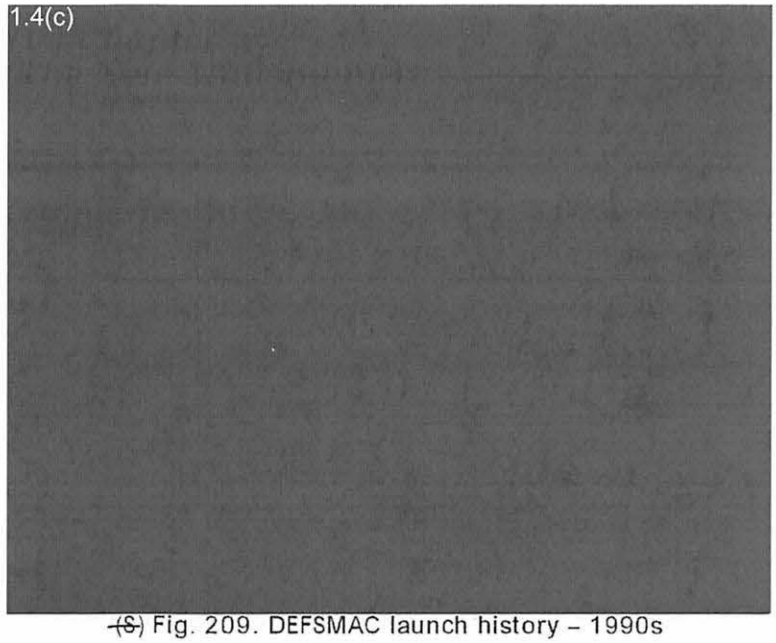
(U) Chapter 5
EPILOG (The New Millennium)

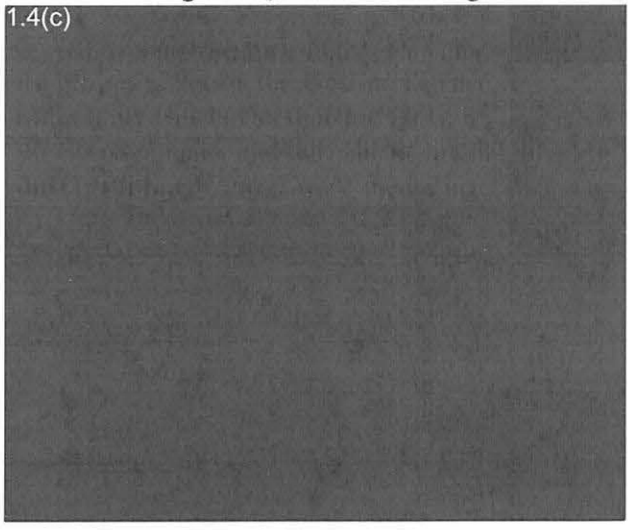
(U) Overview

~~(S)~~ The early years in the 21st century have not significantly added to resources for FIS or for DEFSMAC. Continued reductions in personnel have occurred, particularly with the few remaining experienced personnel retiring given the incentives offered by NSA. Collection priorities have of course dropped for former Soviet targets but have been made up in the sometimes more challenging "Third World" collection and coordination scenarios. Figure 209 shows the decrease in missile and space launch activity from 1991 to 2000.



~~(S)~~ Fig. 209. DEFSMAC launch history – 1990s

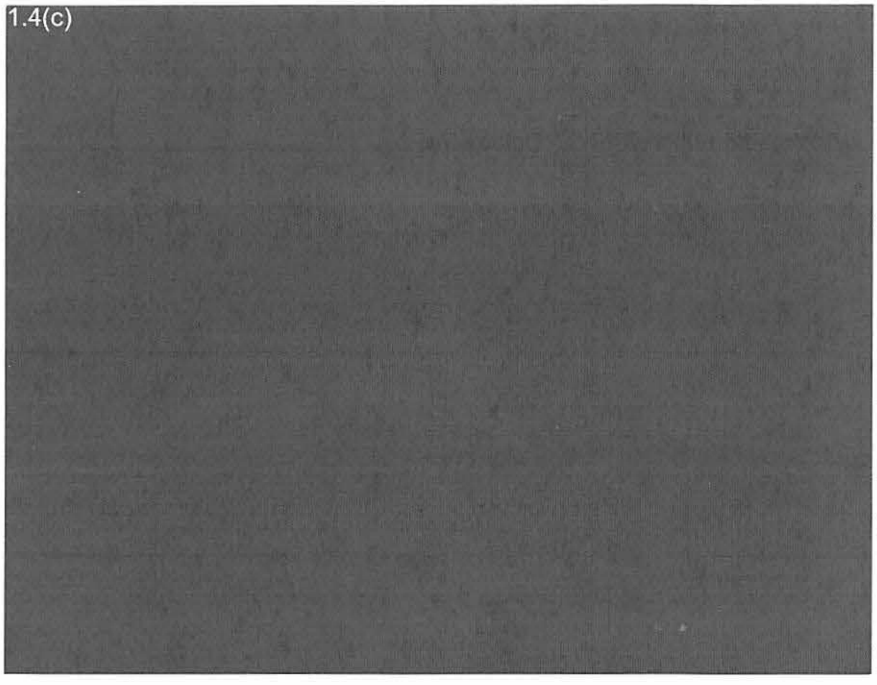
~~(S)~~ Around the turn of the calendar from 1999 to 2000, the U.S. intelligence community concluded that foreign missile developments, and the ballistic missile threat to the U.S. through 2015, were increasing. This was



(U) By the middle of 2001, there were over 2,000 foreign orbiting earth satellites (over 1,300 from Russia) sponsored or owned by over 50 countries. 1.4(c) 1.4(c) There were over 1.4(c) 1.4(c) as possible intelligence targets. The expansion of satellite targets, while not as challenging as the diverse missile launch problem, is still a challenge to DEFSMAC and FIS collectors. Figure 210 shows the connectivity and collection assets that DEFSMAC had to deal with the challenge.

(U) DEFSMAC and Other Management Changes

(U) Starting in 2000, Boyd D. Davis served briefly as director of DEFSMAC and also served as chief of the NSA Office of Weapons and Space. PL 86-36/50 USC 3605 was appointed director of DEFSMAC in November of 2000, as described below.



(~~S//TK~~) Fig. 210. DEFSMAC 2000 connectivity

(~~C~~) The NSA component of DEFSMAC, W9D, became PIW1 in early 2000. In this reorganization the "analytic" elements doing "missiles" and reporting (PIW17) joined the traditional "Operations Center" (PIW11) and "Initial Reporting" (PIW14 and PIW16) functions in DEFSMAC. TEBAC, Target Plans, Dissemination, and Weapons and Space Language Analysis also became part of PIW1. "Space" analysis became part of PIX, Information Operations Support, as PIX23.

(~~C~~) In the middle of 2000, the NSA inspector general completed an organizational inspection of DEFSMAC. A key recommendation was that the director of DEFSMAC return to being a separate NSA senior executive position and that the chief of Weapons and Space not be "dual hatted" as DEFSMAC director. This resulted in the appointment of PL 86-36/50 as DEFSMAC director in late 2000. Also it was again considered that a five-team watch operation (similar to NSOC) be established, instead of the existing four team rotation, to improve morale. This idea was dropped in view of the continued pressure to not increase billets at NSA. It was also recommended that DIA and NSA review the 1964 DEFSMAC DoD Directive "Charter" for DEFSMAC. This was done informally as part of the DIA reassessment of its role in DEFSMAC. [150]

(~~C~~) The NSA portion of DEFSMAC, P1W1, became PIW4 in November 2000. With the formation of PIW4, the Missiles long-term SIGINT reporting and Space long-term SIGINT reporting became part of PIW5. The "weapons" SIGINT analytic function was also transferred to PIW5, the Technical SIGINT Exploitation Division, as PIW53. The "space" analytic functions administratively remained as PIW56 but was matrixed to the Office of SIGINT Support to Information Operations. Once again DEFSMAC was back to its "origins" and had current operations as its core (PIW41). This organization was headed by PL 86-36/50 Early all-source analysis and reporting on missiles (PIW42) was headed by Bill Harrigan of DIA, and early all-source analysis on foreign space (PIW43) was headed by PL 86-36/50 USC 3605 PL 86-36/50 USC 3605 a long-term DEFSMAC senior analyst and manager, became the DEFSMAC staff chief. James Kline, a long-term DEFSMAC manager, had retired in October 2001, as had Walter Stevens, the operations technical director. Figure 211 illustrates the care that Stevens had developed in support the 1.4(c) facilities over twenty-five years of service in

Date: Fri, 8 Dec 2000 08:12:26 -0500 (EST)
From: "Walter J. Stevens" <wjstev1@defsmac.do.nsa>
To: rlberna@nsa
Subject: PERSONNEL CHANGES
Classification: SECRET
PL 86-36/50 USC 3605

Classification: ~~SECRET~~

~~SECRET~~
ACODEASP/DCO1/S00,HE/PP/514,DCA1,DW9T,DOC1,DCO1,DST2,GLRY//
FM DEFSMAC DIRECTOR OF OPERATIONS (JIM KLINE)
TO: 1.4(c)

DTG 0612452 DEC 00
SUBJECT: PERSONNEL CHANGES

1. THIS IS TO INFORM YOU THAT WALTER J. (WALT) STEVENS WILL BE RETIRING AS DEFSMAC'S OPERATIONAL TECHNICAL DIRECTOR AT THE END OF THIS MONTH. HIS DUTIES WILL BE ASSUMED BY MR. PL 86-36/50 USC FROM NSA OFFICE PL 86-36/50
PL 86-36/50 USC 3605

2. I ANTICIPATE A SMOOTH TRANSITION FOLLOWING WALT'S RETIREMENT BUT ASK THAT YOU INCLUDE MY ADDRESS DCO1 ON ALL MESSAGES YOU SEND THAT REQUIRE AN ACTION.

3. WALT HAS FAITHFULLY SERVED OUR MUTUAL MISSION FOR MANY YEARS AND WE WISH HIM WELL IN HIS FUTURE PLANS.

REGARDS,
JIM KLINE
DIRECTOR OF OPERATIONS
DEFSMAC

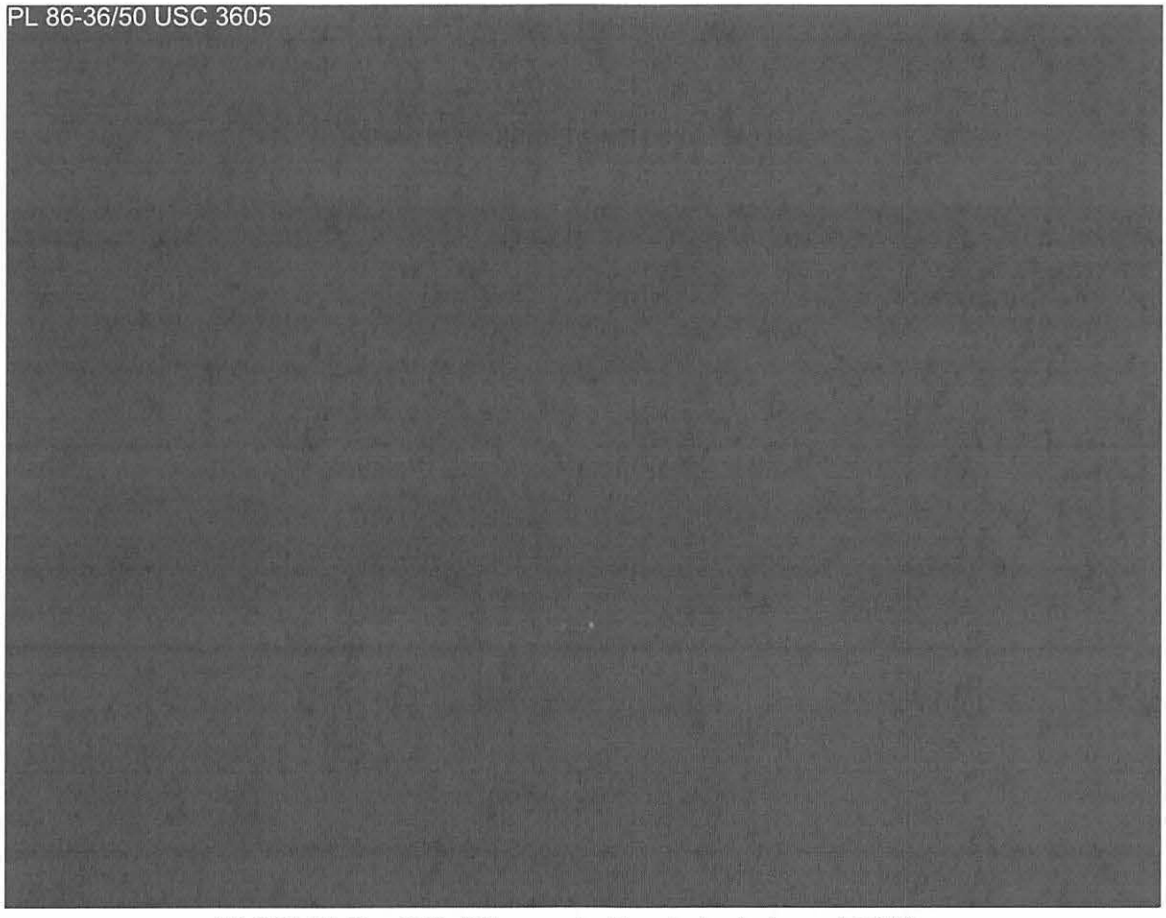
~~(S)~~ Fig. 211. DEFSMAC
1.4(c)

