Goodearl and Aldred Versus Hughes Aircraft: A Whistle-Blowing Case Study

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Abstract – Whistle-blowing is a core topic for any "ethics" or "professionalism" course offered for IS/CS/CE/EE majors. This paper documents a real whistle-blowing case that is ideal for use in teaching. The incident is set in the computing industry, specifically in the supply of micro-electronic chips for use in safety-critical systems. The incident is well documented, with decisions in both a criminal case and a civil case. It touches on all the major issues involved in whistle-blowing.

1. Introduction

The term "whistle blowing" may not already be familiar to students in IS/CS/SE/EE. One author defined whistle blowers as "those who ... make revelations meant to call attention to negligence, abuses or dangers that threaten the public interest. They sound an alarm based on their expertise or inside knowledge, often from within the very organization in which they work ... Most [whistle blowers] know that their alarms pose a threat to anyone who benefits from the ongoing practice and that their own careers and livelihood may be at risk" [5]. Examples of situations that lead to whistle blowing are when an employee discovers that their company is knowingly supplying an unsafe product to customers, or when someone discovers that tax dollars are being wasted in some fraudulent or flagrant manner. The case discussed here actually combines both of these types of concerns.

Whistle-blowing is mentioned in all the major codes of ethics relevant to the computing profession. For example, the first item in the IEEE code (see chapter 3 of [6], also `www.ieee.org`) says that members agree to:

> *Accept responsibility in making engineering decisions consistent with the safety, health, and welfare of the public, and disclose promptly factors that might endanger the public or the environment.*

The explanation of item 1.2 of the ACM code (see appendix 2 of [6]), "Avoid Harm to Others," amplifies on this theme:

> *In the work environment the computing professional has the additional obligation to report any signs of systems dangers that might result in serious personal or social damage. If one's superiors do not act to curtail or mitigate such dangers, it may be necessary to "blow the whistle" to help correct the problems or reduce the risk.*

The AITP Standards of Conduct (see chapter 3 of [6], also `www.aitp.org`) includes the statement that members will:

> *Never misrepresent or withhold information that is germane to a problem or situation of public concern nor will I allow any such known information to remain unchallenged.*

Principle 1.4 of the IEEE-CS/ACM Software Engineering Code of Ethics states:

> *Disclose to appropriate persons or authorities any actual or potential danger to the user, the public, or the environment, that they reasonably believe to be associated with software or related documents.*

It is clear from these quotes that whistle blowing is an important concern for professionals in the computing industry. In fact, the codes of ethics of our professional societies **require** the professional to blow the whistle in certain circumstances.

There are well-known case studies in whistle-blowing; for example, the NASA Challenger disaster [4, 7, 10]. But relatively few are set in the context of the computing industry. Perhaps the best-known is the BART incident of the early 1970s [1] (see also chapter 7 of [6]). This paper presents a modern whistle-blowing case study involving two women who worked for Hughes Aircraft and blew the whistle on fraud in testing and certification of micro-electronic chips used in various weapons systems. A time line for the main events in this case appears in Figure 1. The time line is useful in emphasizing to students the length of time that it can take to resolve whistle-blowing cases.

