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Polygraph Use by the Department of Energy: Issues for Congress

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Summary

In the aftermath of the Wen Ho Lee case and the growing concern over the Department of Energy's (DOE) counterintelligence program that followed, DOE in March 1999 began developing its first-ever polygraph screening program affecting an estimated 800 DOE employees with access to sensitive and classified information.

Congress in October 1999 mandated DOE polygraph testing (P.L. 106-65, Sec. 3154) and expanded the program to cover 13,000 DOE employees with access to sensitive and classified information. The following year, Congress further expanded polygraph testing to cover approximately 20,000 DOE employees (P.L. 106-398, Sec. 3135) with the addition of new eligibility categories. In part because of continuing opposition by some DOE nuclear weapons laboratory employees, Congress in 2001 requested that the National Academy of Sciences (NAS) review the scientific evidence regarding the validity and reliability of the polygraph, particularly when used for personnel security screening. Congress directed DOE to institute a new polygraph program based upon the NAS findings (P.L. 107-107, Sec. 3152).

NAS completed its study in October 2002, concluding that while polygraph testing is more effective when used in connection with event-specific investigations, its accuracy is insufficient to justify reliance on its use in screening current and prospective federal agency employees — DOE's principal purpose in using the polygraph. According to NAS, in populations such as DOE's, where there is an extremely low level of major security violations, the polygraph has serious limitations for use in security screening to identify security risks. NAS also reported that there is a realistic possibility that the polygraph might be defeated with countermeasures.

Although acknowledging the NAS findings, Energy Secretary Spencer Abraham announced on April 14, 2003, that DOE would continue to use the polygraph for screening purposes, citing it as an effective component of DOE's counterintelligence program. He said that DOE does not use the polygraph on a stand-alone basis but as part of a larger fabric of investigative and analytical reviews to help security personnel determine if someone is suitable to access to classified data. He also asserted that polygraphs have value in deterring unauthorized disclosures of classified information.

Pointing to the NAS findings, some Members of Congress have called on the Energy Secretary to review his decision, and have expressed a desire for a more focused polygraph program that would subject fewer DOE employees to testing. Others have cautioned that a false sense of confidence can arise from reliance on a technique they believe is inaccurate. They also cited NAS's warning that the polygraph can be defeated by countermeasures.

There are several possible approaches Congress might assess, including retention of the status quo, the establishment of a more focused polygraph program under which those occupying only the most sensitive positions would be polygraphed; more research into alternatives to the polygraph; and the elimination of the polygraph for screening purposes altogether. This report will be updated as warranted.

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Introduction

Since its establishment in 1977, the Department of Energy (DOE) has been frequently criticized for adopting a lax approach to countertintelligence (CI), particularly in connection with its nuclear weapons laboratories.[1] Years of increasingly critical CI reviews culminated in 1998 when intelligence evidence suggested that the People's Republic of China (PRC) had stolen secrets from DOE's national security laboratories.[2] President Clinton responded by issuing Presidential Decision Directive (PDD) 61, which fundamentally restructured DOE's CI program. The President directed DOE to develop and implement specific security measures, including the possible use of polygraph testing, to reduce the threat to classified information.

In March 1999, DOE began to develop a CI-scope polygraph to screen employees occupying security-sensitive positions. Questions asked as part of a CI-scope polygraph are limited to topics concerning the individuals' involvement in espionage, sabotage, terrorism, unauthorized disclosure of classified information, unauthorized foreign contacts, and deliberate damage to or malicious misuse of a U.S. Government information or defense system. In August 1999, DOE proposed expanding the CI polygraph program to contractor and Federal employees at its facilities in positions with access to the most sensitive categories of classified information and materials, as well as to applicants for such positions.[3] In October 1999, Congress mandated what until then had been a DOE-discretionary polygraph testing program (P.L. 106-65, Section 3154). Congress also expanded the number of those required to take the polygraph to 13,000.[4] In December 1999, Energy Secretary Bill Richardson announced that CI interests could be satisfied with

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[1]DOE has three nuclear weapons laboratories where classified nuclear weapons research is conducted: Los Alamos National Laboratory, Los Alamos, NM; Lawrence Livermore National Laboratory, Livermore, CA; and Sandia National Laboratories, Albuquerque, NM and Livermore, CA.