DEFSMAC. In December 2001, PL 86-36/50 USC 3605 combined the DEFSMAC missile and space analytic areas to form the Intelligence Missile and Space organization under Mr. Harrigan, and PL 86-36/50 USC 3605 became the DEFSMAC chief of staff. At this time the data systems support organization was in S212, Technology Services, and seven of its members, primarily performing day-to-day DEFSMAC support remain collocated with the DEFSMAC Center.

~~(C)~~ The PIW designations were not to last very long. In early 2001, the former DO (SIGINT Operations) and DT (Telecommunications and Research) merged into the SIGINT Directorate (SI). This caused PIW to become S2J, the Office of Weapons and Space. DEFSMAC became S2J2.

~~(C)~~ With the 2002 reorganization, Weapons Systems, e.g., missile systems, became part of S2J3, the Technical Signals Exploitation Group. Space Systems became S2J36. FISINT and Signals Analysis (signals processing) became S2J37. The former DEFSMAC/NSA/W11 SIGINT sharp focus on the tasking function just sort of "disappeared" except for the OCMC focal point for Weapons and Space overhead topics. The FIS aspects of Signals Research and Target Development became S2J11. The remainder of the S2J Weapons and Space organizations were focused on ELINT and PROFORMA. The complete S2J organization chart, as of August 2002, is shown in figure 212.

(U//FOUO) In early 2000 DIA had proposed to replace all DIA personnel in DEFSMAC (then about eleven billets) with collaborative computer mechanisms so that the DIA DEFSMAC functions could be performed at DIA Headquarters and/or the DoD Science and Technology Centers. A joint DEFSMAC, NSA and DIA study, with other affected DEFSMAC participants and customers, was completed in July 2000. The report recommended that some DIA presence continued to be required within the DEFSMAC operations and reporting area. DIA decided to leave about six people integrated into the



(U//FOUO) Fig. 212. S2J organizational chart, August 2001

Center, concentrated in the analysis and reporting function, and including the DEFSMAC deputy director position.[51] In 2001, DIA changed its headquarters focal point for DIA DEFSMAC participation from its long association with the Directorate for Collection (CL) to the Technical Assessments Group in the Directorate for Intelligence, Analysis, and Production (DITA). In early 2002, DIA assigned the first civilian DEFSMAC deputy director, Deirdre Bumbera. All previous deputy directors since 1964 had been U.S. Air Force colonels.

(U) In mid-2002 the USSPACECOM reorganized and the North American Aerospace Defense Command (NORAD) became part of the United States Northern Command (USNORTHCOM). NORAD will stay in Colorado Springs, and there should be little change in DEFSMAC/NORAD relationships. PL 86-36/50 USC 3605 was appointed at the NSA/CSS representative to USNORTHCOM and NORAD, and Jack Bobela will remain as the DEFSMAC exchange officer to NORAD. It is not yet clear how DEFSMAC activities with the new U.S. Strategic Command to be located in Omaha, Nebraska, will be arranged.

~~(S//TK)~~ In 2001 and 2002, after a study by the U.S. ELINT community, led by the recently formed Community ELINT Management Office (CEMO) located at NSA, it was concluded that ELINT needed a better focus and cohesion that could best be obtained by centralizing many of the function in

1.4(c)

1.4(c)

1.4(c) It was concluded that DEFSMAC should remain at its present location, housed at NSA with continued DIA participation. In August of 2003, DIRNSA consolidated

1.4(c)

~~(C)~~ The first plan for building and outfitting the SIGINT Missile and Astronautics Center (SMAC), which preceded DEFSMAC, operations and reporting facility at NSA was completed in August 1962.[152] The Center had been "modernized" and improved in an incremental fashion several times, mostly through automation and other computer database support. The move of the Center from the second floor of the NSA Operations building to the first floor was the first major "physical" upgrade. After almost four years of operations in the "new" DEFSMAC center on the first floor or the NSA OPS-1 building, DEFSMAC was once again ready for physical, mostly computer and other electronic, upgrades. A plan was developed in March of 2002 (forty years later from 1962) calling for an investment of over PL 86-36/50 USC 3605 for five phases over six years. Also, the NSA Information Technology Infrastructure Services (ITIS) organization has prepared a DEFSMAC Transition Management Plan to transition the DEFSMAC Distributed Computing services from the Internal Service Provider (ISP)/A16 to the External Service Provider (ESP)/Eagle Alliance (EA). The DEFSMAC Modernization Acquisition Plan was expanded and distributed in September of 2002.

(U//FOUO) In late 2001 the Office of the assistant secretary of defense for C3I decided to review the DEFSMAC charter, the DoD Directive of 1964. After review and discussion with all of the affected DoD organizations, ASD(C3I) decided to reissue the DoD directive with just a few minor changes to the mission and functions of DEFSMAC. The title of DEFSMAC was changed to the Defense Special Missile and Aerospace Center. The ASD(C3I) reviewer said:

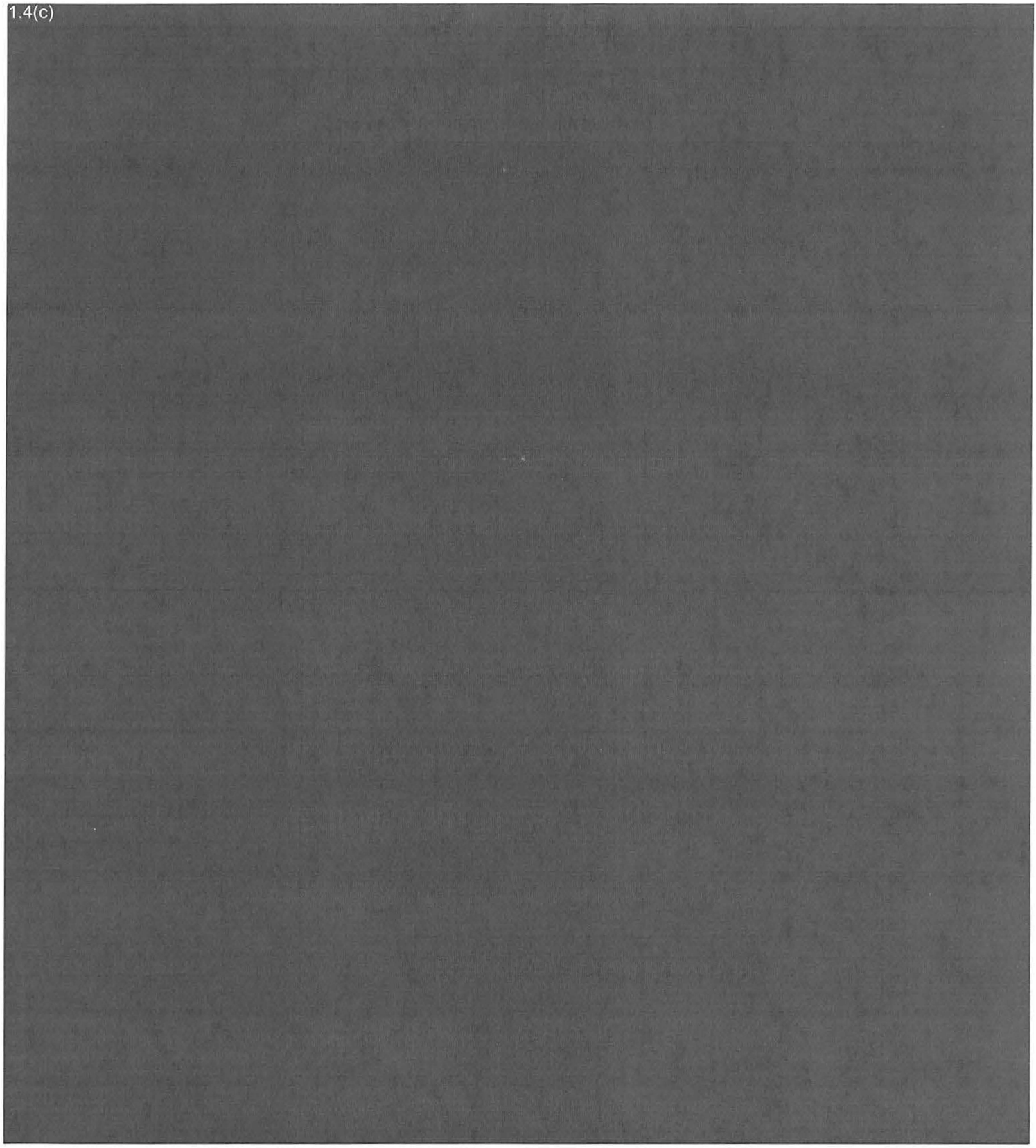
> ***DEFSMAC will not only survive in the 21st century, it will thrive.***

(U) The new charter, DoD Directive S5100.43, was signed by Deputy Secretary of Defense Paul Wolfowitz and was dated September 19, 2002.[153] The first annual joint NSA/DIA report to the DoD under secretary of defense for intelligence, as called for by the new directive, was released by Lieutenant General Michael V. Hayden, USAF, Director, NSA/Chief CSS, on 5 December 2003.[154]

(U) Collection Facilities/Platform Changes

1.4(c)

1.4(c)

