

# Exhibit 6

A Report by a Panel of the

# NATIONAL ACADEMY OF PUBLIC ADMINISTRATION

for the U.S. Congress and the U.S. Patent and Trademark Office



## US Patent and Trademark Office: Transforming To Meet the Challenges of the 21st Century

August 2005

NATIONAL ACADEMY OF  
PUBLIC ADMINISTRATION



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**U.S. PATENT AND TRADEMARK  
OFFICE: TRANSFORMING TO  
MEET THE CHALLENGES OF THE  
21<sup>ST</sup> CENTURY**

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The views expressed in this report are those of the Panel. They do not necessarily reflect the views of the Academy as an institution.

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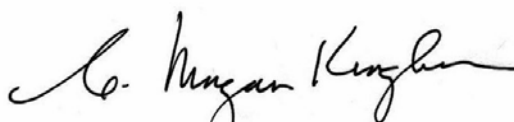
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## FOREWORD

The U.S. Patent and Trademark Office (USPTO) is a fee-supported, performance-based organization within the U.S. Department of Commerce that is at the center of the U.S. intellectual property system. Its patent process affects innovation in the nation as well as the domestic and global economies. Over the past decade, an increase in the volume of patent applications and technological advancement have created additional challenges for the agency, resulting in added time to process patent applications and concerns about the quality of issued patents.

To help ensure that USPTO is on a path to effectively achieve modernization and meet its challenges, the House Appropriations Subcommittee on Science, State, Commerce, and Justice asked the Academy to review the agency's structure and business processes and to provide insights on whether and how agency efforts have helped to increase patent quality and decrease patent pendency. Congress also requested that the Academy examine the extent to which USPTO has a suitable employee allocation and skill mix. The Panel's recommendations will enable USPTO to better meet the needs of the nation and the individual inventor. It is essential that USPTO have a governance structure that gives it the flexibility to make sound decisions based on revenue and expenditure projections.

I want to thank Thomas Stanton, who chaired the Panel overseeing this study, for his leadership, and the other Panel members who contributed substantially to the project. I also commend the project staff for their research and thoughtful analysis in support of the Panel's findings and recommendations. Finally, I would like to express my appreciation to Congress, the Department of Commerce, USPTO, its stakeholders, and its Trilateral partners in Europe and Japan for sharing their insights with the Academy. We hope that the Panel's findings and recommendations have practical application and help USPTO meet the challenges that lie ahead.



C. Morgan Kinghorn  
President



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## LIST OF ACRONYMS

ABA	American Bar Association
ACEPO	Administrative Council of the European Patent Organization
AFGE	American Federation of Government Employees
AIPA	American Inventors Protection Act
AIPLA	American Intellectual Property Law Association
AIPN	Advanced Intellectual Property Network
AIPPI	International Association for the Protection of Intellectual Property
BEA	Budget Enforcement Act
BEST	Bringing Examination and Search Together
BPAI	Board of Patent Appeals and Interferences
CAFC	Court of Appeals for the Federal Circuit
CAO	Chief Administrative Officer
CEO	Chief Executive Officer
CBI	Critical Behavior Interview
CBO	Congressional Budget Office
CCC	Commodity Credit Corporation
CFO	Chief Financial Officer
CHCO	Chief Human Capital Officer
CIO	Chief Information Officer
CIPA	Chartered Institute of Patent Agents
CLE	Continuing Legal Education
COBRA	Consolidated Omnibus Budget Reconciliation Act
COO	Chief Operating Officer
CSRS	Civil Service Retirement System
CY	Calendar Year
DAC	Deputy Associate Commissioner
DG	Directorate General
DHS	U.S. Department of Homeland Security
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOJ	U.S. Department of Justice
DOL	U.S. Department of Labor
DOT	U.S. Department of Transportation
EAST	Examiner Assisted Search Tool
EESR	Extended European Search Report
EIP	Environmental Intern Program
EPA	Environmental Protection Agency
EPC	European Patent Convention
EPI	European Patent Institute
EPO	European Patent Office
ESOP	Employee Stock Ownership Plans
FACA	Federal Advisory Communications Act
FAOM	First Action on the Merits
FCC	Federal Communications Commission

FCRA	Federal Credit Reform Act
FDIC	Federal Deposit Insurance Corporation
FERC	Federal Energy Regulatory Commission
FERS	Federal Employees Retirement System
FFB	Federal Financing Bank
FFRDC	Federally Funded Research and Development Center
FLRA	Federal Labor Relations Authority
FPI	Federal Prison Industries
FTC	Federal Trade Commission
FTE	Full-Time Equivalent
FY	Fiscal Year
GAO	Government Accountability Office
GOCO	Government-Owned Contractor Operated
GCCA	Government Corporation Control Act
GNMA	Government National Mortgage Association
GS	General Schedule
GSA	General Services Administration
GSE	Government-Sponsored Enterprises
HHS	U.S. Department of Health and Human Services
HRM	Human Resources Management
IFW	Image File Wrapper
IFP	Increased Flexitime Program
IPI	International Patent Institute
IG	Inspector General
IPC	International Patent Classification
IPCC	Industrial Property Cooperation Center
IPO	Intellectual Property Owners
ISR	International Search Report
IT	Information Technology
IP	Intellectual Property
IPO	Intellectual Property Owners
JIPA	Japanese Intellectual Property Association
JPAA	Japanese Patent Attorneys' Association
JPO	Japan Patent Office
KSA	Knowledge, Skills, Abilities
LES	Licensing Executives Society
LDRC	Legal Document Review Clerk
LIE	Legal Instrument Examiner
MBA	Master of Business Administration
MOU	Memoranda of Understanding
MPEP	Manual of Patent Examination Policy
NAPP	National Association of Patent Practitioners
NAS	National Academy of Sciences
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NOA	Notice of Allowance