[2]For a comprehensive review of this issue, see CRS Report RL30143, *China, Suspected Acquisition of U.S. Nuclear Weapons Secrets*, by Shirley Kan. See also *Attorney General's Review Team on the Handling of the Los Alamos Laboratory Investigation*, May, 2000, at [http:\\www.FAS.org].

[3]*Federal Register* 64, no. 242 (Dec. 17, 1999), p. 70963.

[4]See United States Department of Energy News, *DOE Polygraph Implementation Plan Announced*, Dec. 13, 1999.

approximately 800 polygraphs.[5] DOE originally had intended its program to cover approximately 3,000 employees, but the number was reduced after protests from national laboratory employees.[6] Richardson said he would seek legislation to ensure consistency between DOE's implementation plan and congressional direction.[7] Instead, Congress in 2000, prompted by continuing security concerns, approved legislation (P.L. 106-398, Section 3135) further expanding, by statute, the program to cover approximately 20,000 DOE employees.[8] By subsequently eliminating overlapping categories of covered employees, DOE today polygraphs approximately 16,000 employees.

In 2002, Congress instructed the National Academy of Sciences (NAS) to review the scientific evidence regarding the polygraph's validity and reliability and directed DOE to institute a new program based upon NAS findings (P.L. 107-107, Section 3152). Congress said a new program should "minimize the potential for release or disclosure of classified data, materials, or information."

Background

Debate continues over the validity and reliability of the modern polygraph, first developed early in the 1900s. What is undisputed is that the polygraph machine does not measure deception but rather is an instrument that charts changes in a individual's respiration, heart rate, blood pressure, and sweat gland activity in response to a series of yes/no answers.[9] Polygraph examiners determine whether a person's physiological reaction is stronger in responding to certain questions when contrasted with recorded reactions to a series of comparison "control" questions. Stronger reactions indicate that the individual may be deceptive. It is these physiological responses which are at the heart of the ongoing debate over the validity of polygraph testing.[10] Scientists studying the polygraph further note a distinction between the polygraph test and the polygraph examination, which includes the test and the interrogation surrounding it. The first represents an attempt to capture

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[5]Ibid.

[6]Andrea Widner, "DOE Lab Employees Protest New Law Mandating Polygraph Tests," *Knight Ridder/Tribune News*, Nov. 9, 2000.

[7]See United States Department of Energy News, *DOE Polygraph Implementation Plan Announced*, Dec. 13, 1999.

[8]*Federal Register* 68, no. 71 (April 14, 2003), p. 17887.

[9]A polygraph instrument will collect physiological data from at least three systems in the human body. Convoluted rubber tubes that are placed over the examinee's chest and abdominal areas will record respiratory activity. Two small metal plates, attached to the fingers, will record sweat gland activity, and a blood pressure cuff, ro similar device will record cardiovascular activity.

[10]See the National Research Council of the National Academy of Sciences, *The Polygraph and Lie Detection*, 2002, p. 13.

accurate psychophysiological indicators of deception. The second is a tool for revealing truth.[11]

The polygraph is used for three principal purposes: event specific or exculpatory — for example, when a crime has been committed; preemployment screening; and screening current employees. The Intelligence Community uses the polygraph as a screening device and investigative tool. The Department of Defense (DOD) uses it almost exclusively as an investigative tool. DOD does use polygraphs for employee screening, but only for individuals granted exceptional clearances for highly sensitive programs.[12]

Although DOE has long used the polygraph as an investigative tool, only since 1999 has it employed it as a screening tool. The Energy Department turned to polygraph testing after President Clinton issued PDD 61 in response to long-standing concerns about security at DOE weapons labs and specifically because of intelligence evidence indicating that the PRC may have stolen secrets from DOE's weapons labs. The President directed DOE to consider establishing a polygraph program as one component of a comprehensive CI program that could include background checks, periodic reinvestigations, monitoring of financial records, restrictions on publishing materials, and, for some employees, mandatory drug testing and medical assessments.[13] Under current DOE regulations, neither DOE nor its contractors may take an adverse personnel action against an individual solely on the basis of a polygraph result indicating deception.[14]

DOE cited three principal reasons when it proposed polygraph screening in 1999.[15] First, a CI-scope polygraph, according to DOE, serves both as means to deter unauthorized disclosures of classified information and to detect early any disclosure of classified or sensitive information. The latter, DOE argues, allows it to promptly take steps to mitigate any damage to the national security. Second, DOE suggested that the polygraph examination is essential in granting interim personnel security clearances on an expedited basis. Finally, DOE argued that a polygraph examination provides an important tool that is available upon employee request to expeditiously resolve any outstanding issues in a CI or personnel security investigation.