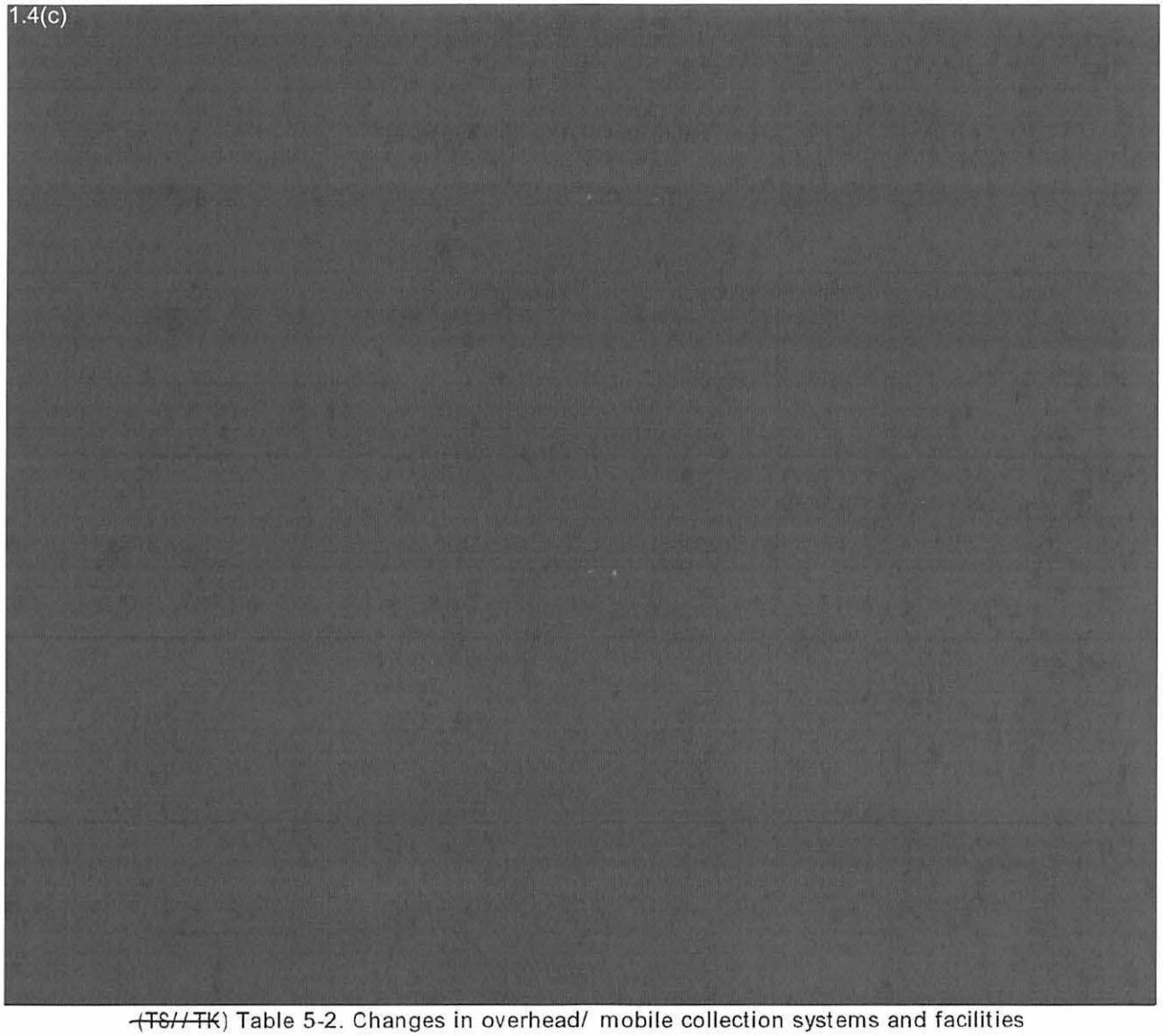


(U//FOUO) Table 5-1 gives an overview of the changes in ground site collection posture from the 1980s until 2002. It is easy to see the significant reduction that has occurred in major ground locations.

Ground Sites	Facility Location	Status in 2002
1.4(c)		

Note: Color type designates closed sites.

(~~S//SI~~) Table 5-1. Ground site collection changes from 1980s to 2002



~~(TS//TK~~) Table 5-2. Changes in overhead/ mobile collection systems and facilities

(U//FOUO) Table 5-2 gives an overview of the many other FIS collection assets.

~~(S)~~ The use of PL 86-36/50 deployments continued in 2000 and to date. Table 5-3 shows some selected efforts.

Year	Project	Location	Target
2000	1.4(c)		
2001			
2002			

~~(TS)~~ Table 5-3. Selected PL 86-36/50 USC 3605 Deployments after 1999

(U) FIS Data Processing

~~(S//TK)~~ There were only very limited sets of field processing upgrades planned for 2003. Minor improvements have continued to be made for 1.4(c)

~~(S)~~ With only one PL 86-36/50 and with two PL positions, PL 86-36/50 USC 3605 PL 86-36/50 The two PL positions will continue to receive and process analog signal tapes, primarily to produce FISDI files for further analysis. The PL equipment is limited to processing the Missile PL 86-36/50 USC signal tapes received PL 86-36/50

~~(S)~~ One new initiative for 2003 is the PL effort to produce a "Super-TAR." This joint effort with the USAF was deferred in 2002 but was scheduled to restart in 2003 with NSA funding. PL provides FIS customers with PL 86-36/50 USC situation awareness by processing FIS data to produce an PL 86-36/50 USC that translates the collected FIS data into 1.4(c) 1.4(c) that can be used directly by the FIS customer.

(U) Important Analytic Results

~~(S)~~ The launch of the 1.4(c) in 2001 allowed DEFSMAC and the collection community to once again use the 1.4(c) 1.4(c) mechanism to affect extensive FIS and other intelligence data collection. Figure 214 shows the results of this operation.

1.4(c)

1.4(c)

~~(TS//SI//TK)~~ Fig. 214. Collection summary

(U) 2000 - 2003 Summary

~~(TS//SI)~~ The new millennium has not brought significant change to the FIS collection assets sponsored by the U.S. or to its allies and partners engaged in FIS activities. The continued diversity of foreign countries launching missiles and satellites continues to strain the available resources 1.4(c) 1.4(c)

Location	Target
1.4(c)	

~~(S)~~ By mid-2002, the many reorganizations at NSA and DIA affecting DEFSMAC began to settle down. This should allow for a more stable management environment in which to effect planning of all NSA FIS activities. While it was once considered that DEFSMAC move 1.4(c) along with a significant portion of the Office of Weapons and Space ELINT functions, it has now been decided to have the DEFSMAC NSA/DIA team remain located within the NSA Operations Building at Fort Meade.

~~(S)~~ The approved planning and budgeting for the DEFSMAC watch center and computer support updating and modernization, and the budget approval for the PL 86-36/50 TAR automation, should provide additional efficiencies and effectiveness of FISINT activities. A congressional-directed review of FIS analysis in 2003 has refocused efforts on a 1.4(c) 1.4(c) This is covered in Objective 1 of NSA's five-year strategic plan.

(U) The revised and updated DEFSMAC charter, issued by DoD in September 2002, firmly solidifies the DEFSMAC mission well into the 21st century.[155]

(U) New Millennium Observations

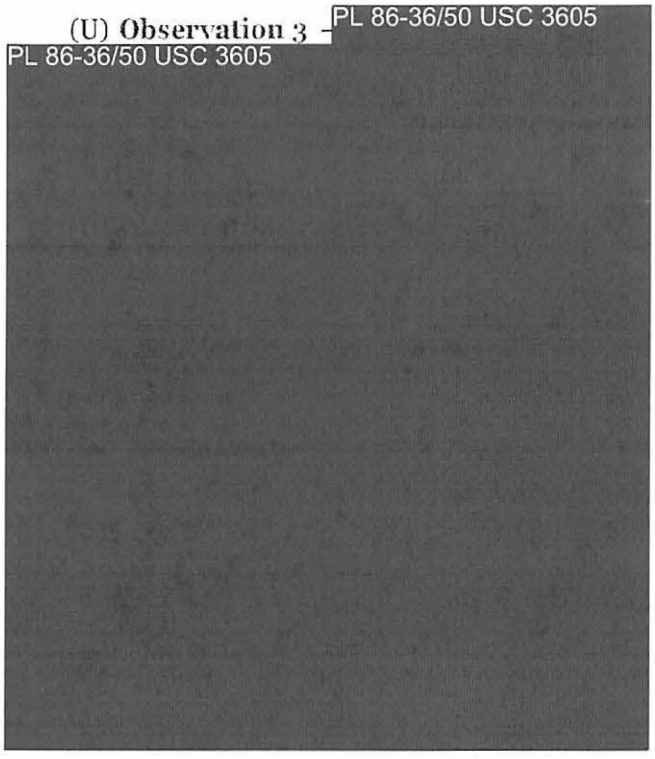
Note: It should be noted that while the "Lessons Learned" sections of the previous chapters (1970s and 1980s) and in Volume 1 (the 1950s and 1960s) were based on extensive documented sets of circumstances. For this chapter this section is largely based on the impression this writer has gathered from limited data and limited discussion with current managers at NSA, CIA, and in industry. They are therefore called "observations" rather than "lessons learned."

~~(TS/TK)~~ **Observation 1 – If you couldn't "do more with less" in the 1990s, you surely can't with even less in the 2000s.** The only 1.4(c) 1.4(c) have remained robust, and the move of the PL 86-36/50 and the use of the 1.4(c) site have helped FIS collection against an expanded list of targets. The continuing expansion of nations adding to their offensive missile and space reconnaissance capabilities continues to challenge DEFSMAC and the FISINT (as well as other SIGINT, MASINT and IMINT) collection managers to provide collection resources for all the potential intelligence targets.

~~(S)~~ **Observation 2 –** 1.4(c) 1.4(c)

(U) Observation 3 – PL 86-36/50 USC 3605

PL 86-36/50 USC 3605



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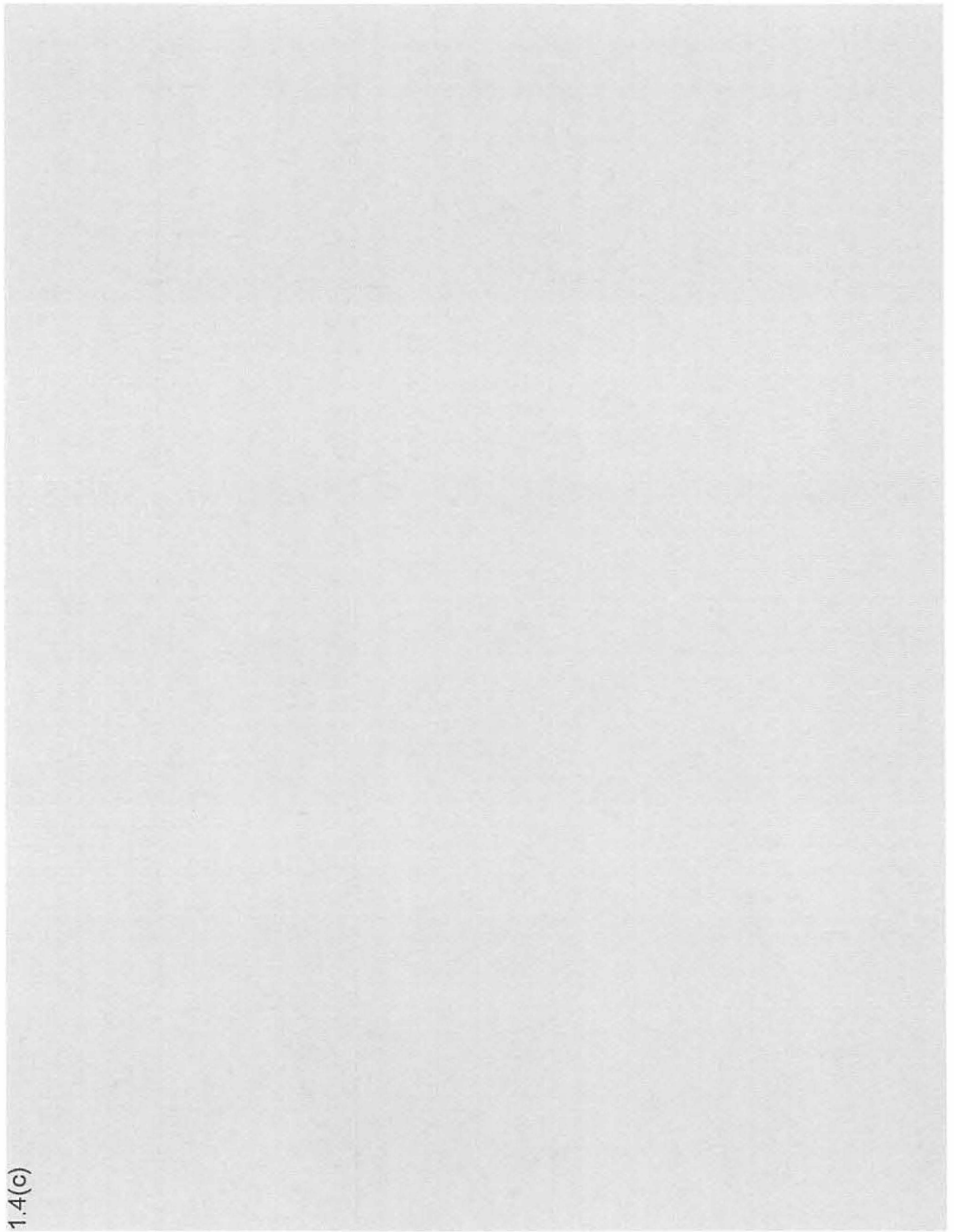