NRC	Nuclear Regulatory Commission
NSF	National Science Foundation
NTEU	National Treasury Employees Union
OBRA	Omnibus Budget Reconciliation Act
OCC	Office of the Comptroller of the Currency
OCP	Office of Corporate Planning
OFHEO	Office of Federal Housing Enterprise Oversight
OGC	Office of General Counsel
OHR	Office of Human Resources
OIG	Office of Inspector General
OIPE	Office of Initial Patent Examination
OMB	Office of Management and Budget
OPFM	Office of Patent Financial Management
OPM	Office of Personnel Management
OPQA	Office of Patent Quality and Assurance
PAIR	Patent Application Information Retrieval
PAP	Performance Appraisal Plan
PBGC	Pension Benefit Guaranty Corporation
PBO	Performance-based Organization
PCT	Patent Cooperation Treaty
PE	Patent Examiner
PGO	Post Grant Opposition
PLT	Patent Law Treaty
POPA	Patent Office Professional Association
P-PAC	Patent Public Advisory Committee
PPM	Patent Production Model
PTDL	Patent and Trademark Depository Libraries
PTO	Patent and Trademark Office
PTOEA	Patent and Trademark Office Efficiency Act
RCE	Request for Continuing Examination
RFP	Request for Proposal
SCP	Standing Committee on the Law of Patents
SFA	Student Financial Assistance
SEC	Securities and Exchange Commission
SES	Senior Executive Service
SL	Senior Level
SME	Small and Medium Sized Enterprises
SPE	Supervisory Patent Examiner
SSA	Social Security Administration
TC	Technology Center
TLO	Technology Licensed Organization
T-PAC	Trademark Public Advisory Committee
TWS	Trilateral Web Site
ULP	Unfair Labor Practice
UPR	Utility, Plant, Reissue (Patents)
USC	U.S. Code

USPC	U.S. Patent Classification
USPS	U.S. Postal Service
USPTC	U.S. Patent and Trademark Corporation
USPTO	U.S. Patent and Trademark Office
USRA	U.S. Railway Association
VPN	Virtual Private Network
WEST	Web-based Examiner Search Tool
WIPO	World Intellectual Property Organization

## EXECUTIVE SUMMARY

The U.S. Patent and Trademark Office (USPTO) is a complex "knowledge worker" agency and the fulcrum of the U.S. intellectual property system. Its mission—grounded in the U.S. Constitution—is to ensure that the intellectual property system contributes to a strong domestic and global economy, encourages investment in innovation, and fosters an entrepreneurial spirit.

Under the close scrutiny of its stakeholders, academia, its counterparts around the world, Congress, and the courts, USPTO must accommodate a burgeoning interest in securing property rights and changing legal interpretations of patent law. It must also deal with substantial external volatility—particularly the U.S. economy and funding levels. With all of these variables and pressure points, USPTO attempts to balance the tradeoffs between enhancing quality and maximizing production and does so within the context of the federal workplace and its myriad requirements.

With a \$1.7 billion proposed fiscal year (FY) 2006 budget, derived from fees for services provided, USPTO needs the flexibility to operate with the incentives and acumen of a private business—with full accountability to Congress and its users. In 1999, to provide USPTO with added management flexibilities to achieve its mission, Congress designated it as one of only two federal “performance-based organizations.” This designation provided additional flexibilities in budgeting, human resources, procurement, and other administrative areas, but not those needed for making long-term business decisions. In 2003, USPTO issued a modified *21<sup>st</sup> Century Strategic Plan*, which described its vision to create a quality-focused, productive, responsive organization supporting a market-driven intellectual property system. It seeks to transform itself over the next five years guided by three strategic themes—(1) agility, (2) capability, and (3) productivity, with quality embedded in each theme.

To help ensure that USPTO is making progress in implementing its strategic plan and is on the right path to transformation, the Chairman of the House Appropriations Subcommittee on Science, State, Commerce, and Justice asked the National Academy of Public Administration (Academy) to examine USPTO’s organization structure and its work processes. The Academy Panel has reviewed and assessed organizational and human capital structures, the timeliness and quality challenges USPTO faces in processing patent applications, and whether it has the appropriate skills needed within its staff.

## CORPORATE STRUCTURE AND CULTURE

As a performance-based organization, USPTO has more flexibility than a traditional federal agency, but it still does not have the flexibility to make long-term business decisions, the borrowing authority to help meet multi-year capital needs, or access to all of its user fee revenues. While organizational form does not guarantee efficient operations, one that does not permit a business-type agency to apply its resources to meet changes in market demand (for USPTO, the changing volume of patent applications) can create inefficiencies and disincentives.

The Panel believes that USPTO's structure has created such inefficiencies. The demand for patents is closely tied to the U.S. economy and its fluctuations. A corporate structure would enable USPTO to respond more quickly and effectively to workload, yet remain accountable to Congress, the President, and stakeholders.

**Accordingly, the Panel recommends that Congress create the U.S. Patent and Trademark Corporation (USPTC) as a wholly owned government corporation under the policy direction of the Secretary of Commerce, with the appropriate authority to borrow, set fees (within parameters Congress would set), and issue its own regulations.**

Past Academy reports have tended to recommend a Chief Executive Officer but not a governing board for government corporations. There are no stockholders for a board to represent. Also, some government corporations have not been well-served by large boards. Therefore, the Academy Panel believes an Advisory Board or Advisory Committee would better serve USPTO rather than a formal governing board of directors and believes such an advisory body could provide guidance in terms of stakeholder interests.