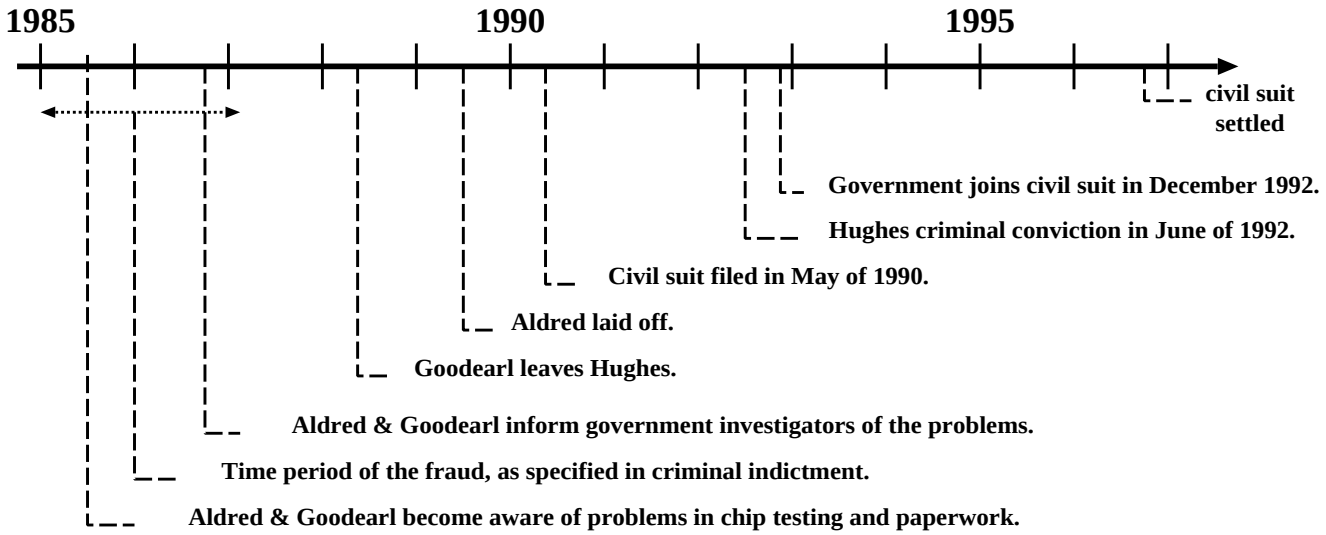

Figure 1: Time line of major events in the Goodearl and Aldred versus Hughes Aircraft whistle-blowing case.

2. The Context: Chips and Testing

This case involves computer chips made at Hughes Aircraft Company's Micro-electronic Circuit Division in Newport Beach, California during the time period of approximately 1985 through 1987. The particular chips involved are called *hybrids*, because they use both digital and analog logic in a single package. Hughes Aircraft would sell as many as 100,000 hybrids per year, at prices ranging from $300 to $5,000 each. The chips were used in a variety of sophisticated electronics systems, such as aircraft radar units and missile guidance systems. At least 73 different Department of Defense programs were involved, including the F-14, F-15, F-16 and F-18 aircraft (see Figure 2), the Maverick, Phoenix and AMRAAM (Advanced Medium-Range Air-to-Air Missile) missiles, DIVADS, INTELSAT and other systems [3]. The results of chip failures in the field could be varied. One possible scenario that was suggested by testimony in the criminal trial was that the radar used by a fighter plane to direct its weapons could fail!

Contracts to supply chips to the government would require that the chips pass specified quality assurance tests. Typical tests would involve checking whether the packaged chip allowed any leaks that might let moisture get to the chip, and checking the chip for failures after being subjected to temperature cycling, constant acceleration, and/or shock. Hybrids that failed a particular test would either be discarded or re-worked to correct the defect. By contract, re-work was not allowed for failure of certain tests.

Assurance that the chips did indeed pass the specified tests would be made through paperwork tracking the tests performed and the results. Hughes used a document called a "lot traveler" to keep track of the sequence of tests and other operations performed on each hybrid.

Ruth Aldred was employed by Hughes from 1979 to 1988. (Her name was Ruth Ibarra at the time the incident began; she later married and her name changed to Ruth Aldred.) From 1984 to 1988, she was a supervisor for hybrid quality assurance.

Margaret Goodearl was employed by Hughes from 1981 to 1989. In 1986, Goodearl became a supervisor for seals processing ("seal" as in seal of the packaging of the chip) in the environmental testing area at the Newport Beach facility. She had previously worked as as supervisor for assembly on the hybrid production floor and as a supervisor in the hybrid engineering lab.

3. The Fraud and Cover-Up

Discovery and recognition of the fraud followed a typical scenario. Apparently small anomalies in paperwork raised questions, the answers to the questions raised more serious concerns and the continued reaction to the questions confirmed the fears of the whistle-blowers. One account states – "Aldred said she became aware of problems at the Hughes plant in 1985, when Goodearl, then new to her job, asked Aldred to look over some paperwork. When she brought errors in the paperwork to the attention of her supervisors, she said she was told to keep quiet about the problem" [13].