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[11]Ibid., p. 21.

[12]See Commission on Science and Security, *Science and Security in the 21st Century, A Report to the Secretary of Energy on the Department of Energy Laboratories*, Apr., 2002, p. 54.

[13]*Federal Register* 64, no. 242 (Dec. 17, 1999), p. 70962.

[14] Ibid., p. 70962.

[15] Ibid., p. 70963.

Some See Polygraph's Utility But Many DOE Scientists Are Skeptical

Many DOE laboratory personnel have a "very negative" attitude towards the polygraph, according to the report of the Redmond Panel, a panel of experts which reviewed DOE CI capabilities at DOE's national security laboratories on behalf of the House Permanent Select Committee on Intelligence.[16] The attitude toward polygraphs at the laboratories, according to panel findings, runs the gamut from cautiously and rationally negative to emotionally and irrationally negative.[17] The Panel noted in its findings that never before have so many cleared employees of a government organization had to have their clearances threatened by the institution of the polygraph.[18] The Panel also noted that scientists do, in fact, represent a particular problem with regard to the administration of polygraphs. "They are most comfortable when dealing with techniques that are scientifically precise and reliable," according to the Panel. "The polygraph, useful as it is as one of several tools in a CI regimen, does not meet this standard. Accordingly, many scientists who have had no experience with it are skeptical of its utility."[19] The Panel went on to note, however, that "...polygraphs, while not definitive in their results, are of significant utility in a broader comprehensive CI program. The polygraph is an essential element of the CI program and it will not work until it is accepted by those who are subject to it."[20] In its report, NAS said that polygraph testing has some utility in "deterring security violations, increasing the frequency of admissions of such violations, deterring employment applications from potentially poor security risks, and increasing public confidence in national security organizations....Such utility derives from beliefs about the procedure's validity, which are distinct from actual validity or accuracy."[21]

The Society of Professional Scientists and Engineers, an association of current and retired scientists at Lawrence Livermore National Laboratory, argues that the polygraph is not only scientifically invalid and unreliable but lacks utility as well. "Their unreliability renders polygraphs incapable of catching spies and can lead to false accusations of innocent workers who may find themselves defenseless against the machine's oscillations," according to the Society.[22] Other critics argue that the polygraph has failed to uncover such prominent spies as Aldrich Ames and indeed maintain that spies know how to employ countermeasures against the polygraph.

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[16]U.S. Congress, House Permanent Select Committee on Intelligence, *Report of the Redmond Panel*, June 21, 2000, pp. 7-8.

[17]Ibid., p. 7.

[18]Ibid., p. 7.

[19]Ibid., p. 8.

[20]Ibid., p. 8.

[21]See the National Research Council of the National Academy of Sciences, *The Polygraph and Lie Detection*, 2002, p. 6.

[22]Society of Professional Scientists and Engineers, *SPSE Speaks Out on Polygraphs*, Aug. 13, 1999.

Dearth of Scientific Evidence Underlying the Polygraph

As distinct from the utility of the polygraph, supporters and critics of the polygraph agree that the scientific evidence relevant to the accuracy of polygraph screening tests — the principal purpose of DOE's polygraph program — is extremely limited. The NAS said it found only one flawed field study that provided evidence directly relevant to accuracy for preemployment screening.[23] The American Polygraph Association (APA), the largest polygraph association consisting of examiners in the private, law enforcement, and government fields, blames the paucity of research into the scientific basis for the polygraph or any other deception detection technique on a lack of resources.[24] The NAS agreed, noting that the lack of serious investment in such research is "striking," given the heavy reliance of the government on the polygraph, especially for screening for espionage and sabotage. [25]