A key feature of USPTO's culture is that its work is far more geared to measurable production than most federal agencies with a highly educated workforce, and the patent workforce is also highly unionized. The consequence is that nearly all aspects of work process and workforce management are negotiated. Given that management and its largest union have been at impasse for decades, proposed reforms may not be accepted with alacrity even if they make sense, because they require negotiation. This is not a healthy organizational culture.

**The Panel recommends that USPTO develop strategies to make theirs a more positive, collaborative organizational culture.**

These efforts should start with an assessment of the current culture, probably by an external group, and should involve employees and managers. Top management should continually reinforce that USPTO is a good employer; its employees receive excellent benefits and enjoy a very flexible work schedules, and work in state-of-the-art facilities.

It is essential that an organization's culture support its mission, and a culture cannot be changed overnight. Cultural change has costs, such as time away from production for focus groups or training, consultant fees, purchasing materials and allowing staff time to read them, or producing a video on how the organization plans to institute change. The Panel believes the long-term benefits will far outweigh the costs.

## **HUMAN CAPITAL MANAGEMENT SYSTEM**

With only 45 percent of the workforce having five years or more of service, USPTO lacks adequate numbers of seasoned examiners to meet its mission challenges. The current human capital system will become an increasing liability to USPTO as even larger portions of the

federal workforce (the Departments of Homeland Security and Defense) implement their new personnel systems and demonstrate the benefits of human capital agility in the federal framework. Those agencies with more constraints will likely be less competitive in the recruitment marketplace.

The Panel believes that the General Schedule pay system impedes USPTO's ability to attract and retain employees. With a personnel system tailored to its needs, USPTO could adopt a pay scale or performance-based pay system that could improve recruitment and reduce attrition, thus keeping more experienced employees rather than training them for several years before they leave to join law firms or other entities as patent attorneys or agents. A performance-based pay system could also expedite the collective bargaining process.

The new DHS personnel system, with a labor-market based pay structure and performance-based pay increases, is in place. While unions have raised issues about the framework for the labor-management relationship, the independent Homeland Security Labor Relations Board provides a valuable vehicle for the quick resolution of all bargaining matters and disputes and ensures continued focus on agency mission. Aspects of this system could be a model for a tailored USPTO personnel system. The Panel believes that if, and only if, USPTO receives congressional authority to develop a more flexible personnel system, it should not be reluctant to pay rates that are substantially above General Schedule levels. It would be far more efficient, for the agency and patent applicants, to retain patent examiners rather than to lose half the number hired within a short period of time, as is the case in most fiscal years.

**The Panel therefore recommends that USPTO work with Congress and OPM to develop an impasse resolution system that permits prompt renegotiation of work processes and pay rates.**

## **TIMELINESS AND WORK PROCESSES**

High performing organizations constantly struggle with using their limited resources efficiently while at the same time ensuring the delivery of high quality work. USPTO's strategic plan acknowledges the importance of issuing high-quality patents in a timely manner. It is a substantial challenge particularly due to funding volatility and the backlog of patent applications.

Pendency is the key measure that USPTO uses to assess the timeliness of processing patent applications. First-action pendency is defined as the time (measured in months) from when an applicant files an application and USPTO makes a preliminary decision about whether to issue a patent. Although first-action pendency averages 20.2 months (up from 7.6 months in FY 1993 and 13.6 months in FY 2000), examiners spend only about 20 hours on average reviewing a patent application. First-action pendency includes time an examiner is not reviewing an application—primarily time in the queue. Pendency varies by the subject area of the application. For example, in FY 2004, it was 31.4 months for the communications area, and 15.2 months for the mechanical engineering, manufacturing, and products area.

In part, conditions beyond USPTO's control—the volatility of the U.S. economy, the concomitant but sometime unexpected increase in applications, and the consequences of not having access to all patent application fees—have created today's massive backlog of patent applications (more than 830,000, up from 244,646 in 1993). Between FYs 1992-2004, USPTO did not have access to \$741 million of the fees it collected, the preponderance of which (\$573 million) came from patent fees. This \$741 million represents between 6 and 7 percent of the total funding available to USPTO during this period. The inherent nature of the appropriations process prevents some fees from reaching USPTO in unanticipated high-volume years because USPTO's budget is set months prior to the start of the fiscal year.

Simulations using USPTO's patent resource model, which the Academy Panel independently evaluated before using, show that if USPTO had been given access to these fees and applied all or most of them to patent staffing, it would have had the ability to consistently hire staff and FAOM pendency could have remained at an average of 11.4 to 12.6 months. USPTO's FY 2005 appropriation permits access to most of the patent fees collected, as does the President's FY 2006 budget request.

**The Panel believes this recent action to allow fuller access to patent fees is a step in the right direction. To provide more funding certainty, the Panel recommends that Congress take steps to ensure that all fees USPTO collects during future fiscal years are available for its use without fiscal year limitation.**

To help USPTO achieve efficiencies in patent processing and possibly reduce pendency, USPTO initiated, at the direction of Congress, a pilot program to test outsourcing the "search" function of the patent prosecution process. The search function involves reviewing patent or non-patent literature for historical references to inventions that are similar to those in a patent application. USPTO estimates that about 20 percent of the total patent prosecution time would be saved if another entity conducted the search. The Panel recognizes that pendency cannot be quickly reduced by hiring new patent examiners. However, it has reservations about outsourcing, in part because the European Patent Office (EPO) previously had the search and examination functions done by different staff members and now has combined these functional responsibilities to achieve greater efficiency. The Japan Patent Office (JPO) began, in the mid-1980s, to outsource some searches because statutes did not permit them to hire more staff. JPO examiners work directly with searchers, most of whom are in a quasi-governmental entity, and the only searches outsourced are those that can be done in patent literature.