The indictment for the criminal trial in which Hughes was convicted of conspiracy to defraud the government summarizes the illegal activity as – "to defraud the Department of Defense by knowingly and deliberately producing hybrids that had not been tested in the manner specified by contract and the pertinent military specifications ..., and to make false statements, writings and representations on documents ..." [3]. More specifically, the indictment states that Hughes would – "skip required environmental tests on certain hy-

Figure 2: F-16 fires an AGM-88 HARM missile.
An F-16 Fighting Falcon from the 416th Flight Test Squadron Edwards Air Force Base, Calif., fires an AGM-88 HARM missile during testing. The F-16 is one of the weapons systems in which the hybrid chips were used. Testimony at the criminal trial indicated that chip failure in the field could cause pilots to be unable to aim their weapons. (U.S. Air Force Photo, photo by Tom Reynolds, `www.af.mil/photos`).

brids for which there were delivery pressures or priorities," "fraudulently test or conduct rework on hybrids contrary to contractual provisions" and "falsify essential documents that required all tests and procedures (including rework history) and the results of such tests to be carefully recorded" [3].

Much of the fraud was apparently implemented under the immediate direction of Donald LaRue. Relevant items in the indictment state:

> "From time to time, defendant LaRue would direct test operators to, among other things: (a) skip certain tests or procedures, but mark the (lot) traveler as if performed; (b) falsify travelers to show hybrids passing tests when the hybrids had in fact failed the required tests; (c) perform undocumented and unauthorized rework without the travelers reflecting the rework actually performed, as required by contract; (d) sign-off travelers before tests were performed; (e) conduct tests and procedures out of sequence; and (f) short cut temperature cycling and other processes.
>
> In order to meet production goals, Hughes (through LaRue) would also cause sign offs on travelers for thousands of hybrids to be forged by employees who had neither conducted nor had knowledge of the tests or the actual test results, in knowing violation of government contractual requirements. On repeated occasions, LaRue would personally remove leak stickers placed on hybrids that failed either the fine leak or gross leak tests, and would cause the travelers for such parts to be initially marked or subsequently altered to fraudulently represent that the part had passed such test ..." [3].

In news accounts at the time that the criminal indictment was announced, Hughes officials downplayed the incident and denied that anything wrong had taken place. One response was that the indictment was "disproportionate to the alleged activities" [11]. Another was that "no substandard or defective hardware was delivered by Hughes" [11].

4. Whistle-Blowing

After failing to get Hughes management interested in correcting the problems, Aldred and Goodearl reported the problems to federal investigators in late 1986. One account quoted Goodearl describing her motivation for whistle-blowing as follows – "I had no choice ... I've got three sons and a daughter, and any one of them could wind up in the military ... and dead because of these bad parts" [13].

The criminal indictment lists specific acts of intimidation and harassment toward the whistle blowers [3]. In one instance, a Hughes manager called Goodearl into his office and

demanded to know who was "the goddamn squealer." In another instance, Goodearl was told to do the tests the way that LaRue wanted them done, and to "get with the program." In yet another instance, LaRue told Goodearl to "stay away from QA" (quality assurance) or "it would cost her her job." In yet another instance, a Hughes manager tore up a handwritten complaint by Goodearl and told here "If you ever do anything like that again, I will fire your ass."

News accounts give various additional details related to intimidation and harassment. It was alleged that the whistleblowers were "harassed by means of racial and sexual slurs and verbal comments, in addition to physical gestures and menacing postures" and that one day when Goodearl left work she "found a butchered pig's head in a brown paper bag on the hood" of her car [8]. The Hughes defense lawyers dispute that the pig's head incident actually happened.

Harassment to discourage the whistle-blowers also extended to their families. Aldred's husband described one incident as follows – "The worst part of this probably was when our daughter, Vicki, came into our bedroom crying. She said she'd picked up the phone and that somebody had told her that we were dead meat if we didn't leave this alone. She was a latch-key kid at the time, so one of the investigators (from the Justice Department) wound up working as her bodyguard for a few weeks" [13].

Goodearl was fired ("laid off") by Hughes Aircraft in 1989. Aldred had left Hughes in 1988, "after being relieved of all meaningful responsibilities and put in a cubicle with nothing to do" [18]. Goodearl filed a "wrongful termination" lawsuit against Hughes and a number of individual managers in June of 1990. This suit was apparently later dropped in favor of the suit under the False Claims Act.