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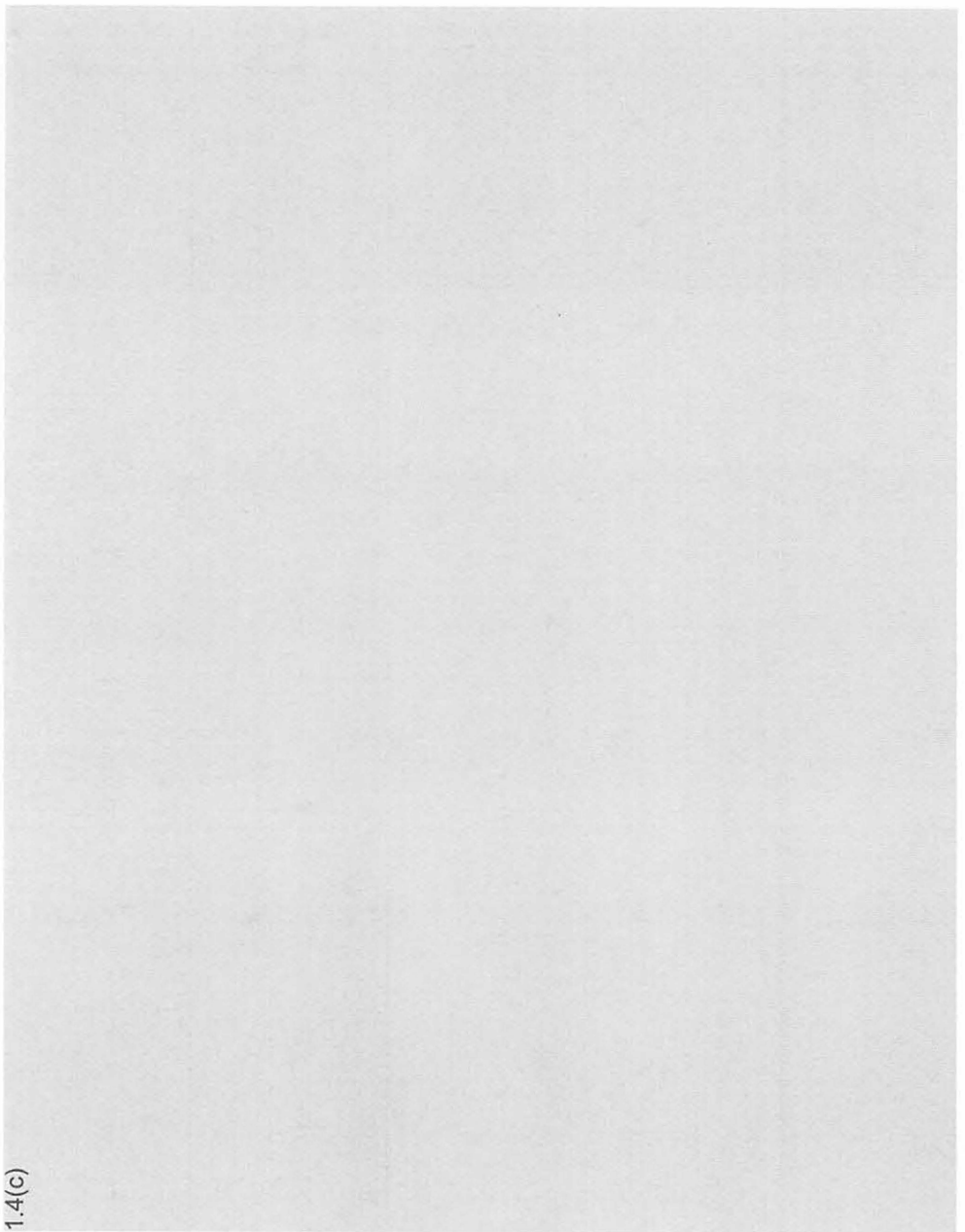

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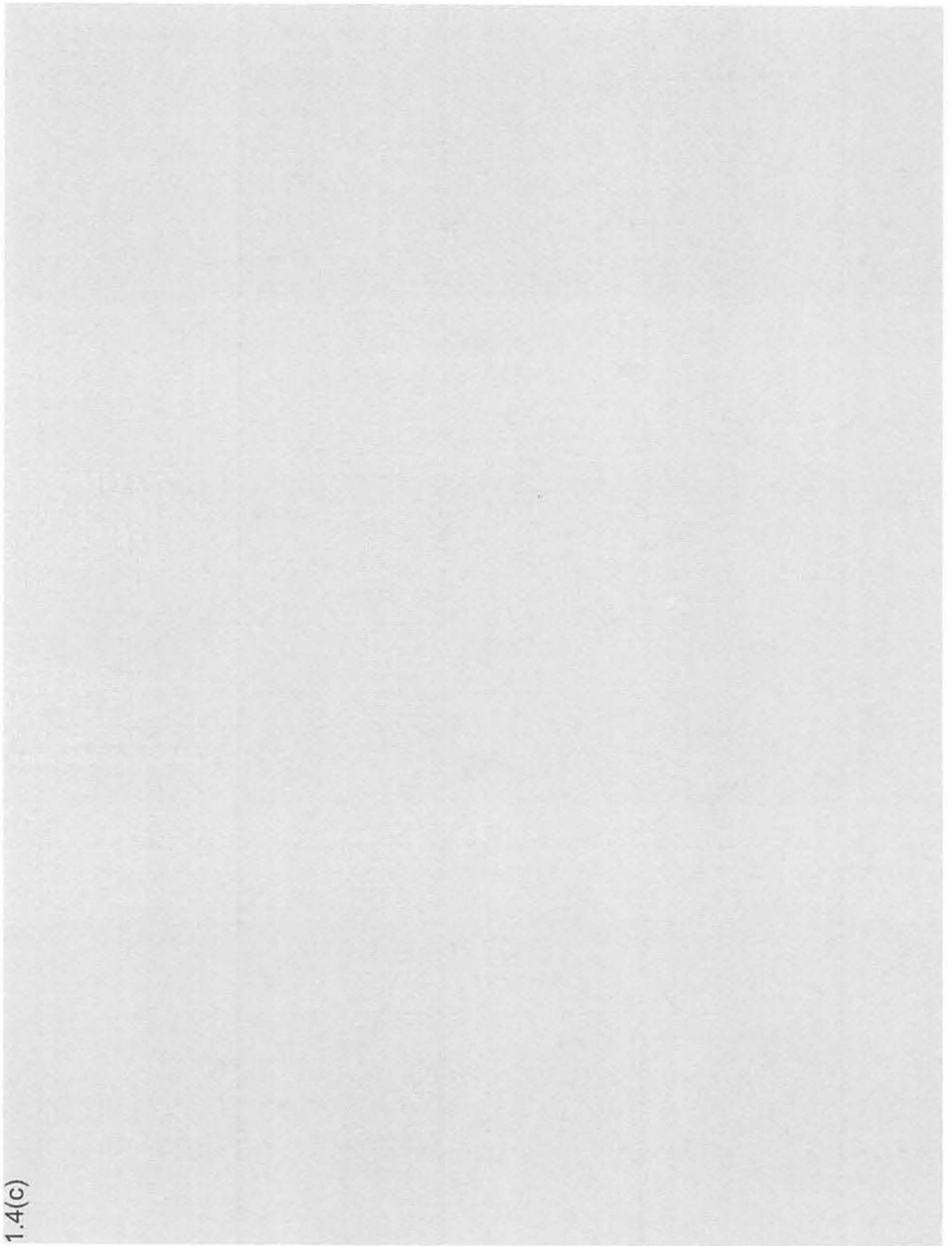

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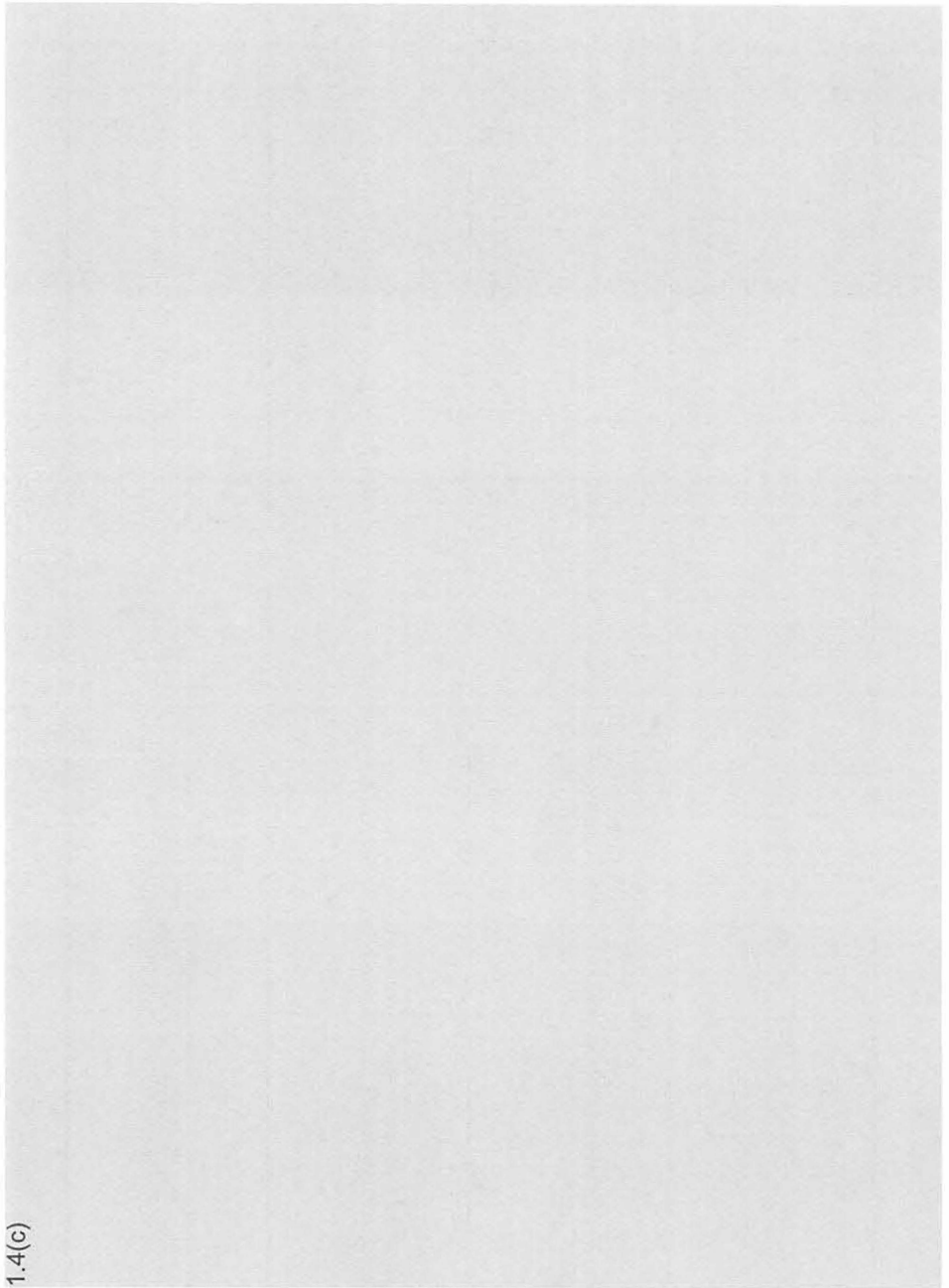