Questions remain about whether private search firms will be attracted to this type of work given the conflict-of-interest requirements or whether they can perform work at the same level of quality as USPTO staff. A thorough evaluation of the pilot program will be critical because the results will have an impact on USPTO's future business vision, which calls for leveraging search results from others—foreign patent offices, the patent applicant, and private contractors. Congress has required such an evaluation.

**The Panel recommends, as part of the evaluation of the pilot, that USPTO examine the potential to outsource the search function to a federally funded research and development center that would work exclusively for USPTO.**

Such centers—which have more flexible hiring authorities—can secure the skills the agency needs, do not have a proprietary interest in the work, and have little incentive to breach the principles of confidentiality.

Eliminating unnecessary rework offers another opportunity to increase efficiency in patent processing. In 2004, 25 percent of examiners' work could be described as rework. Patent law allows a form of rework known as "continuations," which allow an applicant to request another review of the same invention that was included in a prior application—even if USPTO rejected the patent. Continuations provide an applicant a substantial benefit, because this second review skips the queue and receives the same priority for processing as the original application. This means other applicants wait longer for USPTO to review their applications. There are valid uses for continuations, but there are also indications that some applicants use them to “game the system.” There are varied proposals to limit the use of continuations, either through congressional action or USPTO rule-making.

**The Panel recommends that:**

**USPTO use every means possible to work with stakeholders to provide Congress with the necessary information to assist it in identifying the appropriate number of continuations that should be allowed.**

**Congress amend patent law by establishing a specific maximum number of continuations that will be allowed for any patent application.**

Finally, worksharing (relying on aspects of the examination process that foreign patent offices have completed) also has potential to increase efficiencies in processing patent applications and reducing workload. Currently, USPTO, EPO, and JPO (the Trilateral Offices) annually receive almost 200,000 applications in common (more than half USPTO's annual volume of new filings). To achieve the goal of worksharing, the Trilateral Offices need to better understand each other's work methods, and each country needs to amend certain provisions of its patent law to accommodate worksharing. The need for greater collaboration is under discussion and, to some extent, is the driving force behind current patent law reform efforts. A 2004 National Academy of Sciences (NAS) report concluded that the United States, Europe, and Japan should further harmonize patent examination procedures and standards to reduce redundancy in the search and examination functions and eventually achieve mutual recognition of results.

**The Panel strongly supports harmonization and recommends that USPTO work closely with Congress to provide it with the necessary information to amend patent laws to achieve harmonization.**

## QUALITY

Patent quality is important because USPTO's decision on a patent application has economic spillover effects to other businesses and, more broadly, to competition and innovation. Thus, it is important for USPTO to conduct quality reviews during application processing and "get it right the first time" to prevent issuance of inappropriate patents, with their attendant litigation costs and adverse technological impacts. For the last 25 years, USPTO has assessed quality by determining whether the claims in a patent clearly meet the statutory criteria. To make this assessment, USPTO reviews between two to three percent of approved applications. The error rate from FYs 2000-2004 varied from a high 6.6 to a low of 4.2 percent. Although the error rate has remained fairly stable, several studies, congressional hearings, and scholarly articles report perceptions that patent quality has declined, particularly in areas of technology in which patents have only recently been granted, such as computer software and business methods. However, these concerns have not been quantified.

To respond to concerns that patent quality has declined, USPTO implemented several initiatives to ensure appropriate patentability determinations and improve the knowledge, skills, and abilities of examiners. The Panel believes many of these are consistent with sound management practices and acknowledges that additional quality reviews affect timeliness of application processing.

**The Panel recommends that USPTO monitor the results of these reviews to (1) ensure that their implementation does not result in denying or seriously delaying patents to deserving inventors, and (2) identify the appropriate number of reviews needed to sustain quality without adversely affecting pendency.**

In addition to raising concerns about quality, others—the Federal Trade Commission, NAS, and scholarly articles—recommended various regulatory or legislative reforms to improve quality. USPTO's strategic plan includes one such reform—developing a new post-grant review process—which would reduce the volume of litigation by providing a new administrative opportunity to rule on patent validity. Though many stakeholders agree on the need for a new process, they differ on certain design elements. The Panel reviewed four major proposals for establishing a post-grant review process, including proposed legislation.

**The Panel agrees with the provisions of the four proposals for post-grant review that provide for (1) administrative patent judges conducting the process and (2) an appeals option to the Court of Appeals of the Federal Circuit.**

**The Panel recommends the following with regard to the other elements of a post-grant review process:**

- **The grounds for a challenge be limited to patentability and not enforceability.**



- **Discovery be limited to cross examination on matters relevant to the grounds for review.**
- **Estoppel from further litigation be limited to those issues raised and resolved in the proceeding.**
- **The patent owner be permitted a single narrowing of any claims, with the addition of dependent claims on good cause shown.**

**If a post-grant review system is adopted, the Panel recommends that USPTO compile data on the costs and benefits of post-grant review and *inter partes* reexamination, including the impact on patent quality. These data should help inform Congress about whether both systems should be maintained.**

## **WORKFORCE AVAILABILITY AND SKILLS**

USPTO places highly skilled knowledge workers—its patent examiners—in a production environment and measures their performance primarily in quantitative terms. Those who can work in this environment can receive substantial bonus pay, but the production system may be a contributing factor to high attrition rates.

