tests. In the first instance this is focused on those who “fail” their tests and is an effort to address the false positive problem. Deputy McSlarrow’s testimony suggests that “failed” tests be treated as more akin to anonymous tips than definitive evidence of deception. I like that analogy, although it remains to be determined just how this position can be squared with the notion of a full bore investigation suggested by Mr.

McSlarrow in response to a question a few minutes ago. The plan goes further and says that no adverse decision on access will be based solely on the results of the polygraph. But there remains the problem that there is no scientifically based backup test to administer when someone “fails” the polygraph screening examination—administering another polygraph examination will simply not do! In the second component of doing less with results, DOE proposes to rely less on polygraphs for accelerated clearance. This in part addresses the false negative problem.

3. In proposing a random screening program for a subset of employees, the DOE is relying on the deterrent effort some believe the polygraph to have. I need to remind this subcommittee that there is no scientific evidence to back up this belief, especially as it relates to spies or potential spies. There are two features of this program that require attention. First, the number of those actually subjected to polygraph tests need not necessarily be large—I personally would argue for relatively small proportion of those included in the program so that it does not take on the appearance of mandatory screening in disguise. Second, the department still needs to think through what to do with the results because they too will include both false positives and false negatives.
4. The Deputy Secretary’s testimony makes reference to the utility of counterintelligence scope polygraph screening programs employed by federal agencies in terms of admissions made. Our committee heard repeated reference to such anecdotes but found little systematic evidence to evaluate them. It is important to note that such admissions rely heavy on the polygraph as an interrogation tool and not as a device that accurately detects deception. As such the polygraph may be no better a prop than other less costly devices. Our report refers to this as the “bogus pipeline,” a term that comes from the social science literature which has repeatedly demonstrated the value of such props in other settings.
5. The Deputy Secretary seconds the call for research in our report although he has stressed the need for more work to put polygraph testing on a firmer scientific foundation. We already know much about the polygraph, enough so to give us great pause regarding its use in screening. In particular, we do not expect that replacing a flawed physiological measuring device by a more accurate one will make the use of the polygraph acceptable for screening. Rather the scientific consensus appears to be that the psychophysiological systems on which the polygraph relies may never be up to the task of screening for deception. Thus our report emphasizes that a research program should focus less on trying to make the polygraph better and more on alternatives than might not have the inherent scientific shortcomings of the polygraph. But I hasten to add that while our committee concluded that some potential alternatives to polygraphs show promise, none has led to scientific breakthroughs in lie detection. We cannot look for a short-term quick technological fix to aid us in our quest for securing the nation and its secrets.

6. Finally the comments of Deputy Secretary McSlarrow signal the need to begin to change the culture surrounding security at the national weapons labs. We could not agree more. The DOE labs need a strong security program, not a false sense of security. There are better alternatives than maintaining and relying almost exclusively on the polygraph. Last year, the DOE's *Commission on Science and Security* recommended management and technological changes at the labs that could make unauthorized release of national secrets more difficult to conduct and easier to detect without relying on the polygraph or other methods of employee screening—all of which are seriously limited and have little or no scientific base.

There may still be a place for polygraph testing in the DOE labs, for investigations of specific incidents and for a small number of individuals with access to the most highly sensitive classified information, if the test's limited accuracy is fully acknowledged. DOE, in announcing its new plans, does propose to limit the number of polygraphs, but I found the proposed numbers remarkably high. Until DOE is able to further curtail its reliance on the polygraph, the broad use of this flawed test for screening will probably do more harm than good. National security is too important to be left to such a blunt instrument.

Conclusion

Let me conclude by reminding you that polygraph testing now rests on weak scientific underpinnings despite nearly a century of study. And much of the available evidence for judging its validity lacks scientific rigor. Our committee sifted the existing evidence and our report made clear the polygraph's serious limitations in employee security screening. Searching for security risks using the polygraph is not simply like search for a needle in a haystack. It is true that, of the large groups of people being checked, only a tiny percentage of individuals examined are guilty of the targeted offenses. Unfortunately tests that are sensitive enough to spot most violators will also mistakenly mark large numbers of innocent test takers as guilty. Further, tests that produce few of these types of errors, such as those currently used by the DOE, will not catch most major security violators—and still will incorrectly flag truthful people as deceptive. Thus the haystack analogy fails to recognize the unacceptable trade-off posed by these two types of errors.

Our committee concluded that the government agencies could not justify their reliance on the polygraph for security screening. The original proposed DOE regulations issued in April appeared to disregard our findings and conclusions. Today's testimony by Deputy Secretary McSlarrow signals a change in direction that I applaud. The new proposals seem more consistent with the scientific evidence documented in our report. My hope is that, as these proposals get refined and developed in the form of new regulations, the DOE continues along the path of reducing its reliance on the polygraph and developing a scientifically justifiable security program. As a nation, we should not

allow ourselves to continue to be blinded by the aura of the polygraph. We can and should do better.

The National Research Council stands ready to assist the department, both in the short term as the regulations are developed, and in the longer term when the careful evaluation of their impact needs to be carried out.

I would be happy to answer your questions and amplify on these comments.