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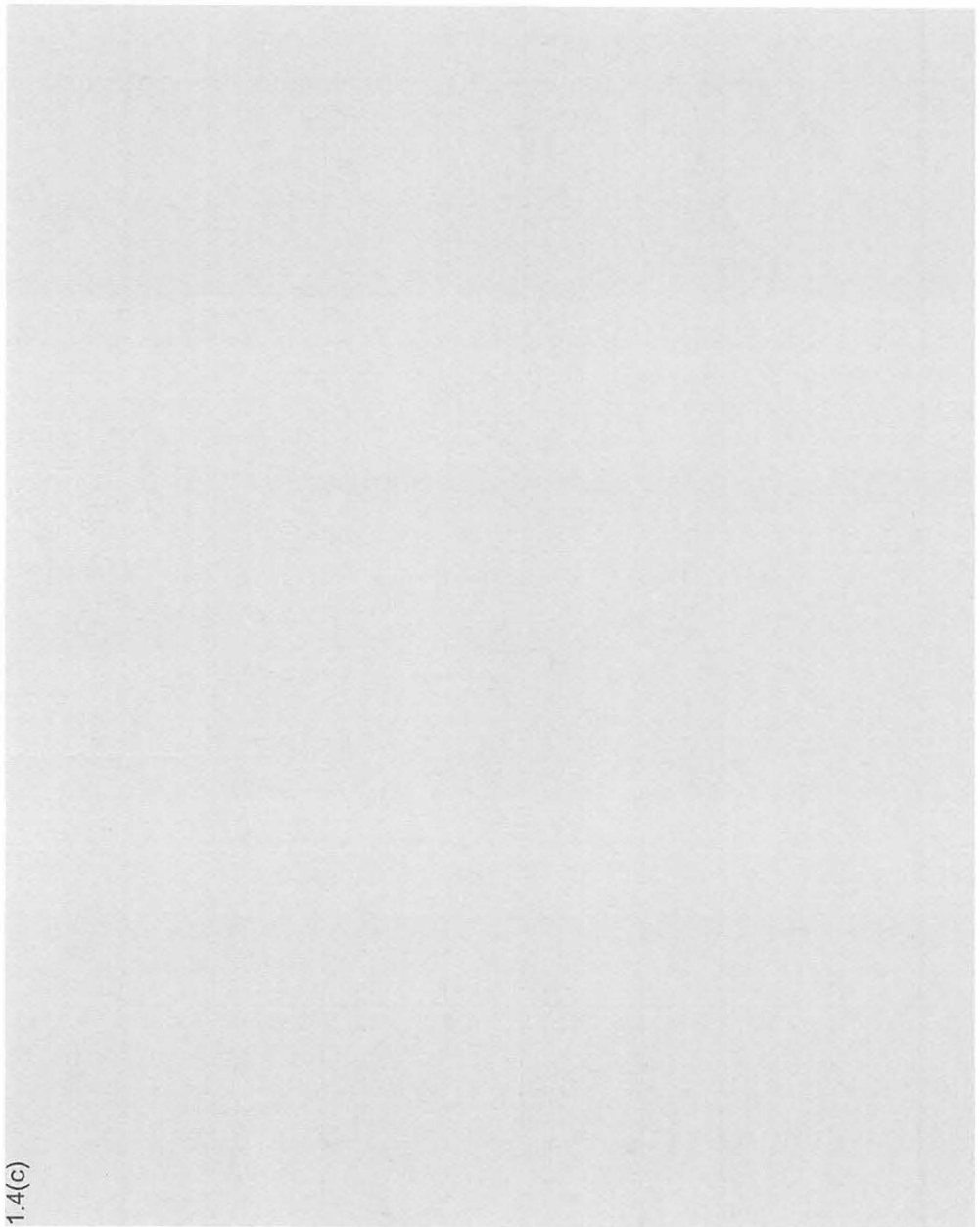

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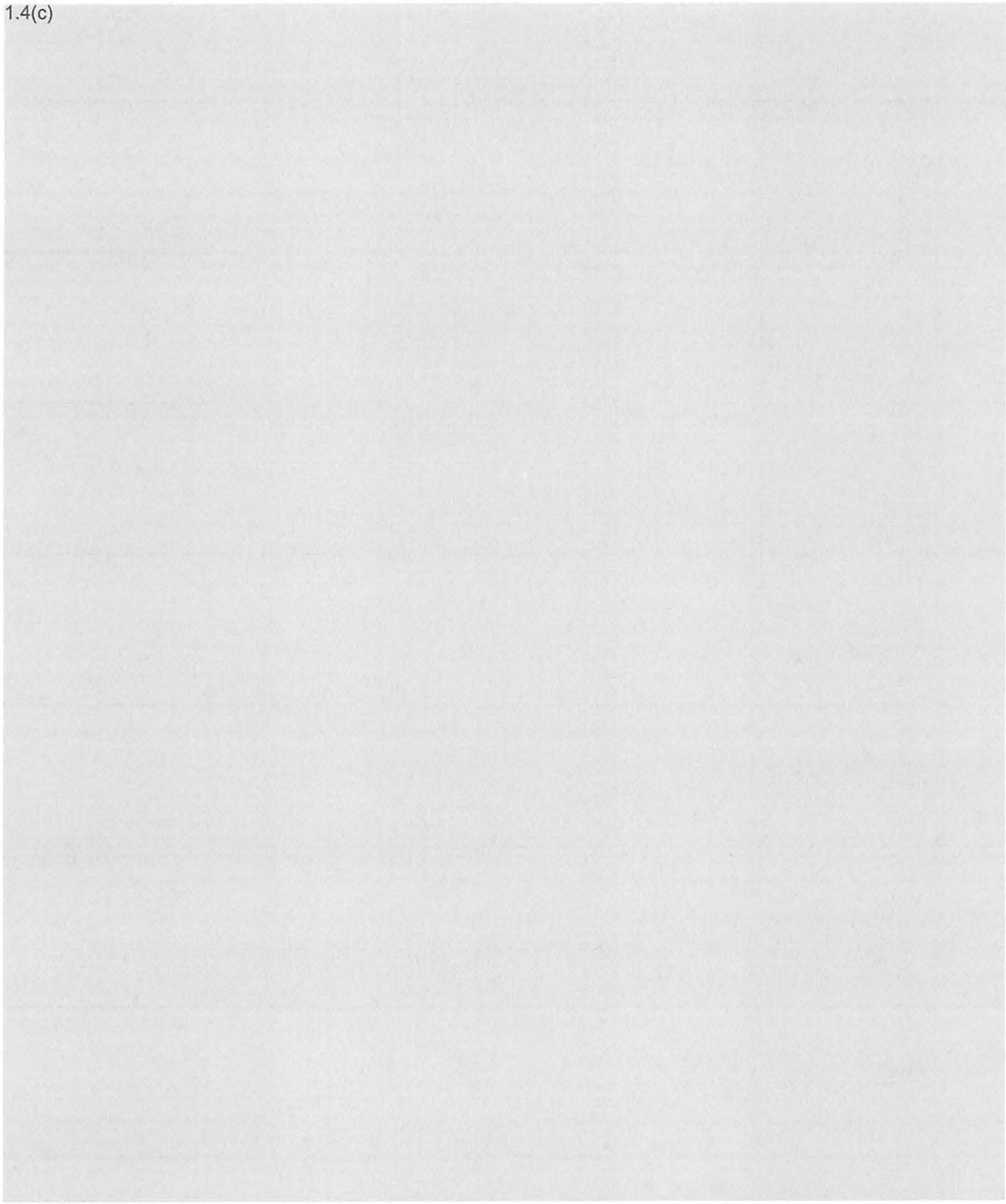

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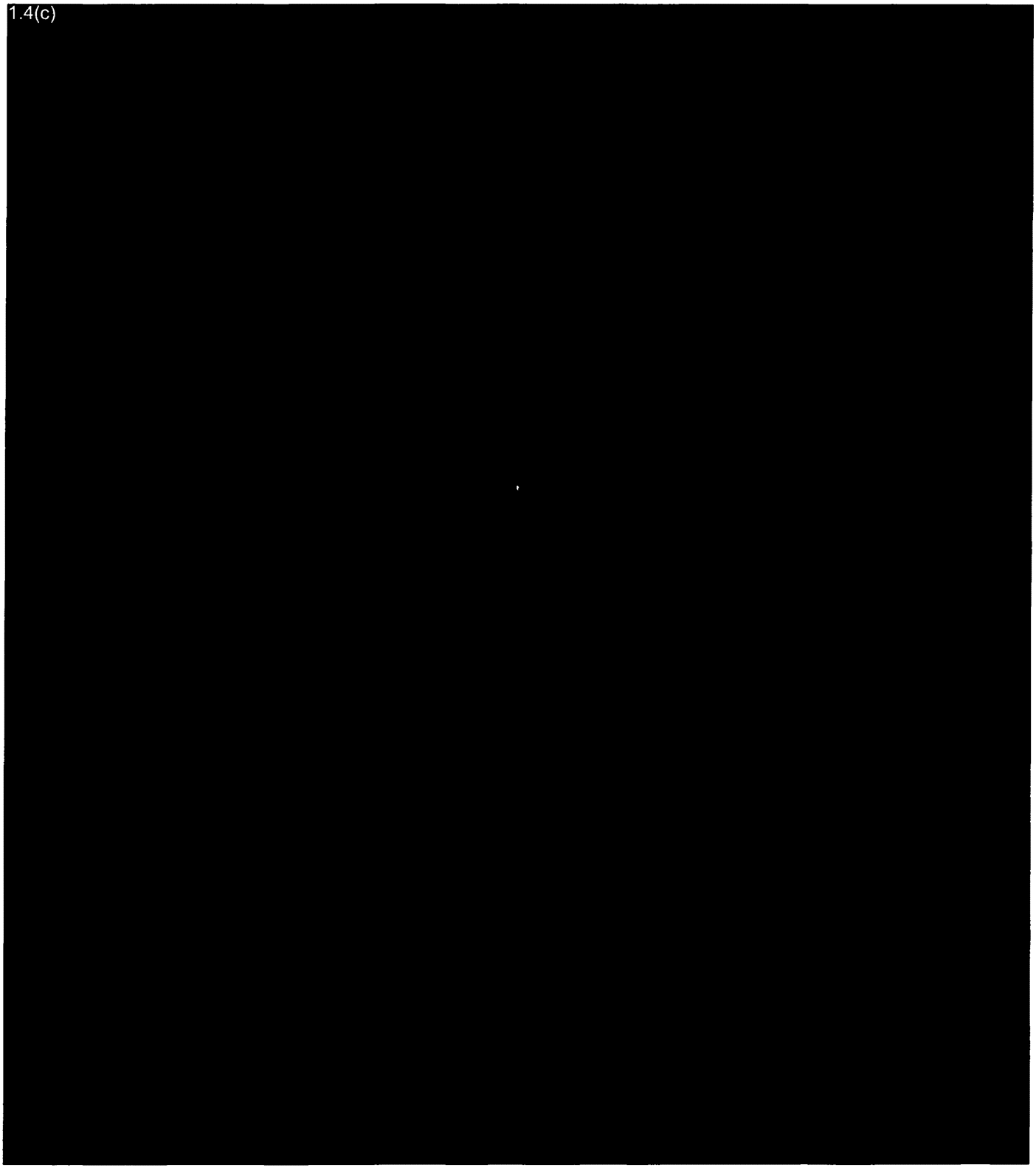