In 10 out of 13 years, from FY 1992-2004, for every ten patent examiners hired, five left; many within the first three years. Because examiners become fully productive only after several years of USPTO work experience, it is essential to retain staff. USPTO does not systematically use exit interviews to determine why examiners leave, but senior USPTO staff attribute high attrition to:

- Pay in relation to the Washington, DC cost of living
- The lack of a real-world understanding about the job on the part of recent graduates
- The difference between the often-isolating and repetitive desk work of USPTO patent examination duties and those of research or bench science, for which many USPTO employees have trained
- The up-front career plans of many new employees, who use this USPTO experience as a stepping stone to law school, or, if already a lawyer, to a more lucrative private practice or employment opportunity in intellectual property

The Panel believes that USPTO is on the right track with:

- Bringing in new human resources management leadership so that USPTO can apply additional and improved techniques in recruiting and retaining staff

- Developing videos and better recruitment literature to more clearly explain the work to potential recruits and requiring personal interviews for all applicants to assess their overall competence and communication skills
- Using information gleaned from quality reviews of patent examiner work to help individual examiners improve their work

**However, USPTO needs to do more, and the Panel recommends that it:**

- **Systematically determine why patent examiners are likely to leave within their first three years with the office and determine if it can make accommodations to retain them**
- **Develop competitive recruitment programs (a “patent scholars program”) to raise USPTO visibility on campuses and attract more of the best graduates**
- **Use more of the hiring flexibilities now permitted under its status as a performance-based organization and general federal personnel regulations**

While USPTO cannot hire its way out of its pendency problems in the short term, unchecked attrition of recent hires is at historical levels and will likely exacerbate the pendency problem and reduce the quality and consistency of patent determinations. An organization that so significantly affects innovation in the U.S. and around the globe needs to have and use the flexibility to deal with these challenges to optimize its performance. The Panel offers several recommendations to help USPTO deal with the problems of staff erosion, improve morale, and enhance the retention of experienced and technology-savvy examiners upon whom the system relies.

With an additional \$503 million devoted to examiner staffing, USPTO would have had:

- FA of 12.6 months
- Issuance pendency of 22.6 months
- 416,203 more patent application disposals

To achieve these levels of pendency and patent application disposals, USPTO would have used 5,059 more work years between FY 1992-2004 and had 3,811 examiner staff on board at the end of FY 2004 instead of 3,681.

## STAFF HIRING LEVELS AND PRODUCTIVITY

Table D-1 shows how a consistent flow of additional funds would have affected hiring in each of the three simulations, and then shows the actual number of hires and attritions. The most noticeable difference is that hiring patterns fluctuate substantially in the actual hiring column.

**Table D-1**  
**Simulations' Estimates of Hires Needed to**  
**Achieve First Action Pendency, Actual Hiring, and Attrition**

Fiscal year	1 <sup>st</sup> simulation's estimate of hires (\$680 million)	2 <sup>nd</sup> simulation's estimate of hires (\$573 million)	3 <sup>rd</sup> simulation's estimate of hires (\$503 million)	Actual hires	Actual attrition
1989	283	283	283	283	219
1990	503	503	503	503	247
1991	350	350	350	227	210
1992	350	350	350	227	166
1993	400	400	400	210	131
1994	400	400	400	216	161
1995	400	400	400	283	162
1996	400	400	400	380	190
1997	400	400	400	204	239
1998	500	400	400	728	259
1999	500	400	400	799	375
2000	500	470	400	375	437
2001	500	500	400	414	263
2002	500	500	400	769	250
2003	500	500	500	308	241
2004	500	500	500	443	336
<b>Total</b>	<b>6,986</b>	<b>6,756</b>	<b>6,486</b>	<b>6,369</b>	<b>3,886</b>

Source: USPTO's Patent Production Model

Table D-2 shows patent examiner productivity by grade and TC, expressed as hours per production unit. A production unit is defined as a first action plus a subsequent disposal (not necessarily for the same application) divided by two. Since a period of months separates first and final actions on a single application, the actions in this measure do not refer to the same application.

### **The Cost of the First Simulation's Hiring Approach**

The Academy staff asked USPTO to provide an estimate of the costs of increased staffing each model year. To do this, Patent's Office of Financial Management incorporated the 2005 pay schedule into the model and applied it to each year's staffing by grade. Thus, all of the simulation estimates are expressed in 2005 dollars. Academy staff converted this estimate into a series of estimates each year expressed in then-current dollars for that year.

To make these conversions, Academy staff obtained the annual federal pay raise adjustments, including locality pay adjustments from the Office of Personnel Management web site. Academy staff converted these pay raise adjustments to an annual index with FY 2005 = 1.0000 and multiplied this by the values calculated by the model.

The increased cost depends both on increased staff, as shown in Figure 1, and the annual federal pay raises. The total increase amounted to \$680 million (which included costs of space for new hires, training, equipment, and overhead).

With the first simulation, USPTO would have had to use some of the \$168 million that was not available to Trademarks to have attained the FY 1996 pendency levels in 2004. Since this could not have occurred, the second simulation uses the actual amount of funds that was unavailable to patent operations.

### **SECOND SIMULATION: ACCESS TO \$573 MILLION ADDITIONAL FEES**

All of the assumptions for the second simulation were the same as for the first, but the total funds stipulated as available for staffing were limited to a number close to the \$573 million that Patents did not receive between FY 1992-2004. Assuming USPTO had these additional funds during this time period, FY 2004 FA pendency would have averaged 11.4 months (compared to the actual 20.2), and total pendency would have averaged 21.2 months (compared to actual 27.6). This information is also reflected on Figure D-1.

