EXHIBIT 2

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION

IN RE: CAPITAL ONE CONSUMER DATA SECURITY BREACH LITIGATION	)	MDL No. 1:19md2915 (AJT/JFA)

This Document Relates to the Consumer Cases

DECLARATION OF STUART E. MADNICK

I, Stuart E. Madnick, pursuant to section 1746 of thistle 28 of the United States Code, hereby declare as follows,

I. INTRODUCTION

1. I have been asked by Plaintiffs' Class Counsel in the above-captioned class action to evaluate and provide expert opinion on the cybersecurity program implemented as part of the Cyber Event Action Plan as set forth in the settlement agreement and in the declaration of Zaheer Ladak, provided in support of the settlement, and to consider whether such measures provide a cognizable benefit to the Class and other parties who maintain their Personally Identifiable Information (PII) within Defendants' systems. In addition, I have been asked to evaluate if the changes will improve the overall security posture and remediate the deficiencies by Capital One resulting in the intrusion and data breach that was announced on July 29,2019.
2. My opinions are based on my formal education and training, my review and assessment of the discovery provided by Plaintiffs' Class Counsel, generally accepted sources within the field of information security, and my professional experience detailed below.
3. I am the John Norris Maguire (1960) Professor of Information Technology, Emeritus, at the Sloan School of Management and a Professor of Engineering Systems for the School of Engineering, both at the Massachusetts Institute of Technology (MIT). I also have held the Leaders for Manufacturing Professor of Management Science chair.
4. I have been a faculty member at MIT since 1972 and have served as the head of MIT's Information Technologies Group for more than 25 years. During that time, that group has been rated as best in the nation among information technology programs in all major

studies of which I am aware, including *U.S. News & World Reports*, *Business Week*, and *ComputerWorld*.

5. Over the last forty-eight years, I have held numerous positions at MIT including being a member of MIT's Center for eBusiness, MIT's Center for Transportation Studies, MIT's Engineering Systems Division, MIT's International Financial Services Research Center, and served on the executive committee of MIT's Center for Information Systems Research, in addition to being an affiliate member of MIT's Laboratory for Computer Science.

6. I have researched and lectured extensively on subjects relating to computer operating systems, software development, information technologies, and cybersecurity. Of particular relevance to the issues in this case, is my expertise in areas related to cybersecurity. My involvement in cybersecurity research goes back to 1973 when I was the Principal Investigator for the "Sloan Information Systems Security Project," funded by IBM. Based on that research, I co-authored several journal articles, such as "The Hierarchical Approach to Information System Security" in the *IBM Systems Journal* in May 1975. In 1979 I co-authored the book *Computer Security*, one of the first on the subject.

7. Subsequently, I have co-authored two other books on cybersecurity, written at least 25 papers in major journals and conference proceedings on cybersecurity, supervised 10 theses on cybersecurity, and conducted 8 research projects on cybersecurity with funding of over $6,000,000. I have been sought out as an expert on cybersecurity to write articles or be interviewed by organizations such as The *Wall Street Journal, Harvard Business Review*, *Forbes, USA Today*, *American Banker, Energy Futures*, and many others, and to speak at major meetings such as the International Energy Agency.

8. In 2014 I founded a research group, Cybersecurity at MIT Sloan: *the Interdisciplinary Consortium for Improving Critical Infrastructure Cybersecurity,* which is one of the leading research groups on cybersecurity.

9. In addition, I have broad expertise in the principles of software engineering and Internet/Web technologies, as well as their applications to businesses and other large organizations. My expertise in these areas has been gained through graduate training, research, teaching, consulting, and business experience, which is reflected in my more than 400 papers and other publications.

10. I have extensive research and development experience in the fields of computer science and software engineering. I have also been active for several decades in the design and development of computer software applications and operating systems.

11. I hold degrees in Electrical Engineering (B.S. and M.S.), Management (M.S.), and Computer Science (Ph.D.) from MIT. In addition to being a member of the MIT faculty for about 48 years, I have been a visiting professor at Harvard University, Nanyang Technological University (Singapore), University of Newcastle (England), the Technion (Israel), Victoria University (New Zealand), Université Paris Panthéon Sorbonne (Paris, France), Northumbria University (England), University of Nice (Nice, France), Florida Atlantic University (USA), University of Edinburgh (Scotland), European Research Consortium for Informatics and Mathematics (Sophia Antipolis, France), and Conservatoire National des Arts et Métiers (Paris, France.)

12. I am also a member of several professional information technology, computing, and electrical engineering societies. I have served in several leadership roles in these professional societies, including as a member of the Board of Governors of the Institute for

Electrical and Electronics Engineers (IEEE) Computer Society and Chairman of its Technical Committee on Database Engineering, and as Vice President of the Very Large Data Base Foundation.

13. I have researched and lectured extensively on subjects relating to computer operating systems, software development, information technologies, and cybersecurity. Early in my career, I was the principal author of a textbook, *Operating Systems* (McGraw-Hill, 1974), which has been translated into several languages and had been used at hundreds of colleges and universities. I am also the co-author of other books, such as *The Strategic Use of Information Technology* (Oxford University Press, 1987) and *The Dynamics of Software Development* (Prentice-Hall, 1991). The last book received an award from the Systems Dynamic Society in 1994 for "best contribution to the field of system dynamics in the preceding five years."