What The Available Evidence Does Show

The NAS, in its study, arrived at a number of conclusions. First, it concluded that polygraph testing, particularly with regard to personnel screening, 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. The polygraph's accuracy, according to the NAS, 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.[26]

Second, the NAS concluded that, based upon field reports and indirect scientific evidence, polygraph screening may have some utility for achieving such objectives as deterring security violations, increasing the frequency of admissions of such violations, deterring employment applications from potentially poor security risks, and increasing public confidence in national security organizations. Such utility, however, derives from beliefs about the validity of the procedure, and are distinct from "actual validity or accuracy," according to NAS.[27] The NAS also concluded that the proportion of spies, terrorists and other major national security threats among the employees subject to polygraph testing in the DOE labs presumably is very low, and that polygraphs therefore should not be counted on for detection when screening population with low rates of the target transgressions, because "screening populations

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[23]See the National Research Council of the National Academy of Sciences, *The Polygraph and Lie Detection*, 2002, p. 3.

[24]American Polygraph Association, *Statement of the American Polygraph Association Pertaining to the National Academy of Sciences (NAS) Report on the Use of the Polygraph*, undated.

[25]See the National Research Council of the National Academy of Sciences, *The Polygraph and Lie Detection*, 2002, p. 8.

[26]Ibid., p. 6

[27]Ibid., p. 8.

with very low rates of the target transgressions (e.g., less than 1 in 1,000) requires diagnostics of extremely high accuracy, well beyond what can be expected from polygraph testing."[28] NAS also stated that countermeasures pose a potentially serious threat to the performance of polygraph testing because all the physiological indicators measured by the polygraph can be altered by conscious efforts through cognitive or physical means. NAS noted that "there is enough empirical evidence to justify concern that successful countermeasures may be learnable."[29]

The NAS findings essentially track the results of a similar research review completed by the Congressional Office of Technical Assessment (OTA) in 1983, which concluded that there was not adequate evidence at that time to establish the scientific validity of the polygraph test for personnel security screening. OTA went on to more broadly state that the establishing the overall validity of the polygraph is not possible. OTA cited two reasons. First, the polygraph is a very complex process that is much more than the instrument. The types of individuals tested, examiner's training, purpose of the test, and types of questions asked, among other factors can differ substantially, according to the OTA report. Second, OTA noted, the research on polygraph validity varies widely in terms of results and the quality of the research design and methodology. "... conclusions about scientific validity can be made only the context of specific applications and even then must be tempered by the limitations of available research evidence," according to OTA.[30]

Polygraph supporters such as the APA in turn cite 80 research projects, published since 1980, showing accuracy ranges for the polygraph from 80 to 98 percent.[31] While conceding that there has been only a limited number of research projects on the accuracy of polygraph testing for screening, the APA argues that "real world conditions are difficult if not impossible to replicate in a mock crime or laboratory environment for the purpose of assessing effectiveness."[32] The APA further argues that the same physiological measures are recorded and the same basic psychological principles may apply in both the event specific and pre-employment screening examinations and therefore there is no reason to believe that there is a substantial decrease in the accuracy rate for the preemployment circumstance. The few studies that have been conducted on pre-employment testing support this contention, according to the APA.[33]

U.S. intelligence community agencies, however, continue to believe the polygraph is a useful screening tool. The CIA claimed to have classified research to

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[28]Ibid., pp. 5-6.

[29]Ibid., p. 216.

[30]Office of Technology Assessment, *Scientific Validity of Polygraph Testing*, Nov. 1983, p. 4.

[31]American Polygraph Association, *Polygraph Issues and Answers*, undated.

[32]American Polygraph Association, *Statement of the American Polygraph Association Pertaining to the National Academy of Sciences (NAS) Report on the Use of the Polygraph*, undated.

[33]American Polygraph Association, *Polygraph Issues and Answers*, undated.

support their use of polygraph tests but would not share it with OTA at the time of its study. According to OTA, in its 1983 report, CIA and NSA use the polygraph not to determine deception or truthfulness per se, but as a technique of interrogation to encourage admissions. OTA reported that the polygraph examination results that are most important to NSA security adjudicators are the data provided by the individual during the pre-test or post-test phase of examination. The Director of Central Intelligence Security Committee concluded that polygraph was the most productive all background investigation techniques. But OTA pointed out that the study was one of utility, not validity.