To achieve these pendency levels, USPTO would have needed 5,954 additional work years between FY 1992-2004 (see Figure D-2), and would have had on board 4,081 staff in FY 2004 instead of 3,681. USPTO would have prosecuted an additional 478,079 applications between FY 1992-2004.

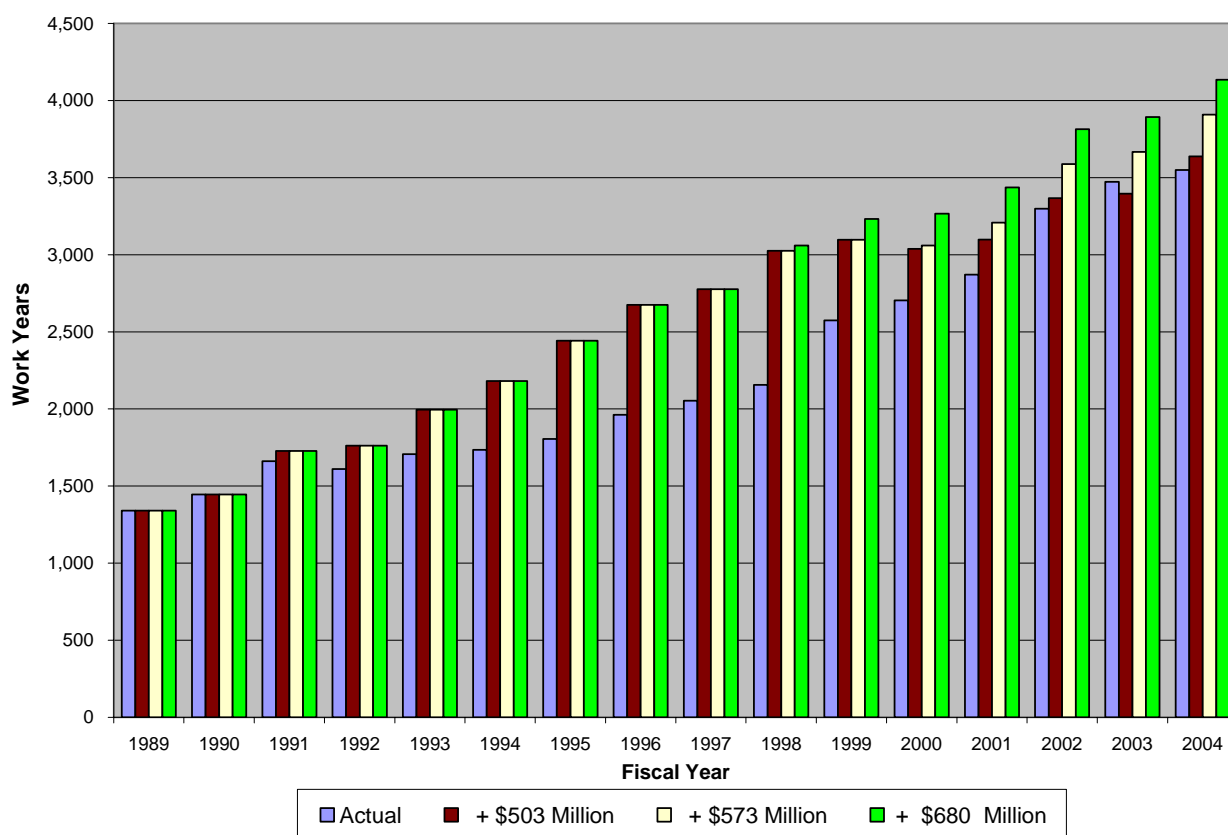
### **THIRD SIMULATION: ACCESS TO \$503 MILLION IN ADDITIONAL FEES**

During any 12-year period, it is unlikely that an organization would use all additional resources on staffing; some would go to information systems, customer service, quality enhancements, etc. Thus, the Panel looked at the impact of some number less than the full \$573 million and chose \$503 million. Using a number only \$70 million less than \$573 million assumes that most added resources would have gone to staffing so as to keep pendency within a reasonable timeframe

The additional \$680 million would also have meant that total pendency would never have exceeded the FY 1996 level of 20.8 months. In FY 2004, total pendency would have declined to 18.2 months compared to the actual 27.6 months.

To have maintained the FY 1996 pendency levels, USPTO would have needed 7,237 work years above historical levels over the period FY 1989-2004. With the additional work years, USPTO could have prosecuted 562,676 additional applications. Figure D-2 shows that, beginning in 1991, additional staff are added in steady increments. Using this hiring approach, at the end of FY 2004, USPTO would have had 4,308 patent staff instead of 3,681 staff. With the FY 2005 appropriation, USPTO will reach approximately the same level of staffing, but has no chance of reaching the equivalent pendency levels. Additional staff added in FY 2005 are primarily intended to prevent the problem from getting worse.