The unemployment and the general strain on Goodearl contributed to the breakup of her marriage in 1995. She was quoted as saying – "I went from engineering work to being a housekeeper" [13].

5. The Criminal Trial

The indictment in the criminal trial named two defendants, Hughes Aircraft and Donald Anthony LaRue [2]. The allegations were that the defendants:

> *willfully conspired and agreed ... (1) to defraud the Department of Defense by knowingly and deliberately producing hybrids that had not been tested in the manner specified by contract and the pertinent military specifications ... and (2) to make false statements, writings and representations on documents*

The trial lasted four weeks, and "a number of Hughes employees testified ... about "wholesale cheating on a wide range" of environmental tests" [16]. On June 15, 1992, a jury found Hughes Aircraft guilty conspiring to defraud the U.S. government. Donald LaRue was acquitted of all charges, apparently because the jury believed that his actions were the result of pressure on him by higher-level management. In October of 1992, U.S. District Judge Matthew Byrne fined Hughes Aircraft $3.5 million.

Hughes appealed the criminal conviction and fine. The appeal was taken as far as the Supreme Court, but was denied. Results of a criminal trial can be presented as evidence in a related civil trial. Thus the criminal trial in this case nearly guaranteed the whistle-blowers would win a civil suit.

6. Background: The False Claims Act

An important element of this case is that it involves the use of the False Claims Act (FCA), an essential tool for whistle blowers in cases involving fraud on the federal government. An informative video that deals with the False Claims Act and whistle-blowing, and is suitable for classroom use, is "Fighting Fraud: Citizen Action and the Qui Tam Remedy." This video is available from the Taxpayers Against Fraud organization. See their web page at `www.taf.org`.

The FCA (31 U.S.C. 3729-31) is a federal law which has been in existence since 1863. It was motivated by fraud against the government; the military at that time was having serious problems with suppliers cheating on the supply and price of goods. President Abraham Lincoln was apparently an early backer of the law, and it was known as the "Lincoln Law."

The law was created to discourage fraud by encouraging people to report it. Under this law, private citizens can bring a civil suit against someone that has defrauded the federal government. The legal term "qui tam" is used to describe such suits. The private citizen that brings the suit is known as a "relator." The FCA states that a relator (whistle blower) may receive between 15 and 25 percent of the recovered funds if the government chooses to participate in the suit. If the government decides not to participate in the suit, the whistle blower may receive between 25 and 30 percent of the recovery, plus legal fees and expenses.

The FCA had fallen into relative non-use until 1986, when Congress passed amendments to strengthen the law and make it easier to apply. In 1985, the last year before the amendments to the law, the government recovered roughly $27 million from civil fraud suits. The number of cases filed and the amount of funds recovered by the government each year has grown quickly since then. Roughly $500 million per year was recovered in 1997 through 1999! The number of cases pursued by the Department of Justice averaged about 500 per year in 1997 through 1999.[1]

[1] See the Department of Justice statistics posted in the `www.taf.org` web pages for more detail.

7. The Civil Trial

The civil trial was originally filed on May 29, 1990 by Goodearl, Aldred, and the Taxpayers Against Fraud organization. Aldred heard of the FCA while watching a representative of a law firm speak on a television talk show. Aldred and Goodearl then contacted the firm of Phillips & Cohen, and determined that they should have a good case.

Under the provisions of the FCA, the government took over the case in December of 1992. The civil suit was settled in September of 1996. In settling the suit, Hughes agreed to pay $3,159,000 to the United States government, $891,000 to the whistle-blowers, and $450,000 to cover the attorneys' fees and expenses for the whistle-blowers. In one part of the settlement agreement, Hughes asserts that it "denies any wrongdoing or liability of any kind with respect to any charge, allegation or claim asserted against it in this civil action." One of the attorneys who represented Goodearl and Aldred was quoted as saying – "This completely vindicates Ruth Ann Aldred and Margaret Goodearl who made great personal and profession sacrifices to see justice done." [15]