DOE Proposes To Maintain Current Polygraph Program

The National Defense Authorization Act for Fiscal Year 2002 (P.L. 107-107, Section 3152) directed DOE to issue a notice of proposed rule-making for a new polygraph program based upon the findings of the NAS polygraph review. The Act also stated that the purpose of any such new program would be to minimize the potential for release or disclosure of classified data, materials, or information.

On April 14, 2003, DOE, to satisfy the congressional directive, published a notice of proposed rule-making "to begin a proceeding to consider whether to retain or modify [DOE's] current Polygraph Examination Regulations."[34] Secretary Abraham made clear that DOE intended to retain polygraph screening as a component of the Department's CI program. In doing so, he acknowledged NAS's recommendation against using the polygraph for employee screening and the congressional directive that he take NAS's views into account. But he said that maintaining polygraph testing was "consistent with the statutory purpose of minimizing the risk of disclosure of classified data."[35] He also said that DOE's use of the polygraph only as a trigger for a detailed follow-up investigation, and not as a basis for personnel action, was compatible with NAS's conclusion that if polygraph screening is to be used at all, it should be used in this fashion.[36]

Critics of the Secretary's decision, including Senator Bingaman (D-NM), said relying on a technique as inaccurate as the polygraph could produce a false sense of confidence. That overconfidence, Bingaman suggested, "can be the real danger to national security." Applying polygraphs to employee screening could lead to either too many loyal employees who will judged deceptive, or too many major security threats undetected, Bingaman noted.[37] Senator Pete Domenici said, "I continue to believe that the system is too much an affront[,] especially since the polygraph

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[34]*Federal Register* 68, no. 71, p. 17886.

[35]U.S. Department of Energy, "DOE Issues Notice of Proposed Rulemaking on Polygraph Use," press release, Apr. 14, 2003.

[36]Ibid.

[37]See press statement of Senator Bingaman, Apr. 14, 2003

program was so thoroughly criticized by the National Academy of Sciences. I hope the department will rethink this situation."[38]

Issues for Congress

A More Focused Polygraph

One issue for Congress is whether DOE's polygraph screening program should focus on a smaller number of individuals occupying only the most sensitive positions. Approximately 16,000 DOE employees, falling into eight separate categories, currently are polygraphed. Critics argue that the program requires a screening polygraph for virtually every DOE employee and contractor who holds a security clearance, without regard to the level of sensitivity of that persons's activities or access. Such a program exposes a large population to polygraph examination without regard to the risk associated with that person's access. One result, according to critics, is that polygraphs have caused, and may continue to cause, severe morale problems and thereby ultimately undermine the very goal of good security.[39]

DOE counters by saying that the Department's classified information consists in significant measure of information regarding nuclear weapons of mass destruction and that the consequences of compromise could be profoundly significant. DOE contends it is under a particular obligation to make sure that no action that it takes be susceptible to misinterpretation as a relaxation of controls over information concerning these kinds of weapons.[40]

Additional Research

Critics and supporters alike agree that further research into the scientific basis for psychophysiological detection of deception by any technique is warranted. The NAS, in its report, suggests that if the government continues to rely heavily on the polygraph, some research effort should focus on putting the polygraph on a firmer scientific foundation. NAS cautions, however, that given the inherent ambiguity of the physiological measures used in the polygraph suggest that further investments in

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[38]See news release of Senator Domenici, "Domenici: DOE Worries Shouldn't Mean Continuation of Flawed Polygraph Policy," Apr. 15, 2003.

[39]See Commission on Science and Security, *Science and Security in the 21st Century, A Report to the Secretary of Energy on the Department of Energy Laboratories*, April 2002, pp. 55-56. The Commission points out in its report that DOD does use the polygraph for screening purposes, but only for individuals granted exceptional clearances for highly sensitive programs. In the case of the Intelligence Community, according to the Commission, the polygraph is an integral — "and more important, an accepted — part of the intelligence community's security practices and culture. People are aware of this practice before accepting employment in intelligence organizations, and they accept it as an integral part of a more comprehensive security architecture."