**Figure D-2**  
**Historical and Simulated Impacts of Additional Staffing Resources**  
**on Examiner Work Years**



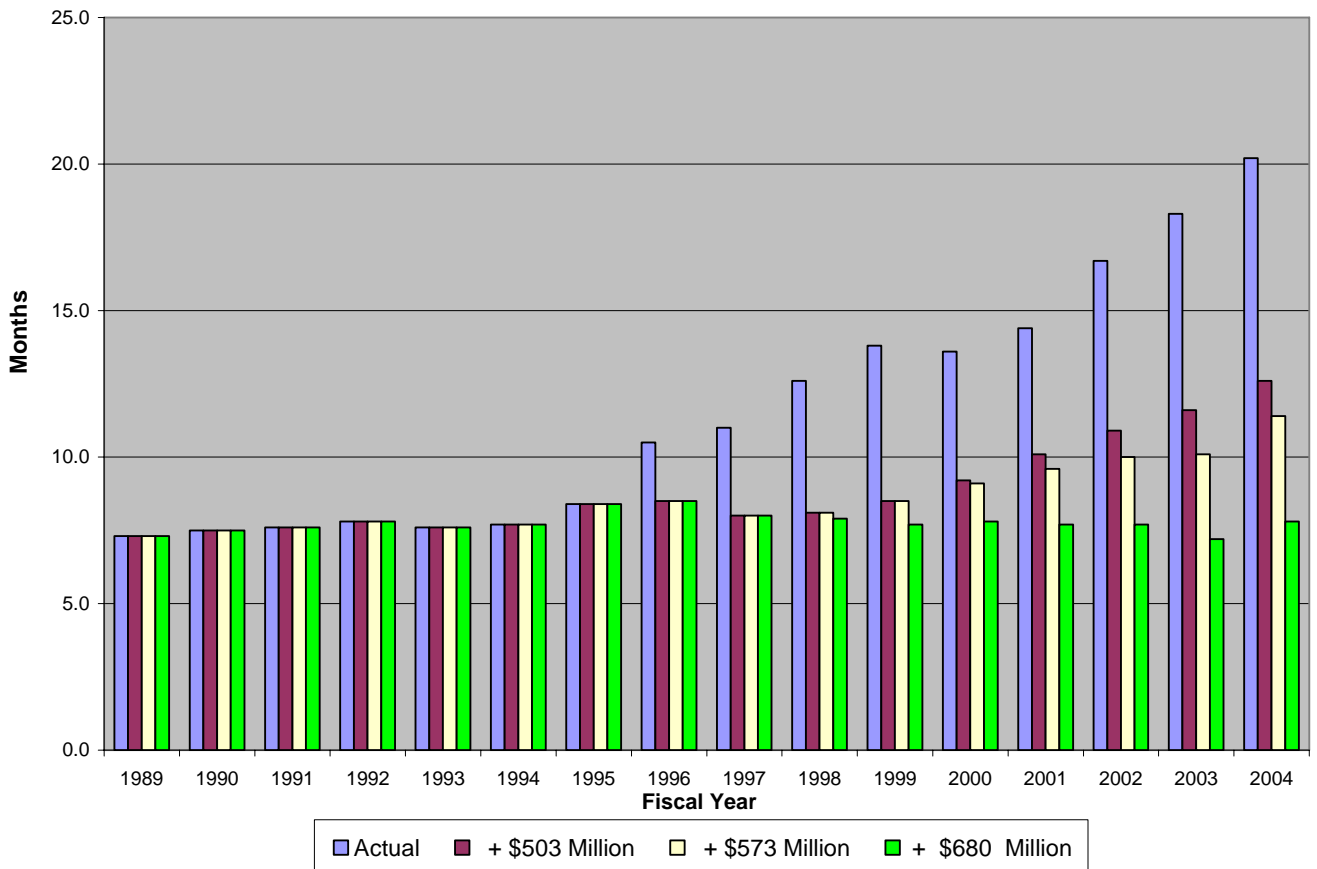
Source: USPTO's PPM

**Analysis of the First Simulation**

The first simulation showed that USPTO would have needed about \$680 million of its unavailable fees to ensure that FA and total pendency would never have exceeded the FY 1996 levels. Figure D-1 shows how these additional staff reduce FA pendency to 8.5 months beginning in FY 1996. Subsequently, historical pendency generally increases, (with the exception of FY 2000), while the pendency associated with increased hiring in the model begins a steady decline. By FY 2004, actual FA pendency was 20.2 months, while FA pendency using the simulation’s hiring approach is only 7.8 months--61.4% percent below the historical level.

Figure D-1 shows historical FA pendency rates and pendency rates calculated by the three simulations using the model.

**Figure D-1  
Historical and Simulated Impacts of Additional Staffing Resources  
on FA Pendency**



Source: USPTO’s PPM

This appendix presents the results of the three simulations on pendency in terms of months to achieve the first action (FA), months to final pendency, and additional applications processed as of 2004. It also examines patent staff productivity based on years of experience with USPTO.

### **FIRST SIMULATION RESULTS: ACCESS TO SUFFICIENT ADDITIONAL FEES TO REACH FY 1996 PENDENCY LEVELS**

The assumptions for the first simulation were:

- USPTO would have had no limitations on total fees available for additional staffing.
- USPTO would have had no fiscal year limitations on its use of funds.
- USPTO would have hired staff to reduce FA and total pendency to the maximum extent possible consistent with a sustainable work force (no layoffs, fully employed and factoring in actual attrition).
- USPTO would have made full allowance for all associated hiring costs (space, equipment, training, supervision, overhead, etc.).

Using these assumptions, the Panel requested the historical information and simulations for:

- FA and total pendency rates
- level, and average grade of the work force
- salary and benefit costs of examiner hires and
- total costs

The methodology was relatively straightforward. The number of hires was the only variable that changed in the model. The number of hires was increased each year. The model accounted for actual attrition, promotions, and productivity. Hiring was adjusted in a series of approximations to produce a pattern of staffing that kept pendency at its FY 1996 level or better.