8. Uses of this Case in Teaching

This case is good for teaching purposes because decisions were reached in both criminal and civil court cases. Thus a reasonable amount of detail is available, in terms of real facts and conclusions. Also, the case follows what might be considered a classic pattern in which the whistle blowers discover a fraud, are rebuffed in attempts to handle it inside the company, lose/leave their jobs, undergo turmoil in their personal lives, and are vindicated years later through the court system. In terms of the legal resolution, it is tempting to say that Goodearl and Aldred "won." However, their experience was not an easy one and a "they won" conclusion may take too narrow a view of the events. Their lawyer summarized the impact on the whistleblowers as follows – "As a result or reporting Hughes to the authorities, they lost their jobs. They went through substantial periods of unemployment. They underwent a lifestyle change. I don't think they would tell you it was a pleasant experience." [12] Aldred and her husband ended up on welfare at one point, before landing new jobs in 1991 [17]. Goodearl and her husband ended up filing bankruptcy because they had trouble paying bills [17], and the strain of unemployment and financial problems "helped end their 20-year marriage" [13]. Goodearl said – "I went from engineering work to being a housekeeper" [13]. However, in spite of the difficulties, the whistleblowers say they "would do it all again" [13].

One method of using this case in teaching is to assign it as the topic of a research paper. Students should be able to find various news accounts related to this case. A good paper should distinguish between the criminal and civil trials, explain the role of the FCA, and might also discuss how the specifics of this case mesh with the IEEE Ethics Committee's "Draft guidelines for engineers dissenting on ethical grounds" [9]. This case might similarly be assigned to a student to be developed for an in-class presentation.

Alternatively, this case could be used for a class discussion. One approach is to (1) ask students to read about the case prior to class, perhaps with a short worksheet to complete, (2) go over the IEEE Ethics Committee's "Draft guidelines for engineers dissenting on ethical grounds" in class, and then (3) use the elements of the draft guidelines as points of departure for discussion. A complementary approach is to (1) ask students to go to the web and read the IEEE Ethics Committee's draft guidelines prior to class, (2) outline the basics of this case for the class, and (3) ask the students to analyze how the draft guidelines relate to this specifics of this case. Still another approach is to ask the students to read material and complete worksheets prior to class, and use the worksheets as the starting point for discussion. Example worksheets for this purpose can be found on the web site `marathon.csee.usf.edu/~kwb/nsf-ufe/`.

Another approach to using this case is to present it to the class as a specific example of whistle-blowing and the False Claims Act in the computing industry. This might be done by (1) having the class view the TAF video on the False Claims Act, (2) then presenting this case to the class, and (3) then having the class follow up by writing a short paper either on a more recent case (e.g., [19]) in the computing industry that involves the FCA, or on how the draft guidelines for ethical dissent relate to this case. Additional model exercises and activities related to whistle-blowing are available at the web site mentioned just above, as well as a short review of the TAF video.

9. Discussion

The eventual cost and damage due to the delivery of chips whose test results were falsified will never be known. Because the number of potentially defective chips delivered was so large, and they were installed in systems already in use, the cost and logistics of recalling and replacing the chips was judged to be impractical. One of the lawyers was quoted as follows – "They are out in the field and it would be prohibitively expensive to take these hybrids out of all the missiles and planes they are in... There is added risk, but the government has no alternative; they just can't afford to shut these systems down to take all the hybrids out and test them again" [14].

If students are tempted to think such cases are a rare occurrence, a web search on suits filed under the FCA should quickly dispel this notion. For example, in March of 2000, documents were unsealed in a whistle-blowing case filed by Nira Schwartz against TRW. Schwartz worked in the design of computer software for anti-missile systems at TRW. The allegation is that TRW falsified tests to show that the systems passed when in fact they had failed [19].

Industries in which fraud has been uncovered through the False Claims Act – health care and defense are major areas – have argued for changes in the law. In essence, the companies would like to make it harder for whistle blowers to win their cases, and to reduce the amounts companies would have to pay when whistle blowers do win their cases. In 1998, there was a bill before the Congress that would have drastically weakened the False Claims Act by raising the standard of proof required and opening loopholes that would "prohibit suits against most health care providers" [20]. Sponsors of this bill were representatives Bill McCollum (R-Fla) and William Delahunt (D-Mass) and senators Thad Cochran (R-Miss) and Ernest Hollings (D-SC). Additional attempts of this type will likely be seen in the future.

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