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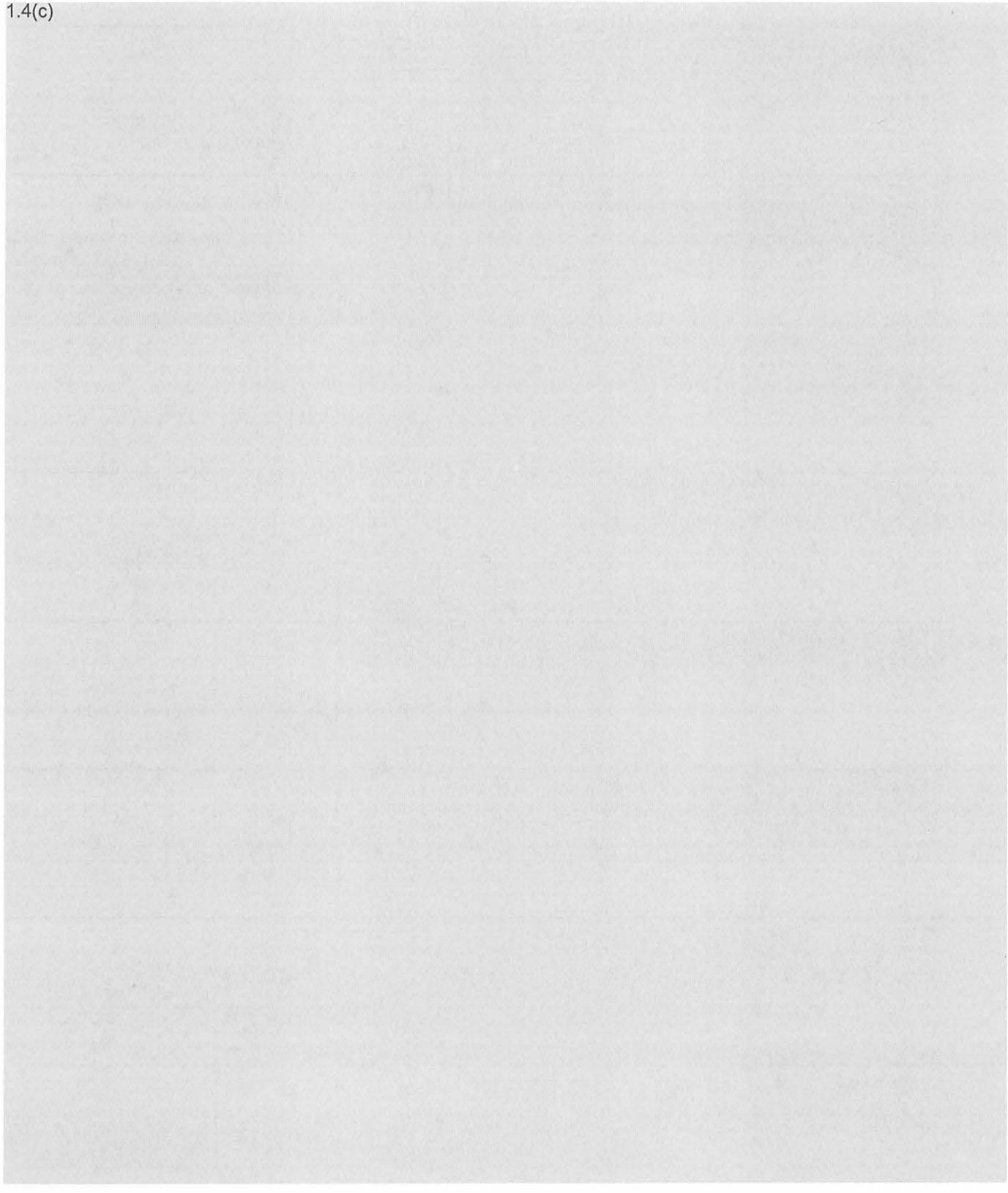

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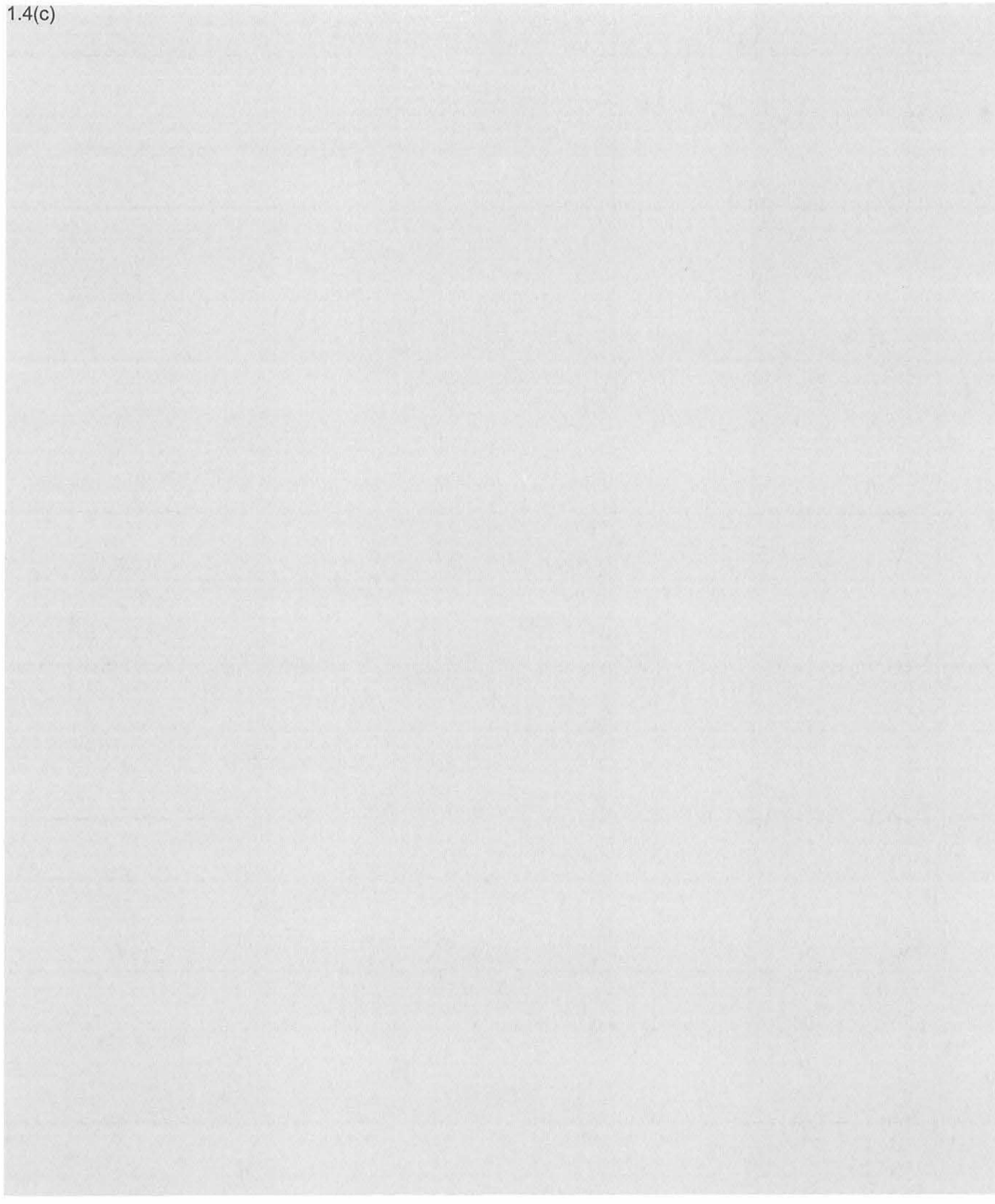

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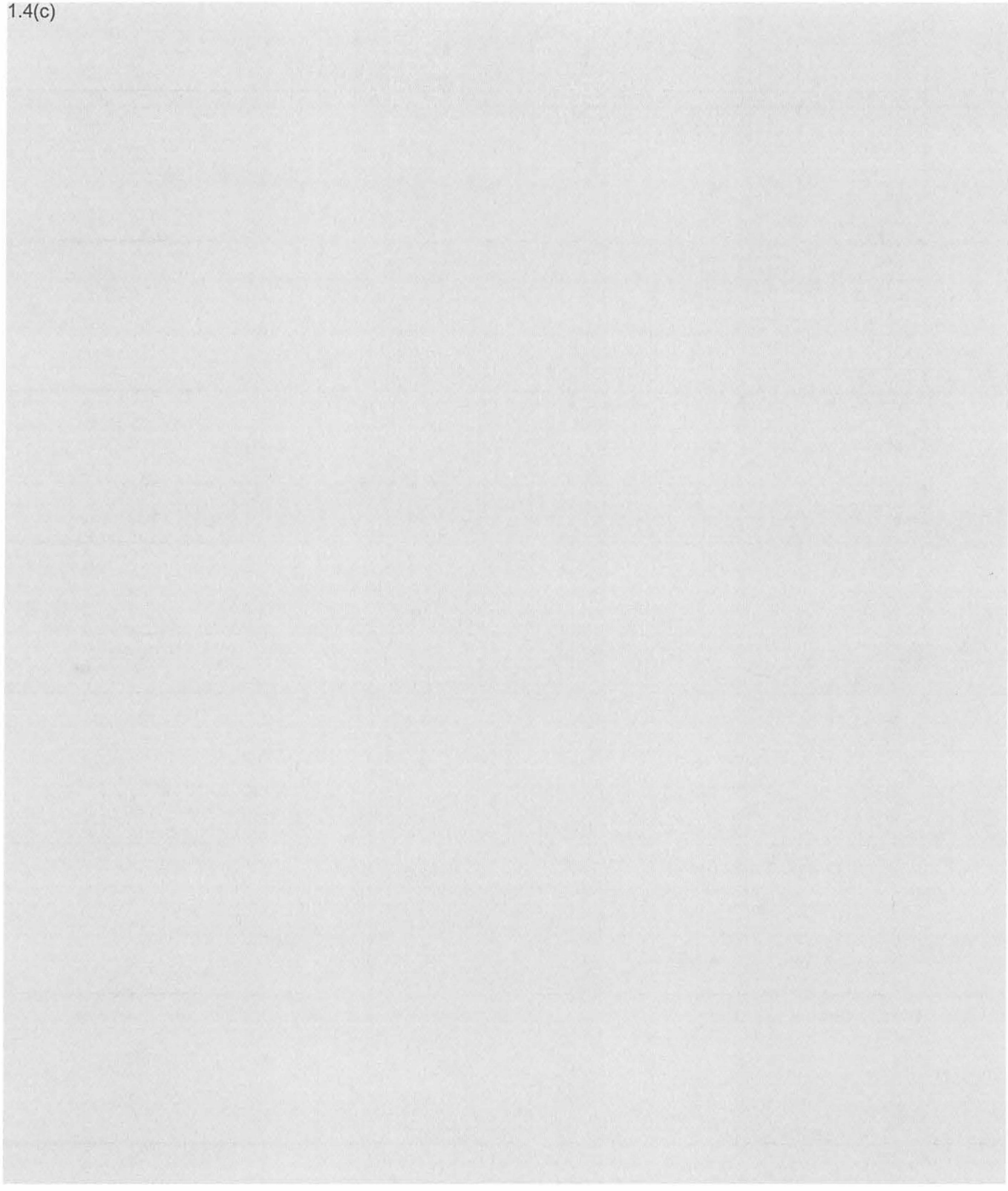

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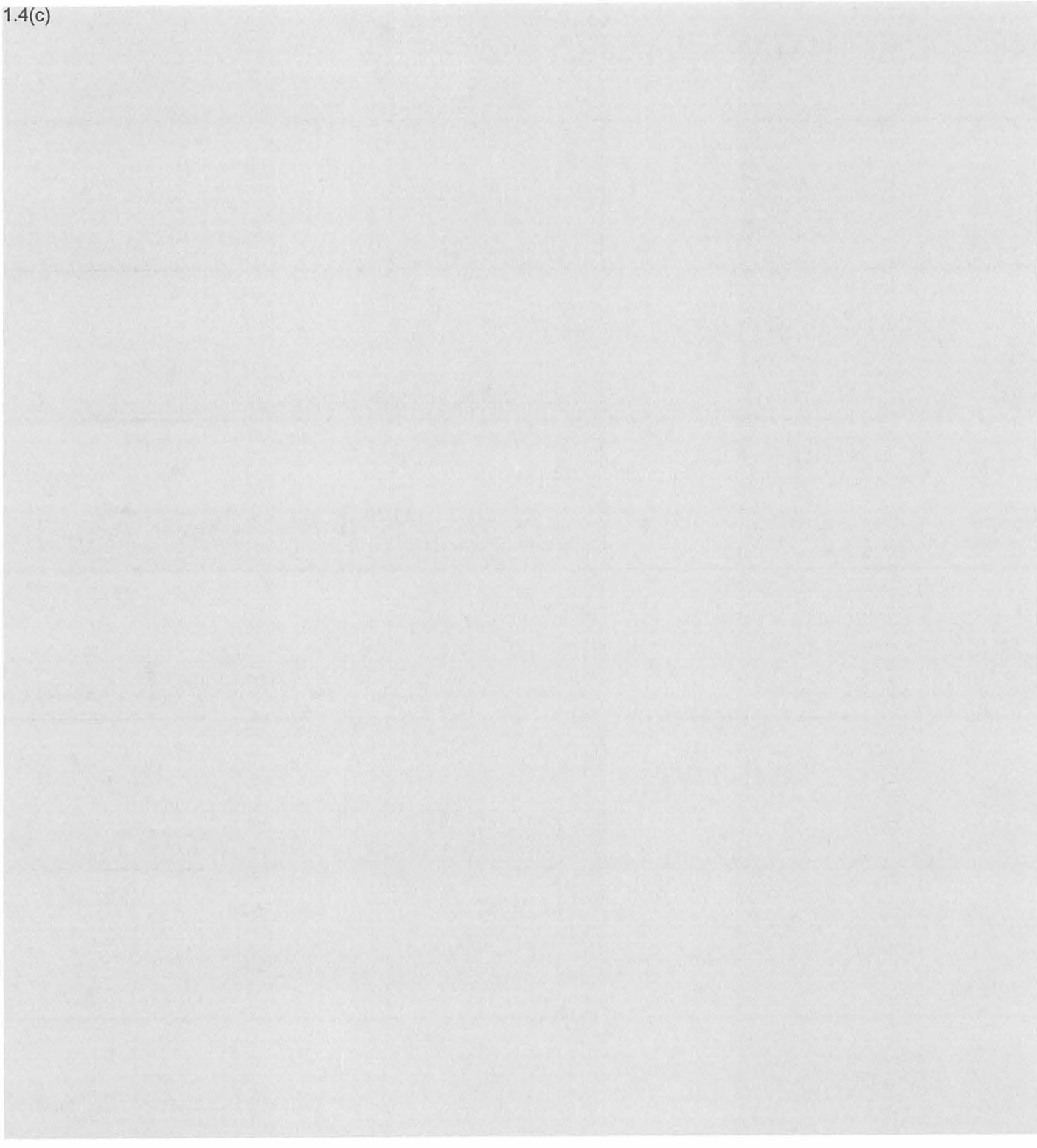