Because the Panel was aware that worker productivity and pendency vary by technology, sometimes substantially, the Panel requested the historical data and simulations for each TC. Patent officials said they could not provide data by TCs before 1998 because the TCs did not exist. They indicated they could not compile the pre-1998 data to correspond to the subject areas of the current TCs. Academy staff obtained productivity information by TC from another source, and these data are presented later in this appendix (Table D-1).

## SIMULATIONS USING THE PATENT PRODUCTION MODEL

The Office of Patent Financial Management, which is under the Commissioner for Patents, uses its Patent Production Model (hereafter referred to as the model), which it developed during the 1980s, to link staffing, productivity, workload and production, and forecast expected pendency. Despite its age and primitive format, an Academy staff review determined that the model is a solid analytic effort. It is USPTO's primary vehicle for making staffing and program impact projections.

Per the Panel's guidance and the Academy staff's request, USPTO used the model to simulate the impact on pendency if USPTO had access to all or a portion of the funds that USPTO collected from FYs 1991–2004. The amount that Congress did not make available to USPTO during this period had been estimated at \$742 million. Because Congress can choose to provide some of the initially unavailable funds to USPTO, ultimately the collected fees that were unavailable to USPTO were \$741 million.<sup>1</sup>

Additional analysis showed that, of the \$741 million, \$573 million comprised unavailable patent fees and \$168 million unavailable trademark fees. To determine the impact on staffing and pendency, the Panel requested that USPTO simulate the programmatic impact if additional funds had been available for staffing.<sup>2</sup> The Panel had USPTO do three simulations. For each, the Panel wanted to know the impact on pendency if additional resources been available for examiner staffing, and what level of staffing would have been needed to achieve given levels of pendency. The three simulations were:

- What amount of spending would have enabled USPTO to maintain 1996 levels of patent pendency?
- What difference would an amount close to \$573 million (the funds Patents did not receive) have made?
- What difference would a lesser amount of spending (\$503 million) have made?

The first two simulations assume that any additional funding would be efficiently used to expand patent examiner staffing to meet annual workloads. Moreover, the additional funding would have been provided throughout the period rather than in one or two large lumps. This allowed the model to avoid or minimize the development of any workload backlogs. The third simulation assumed that USPTO might have chosen not to use the entire \$573 million on examiner staffing.<sup>3</sup>

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<sup>1</sup> Essentially, Congress made a certain dollar amount of fees unavailable for USPTO use each year and then, in differing amounts over the years, allowed the agency to use some, but not all prior year money for patent and trademark functions. This made tracking the fee diversions somewhat challenging. The agency used three criteria to determine the allocation of these carryover funds: (1) requested funding level for each of the program components; (2) estimate of fees for each program for the current year; and (3) if allowed by Congress, amount of carryover money available.

<sup>2</sup> For this simulation, the number of hires was the only variable that changed to reach or exceed a specific pendency goal. The model accounted for all attrition, promotions, and productivity. Hiring was not increased beyond the level that could be funded from the fees.

<sup>3</sup> The \$503 million chosen for the third simulation was an arbitrary number (\$70 million less than total unavailable patent fees), used to demonstrate a simulation with an amount less than the \$573 total patent fees unavailable.



While on average, it takes about 20 hours to examine a patent application, productivity varies by TC. Part of variation may stem from differences in application complexity. Typically, the most senior examiners are at least three times as productive as the most junior, according to USPTO standards.

**Table D-2**  
**Examiner Hours per Production Unit by Grade and TC\***

<b>Grade</b>	<b>1600</b>	<b>1700</b>	<b>2100</b>	<b>2600</b>	<b>2800</b>	<b>3600</b>	<b>3700</b>	<b>Corps</b>
15	15.7	12.1	21.1	19.7	11.8	11.8	11.2	13.0
14	16.9	15.0	22.1	19.0	14.6	14.4	13.5	14.5
13	20.4	17.8	25.7	24.2	17.5	18.0	16.3	18.9
12	25.2	21.0	29.1	28.6	20.4	23.1	19.6	21.9
11	37.5	23.9	33.1	30.2	23.0	22.3	21.4	26.3
9	38.2	26.6	41.0	37.1	27.0	25.2	24.6	33.4
7	66.5	52.6	59.6	51.8	36.5	50.5	41.7	52.7
5	<u>N/A</u>	<u>N/A</u>	<u>71.0</u>	<u>61.8</u>	<u>76.1</u>	<u>128.5</u>	<u>48.0</u>	<u>64.7</u>

Source: USPTO, *Special Examining Production Report*, PALM3180-PR3, 10/06/2004

\* USPTO hires very few staff at the GS-5 or GS-7 levels, so production unit hours for these grade levels represent a small number of PEs.

**Note:**

1600	Biotechnology and Organic Chemistry
1700	Chemical and Materials Engineering
2100	Computer Architecture, Software & Information Security
2600	Communications
2800	Semiconductor, Electrical, Optical Systems & Components
3600	Transportation, Construction, Agriculture & Electronic Commerce
3700	Mechanical Engineering, Manufacturing, Products & Design

The wide variability in examiner productivity and the uniformly low productivity of junior examiners suggest that volatility in staffing is likely to result in high costs and low production in comparison to a steadily growing work force. In 2004, a GS-15/1 examiner was paid 3.6 times as much as a GS-5/1 entry level examiner, not including overtime and bonuses, but was 5 times as productive. A GS-12 made 2.2 times as much and was 2.8 times more productive. In general, it pays to retain workers, if only from a narrow productivity perspective. This argument is strengthened when one considers the costs of recruitment, hiring, and training, and the fact that attrition is highest in the entry level grades.