[40]*Federal Register* 68, no. 71, pp. 17888-17889.

improving polygraph technique and interpretation will bring only modest improvements in accuracy.[41] Rather, NAS recommends the development of a broader research program to detect and deter security threats be developed, rather than focus on polygraph research.[42] NAS points out that potential alternative techniques such as measurements from brain activity and other physiological indicators, facial expressions, voice quality and other aspects of demeanor show some promise, but that "none has yet been shown to outperform the polygraph. None shows any promise of supplanting the polygraph for screening purposes in the near term."[43] According to NAS, any such research program should be largely administered by "an organization or organizations with no operational responsibility for detecting deception and no institutional commitment to using or training practitioners of a particular technique."[44]

NAS pointed out two particular areas worthy of more research — computerized analysis of polygraph records to improve the accuracy of test results by using more information from polygraph records than is used in traditional scoring methods; and combining polygraph information with information from other screening techniques,. NAS also concluded that more research needs to be conducted with regard to countermeasures, but pointed out that policy makers must weigh the danger of public knowledge of countermeasures against the benefits of a robust public research program.[45]

Supporters, while claiming that the polygraph now provides satisfactory detection and deterrence, favor enhanced research efforts on grounds that they will certainly expand the capacity to improve the polygraph's validity and reliability.[46] At the same time, supporters note that real world conditions are difficult if not impossible to replicate in a mock crime or laboratory environment for the purpose of assessing the polygraph's effectiveness. A lack of resources, according to supporters, also has impeded research efforts.

Responding to the NAS research recommendation, the Senate Select Committee on Intelligence in its fiscal year 2004 intelligence authorization bill authorizes $500,000 for the National Science Foundation and the Office of Science and Technology to lead a more focused research effort on alternatives to the polygraph.[47]

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[41]See the National Research Council of the National Academy of Sciences, The Polygraph and Lie Detection, 2002, p. 213.

[42]Ibid., p. 9.

[43]See the National Research Council of the National Academy of Sciences, *The Polygraph and Lie Detection*, 2002, p. 8.

[44]Ibid., p. 229.

[45]Ibid., p. 231.

[46]See American Polygraph Association, *Statement of the American Polygraph Association Pertaining to the National Academy of Sciences (NAS) Report on the Use of the Polygraph*, undated.

[47]See S.Rept. 108-44, p. 29.

Discard Use Of Polygraph For Screening

Another issue for Congress is whether to discard the use of polygraph screening — as opposed to event specific use where the accuracy is well above chance but below perfection [48] — altogether. Critics label the screening polygraph as misguided and suggest that it be shelved in favor of more thorough examination of staff's financial records and travel, and more frequent reinvestigation by traditional means. These critics argue that the screening polygraph gives a false and dangerous sense of over confidence to authorities that they have adequately screened for spies.[49] They believe that this, in turn, could lead to a relaxation of other methods of ensuring security, such as periodic security re-investigation and vigilance about potential security violations in facilities that use the polygraph for employee security screening.[50] Critics also argue that polygraph test accuracy can be undermined by countermeasures, seriously undermining the any value of polygraph security screening.[51]

Supporters argue that the polygraph is the best tool currently available to detect deception and that it remains an important tool to detect deception in selected national security and law enforcement matters. Some supporters distinguish between the polygraph's utility and its scientific validity and reliability. While not definitive in its results, they argue, the polygraph is of significant utility in a broader comprehensive CI program.[52] Some government organizations further claim to have classified information which supports their use of polygraph tests.[53] And virtually all supporters of polygraph screening argue that polygraph testing is just one tool among several used as part of comprehensive CI program.

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[48]See the National Research Council of the National Academy of Sciences, The Polygraph and Lie Detection, 2002, p. 4.

[49]See comments by the Society of Professional Scientists and Engineers to proposed polygraph examination regulations, 10 CFR Pat, 709, Federal Register 68, p. 17886, Apr. 14, 2003.

[50]See the National Research Council of the National Academy of Sciences, The Polygraph and Lie Detection, 2002, p. 7

[51]Ibid., p. 5.

[52]U.S. Congress, House Permanent Select Committee on Intelligence, *Report of the Redmond Panel*, June 21, 2000, pp. 7-8.

[53]See Office of Technology Assessment, *Scientific Validity of Polygraph Testing*, Nov. 1983, p. 100. OTA said it did not review this research.