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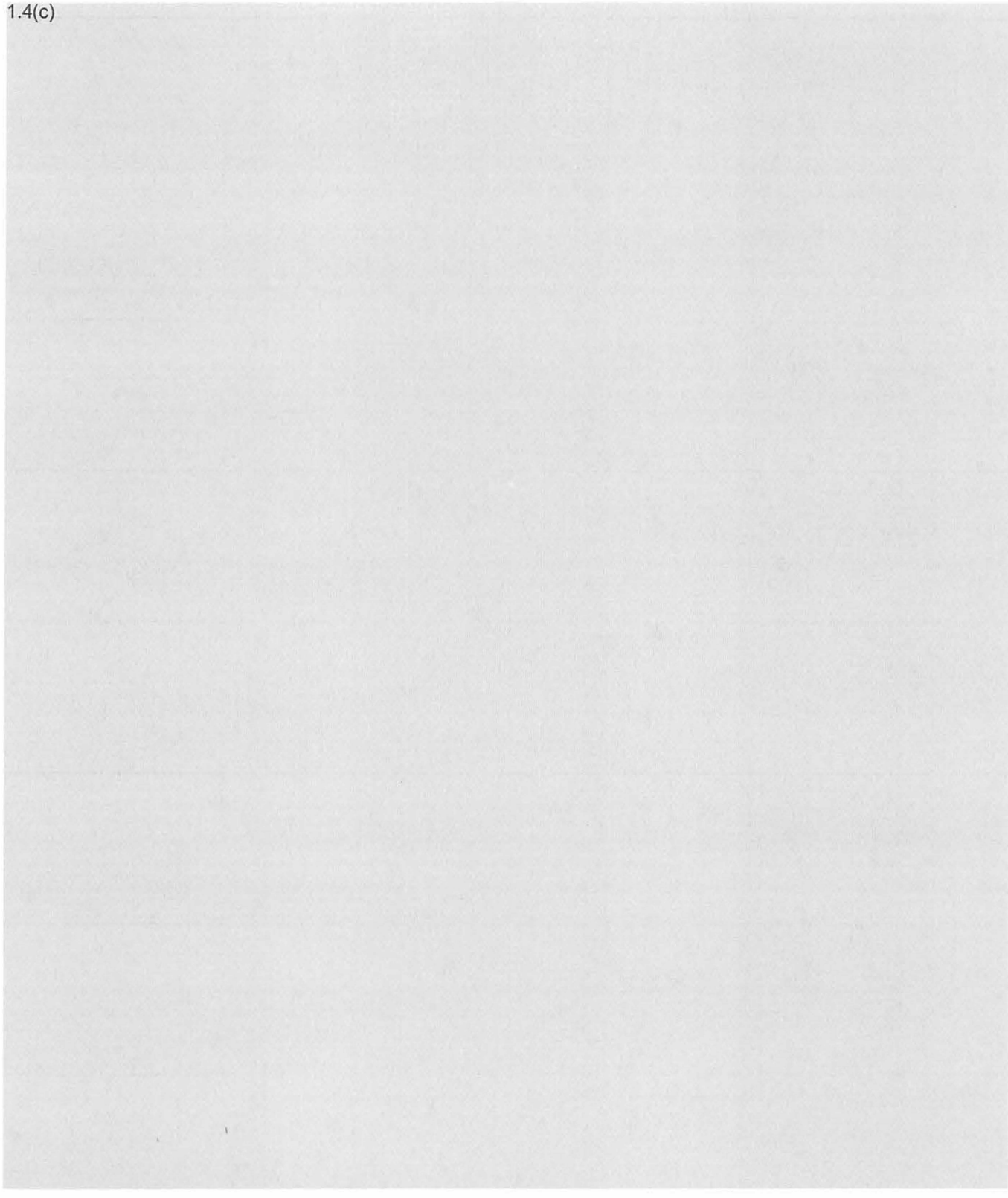

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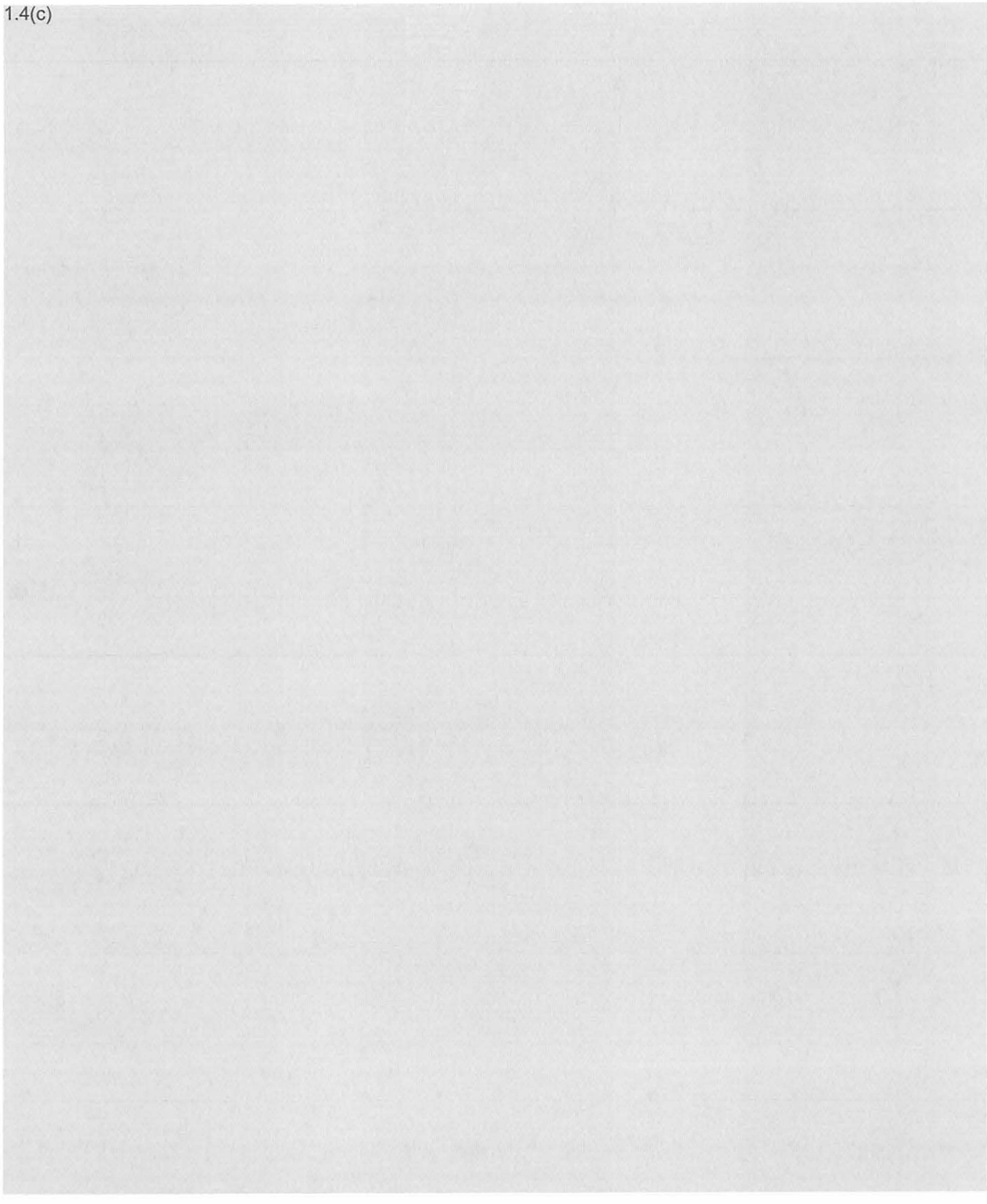

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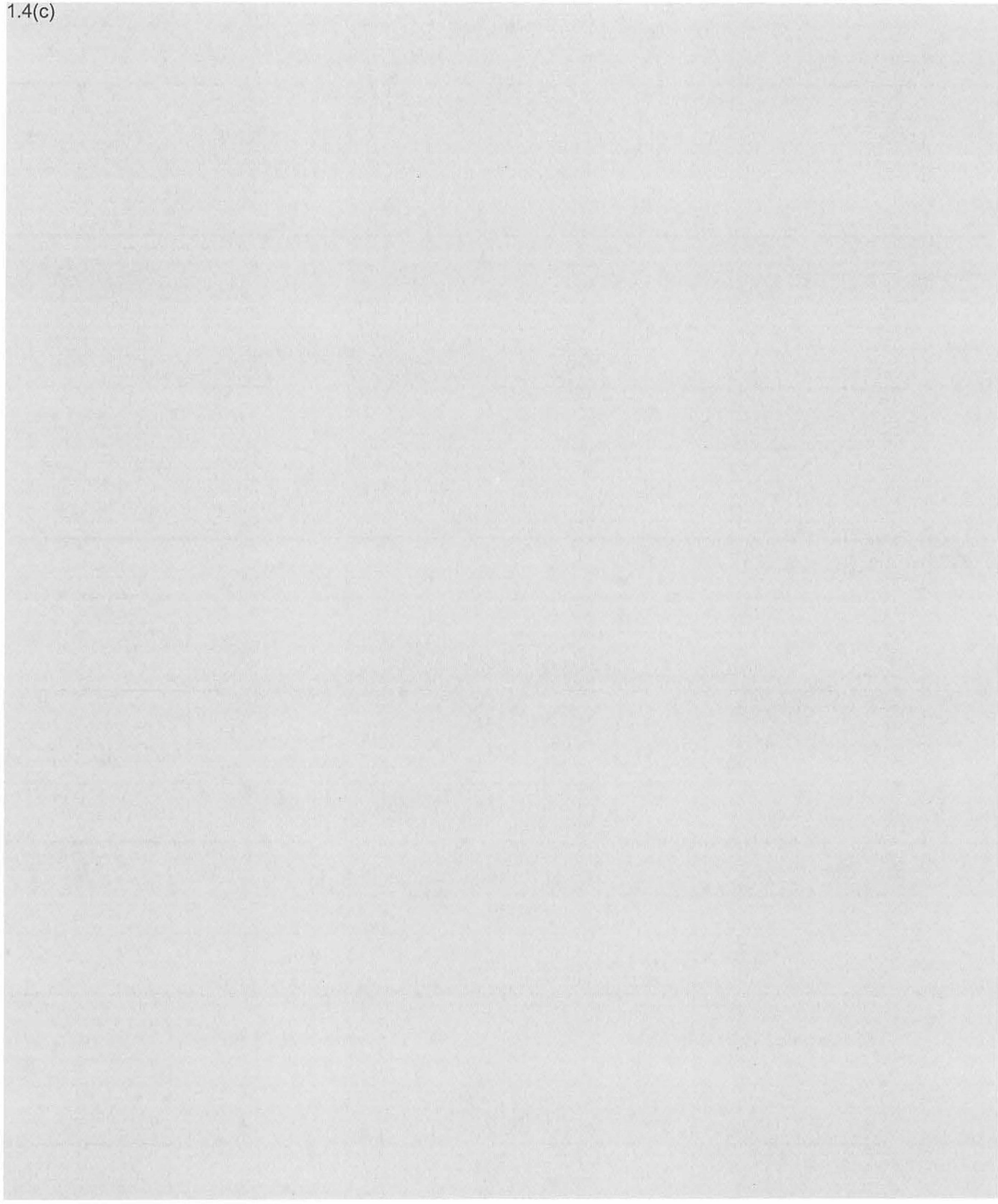