14. In addition to my research and development work in academia, I have extensive experience in the development of information systems for industry. I have been a key designer and developer of projects including IBM's VM/370 virtual machine operating system, IBM's Script/370-word processing system, and Lockheed's DIALOG information retrieval system. I have also co-founded several high-tech firms, including Intercomp (acquired by Logicon), Mitrol (acquired by GE Information Systems), Cambridge Institute for Information Systems (predecessor to the Cambridge Technology Group and Cambridge Technology Partners), and iAggregate (acquired by ArsDigita, which was subsequently acquired by Red Hat).

15. In addition to my teaching activities at MIT, I have conducted technical training and executive education programs for other organizations, and as a result I have worked with

hundreds of executives from major corporations and have extensive knowledge of the operations and management of major organizations throughout the world.

16. I have also developed various software technologies and received patents, such as "Querying Heterogeneous Data Sources Distributed Over a Network Using Context Interchange", U.S. Patent 5,953,716; "Data Extraction from World Wide Web Pages", U.S. Patent 5,913,214; and "Querying and Retrieving Semi-Structured Data from Heterogeneous Data Sources by Translating Structured Queries", U.S. Patent 6,282,537.

17. In my opinion, the improvements embodied in the Cyber Event Plan reduce the risk of compromise of PII that gave rise to this litigation and as such, confer a benefit to Class Members .

II INFORMATION REVIEWED

18. In preparation of this analysis, I reviewed the declaration of Zaheer Ladak, and the Business Practice Changes, an exhibit to the Settlement Agreement. Throughout the course of this case, I also had access to the database of documents produced by the Defendants and depositions, all of which are described in the expert report that I submitted in this case.

III REVIEW AND EVALUATION OF BUSINESS PRACTICE CHANGES

19. The improvements and changes made by Capital One increases and creates an improved security posture. The improved posture will serve to proactively protect and identify attempts to compromise data held by, and entrusted to, Capital One. A summary review of each improvement area agreed to by Capital One is below.

20. Specifically, Capital One has:

- Strengthened the company's perimeter security defenses by, among other things, (i) implementing an improved web application firewall architecture; and (ii) extending the company's anti-bot capabilities;

- Strengthened the company's cloud governance practices by, among other things, enhancing oversight of controls for cloud services;
- Enhanced the company's cloud security standards, procedures, and controls, by among other things, (i) enhancing compliance tracking; and, (ii) implementing additional cloud security controls;
- Strengthened the company's security configuration management practices, by among other things, (i) updating the company's Security Configuration Management Procedures for cloud and non-cloud resources to close any potential procedural or scope gaps; and (ii) enhancing baseline configuration documentation and compliance processes;
- Expanded the monitoring of the company's cloud environment and improved the alert coverage and the intelligence of that environment, by among other things, (i) reviewing logging and alerting practices for enhancement opportunities; and (ii) reviewing the company's Information Security Standards and enhancing them as appropriate;
- Improved readiness and training for analysts in the company's Cyber Security Operations Center ("CSOC"), by among other things, (i) reviewing and enhancing CSOC operating procedures; and, (ii) improving alert handling by improving automation and adding additional information and intelligence;
- Strengthened the company's vulnerability scanning and penetration testing practices;
- Improved existing restrictive access for humans, machines, and resources in the company's AWS environment, by among other things, (i) enhancing access policies

for storage services; (ii) enhancing machine identity and access management policies; and (iii) enhancing governance procedures for AWS access management;

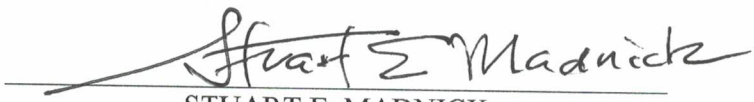
- Strengthened the company's data protection controls and governance, by among other things, making enhancements to standards, monitoring, and exception management;
- Enhanced the company's data loss prevention program to better identify and measure risk and improved corresponding technical capabilities;
- Enhanced board and senior management oversight of the company's cybersecurity program and elevated adherence monitoring to enterprise policies;
- Enhanced the company's cybersecurity skills framework and recruiting and training programs; and
- Increased the number of cloud and cyber certified practitioners employed by the company.

IV. SUMMARY AND CONCLUSION

21. In my assessment, the improvements undertaken by Capital One will reduce the likelihood of the repetition of the events that led to the breach that gave rise to this litigation. Taken as a whole, the training, increased staffing, third party assessments, hardening, improved logging, monitoring, scanning combined with red team testing will reduce the likelihood of a similar successful breaches and also proactively detect and prevent other types of intrusion attempts and potential vulnerabilities.

I declare under penalty of perjury, under the laws of the United States of America, that the above statements are true and correct.

Executed on this the 22nd day of August, 2022, in Boston, Massachusetts.



STUART E. MADNICK