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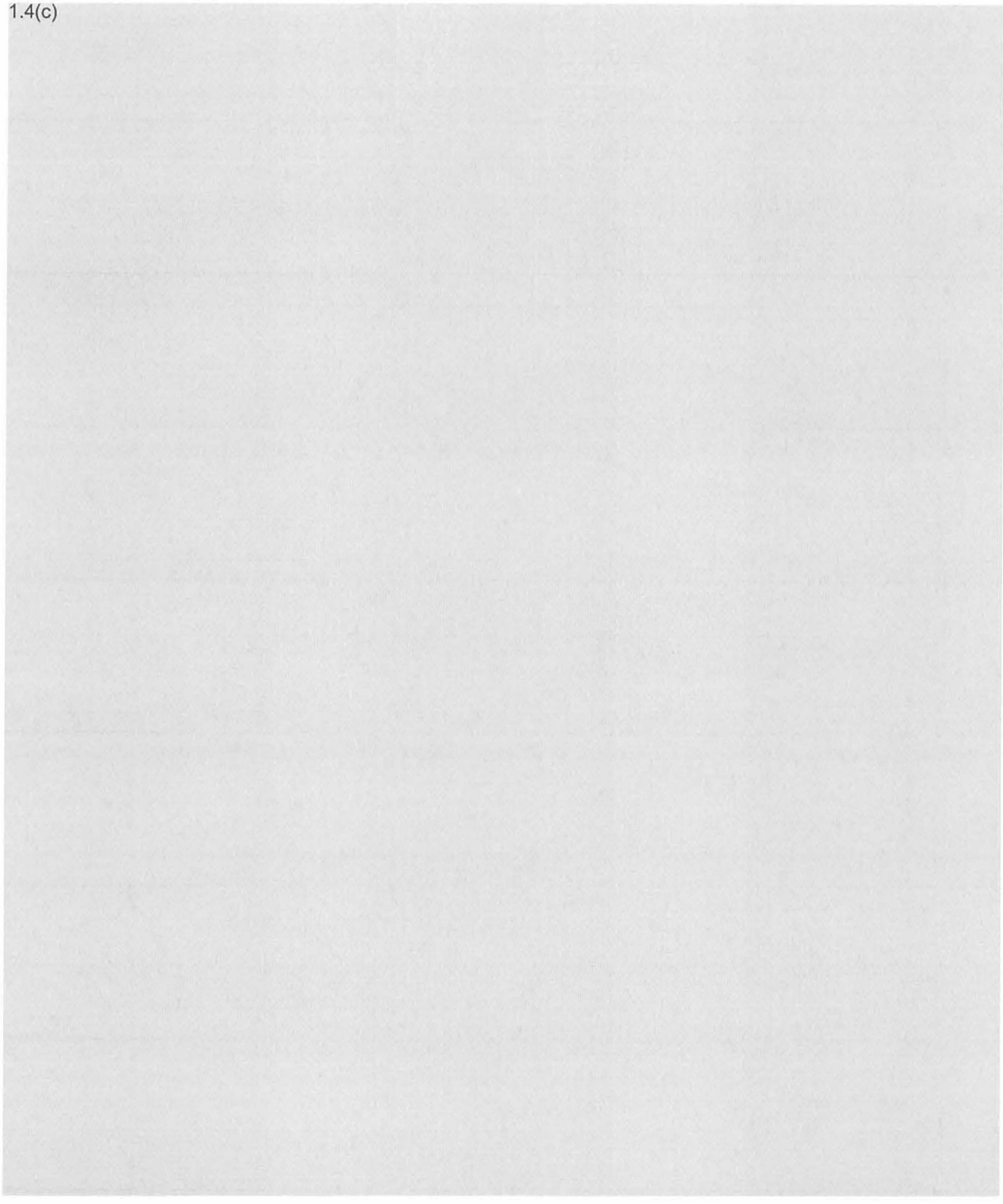

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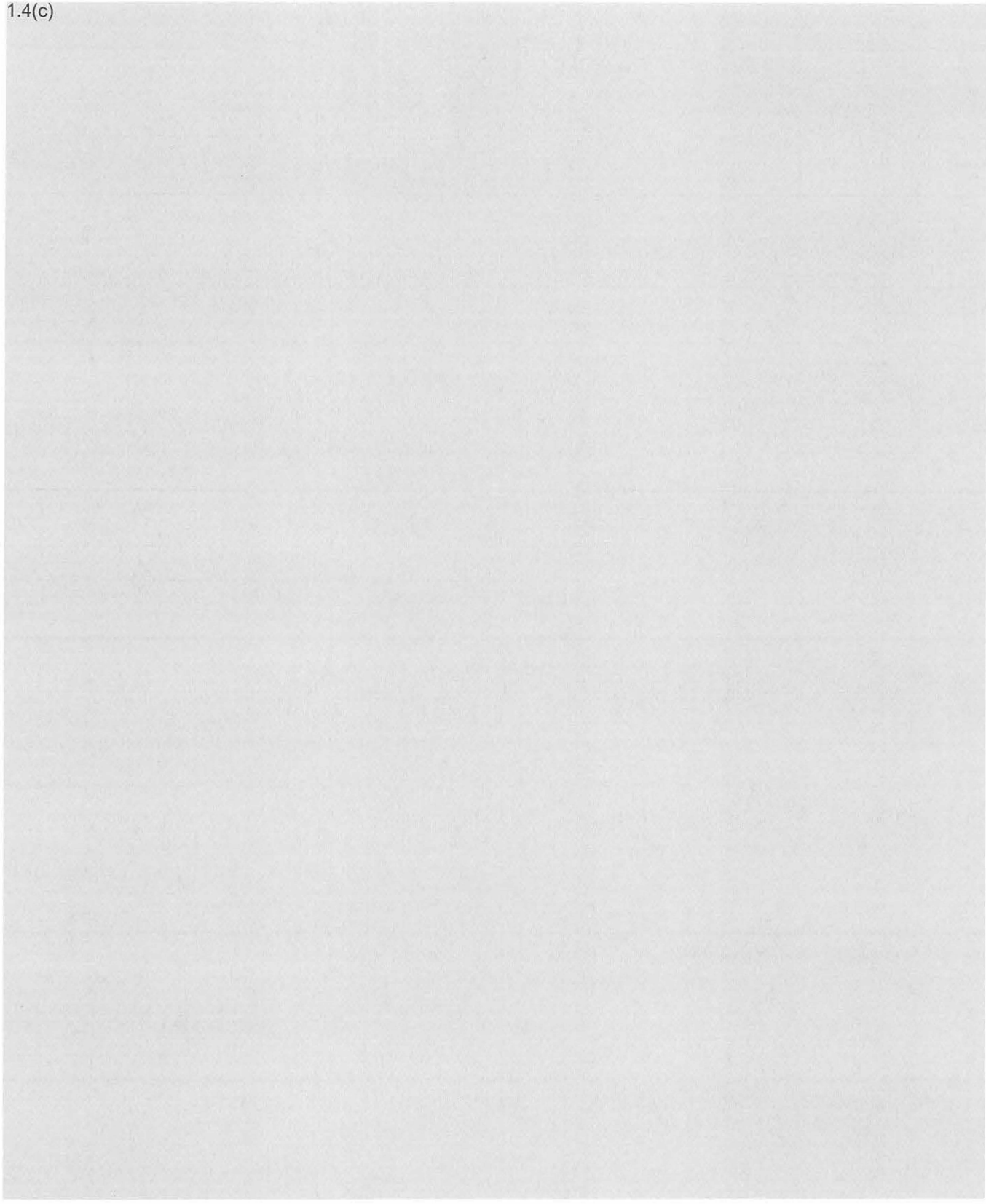

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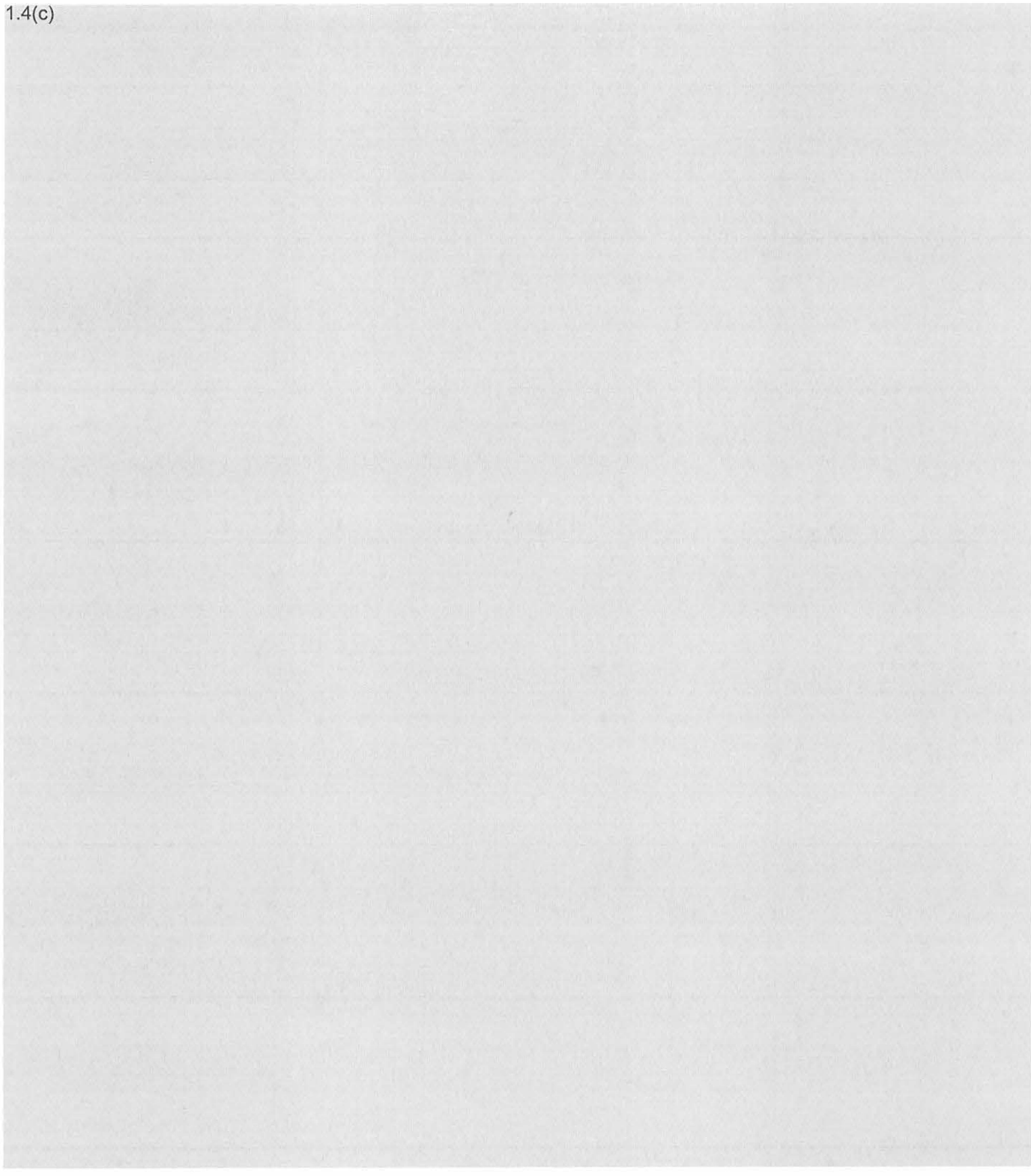

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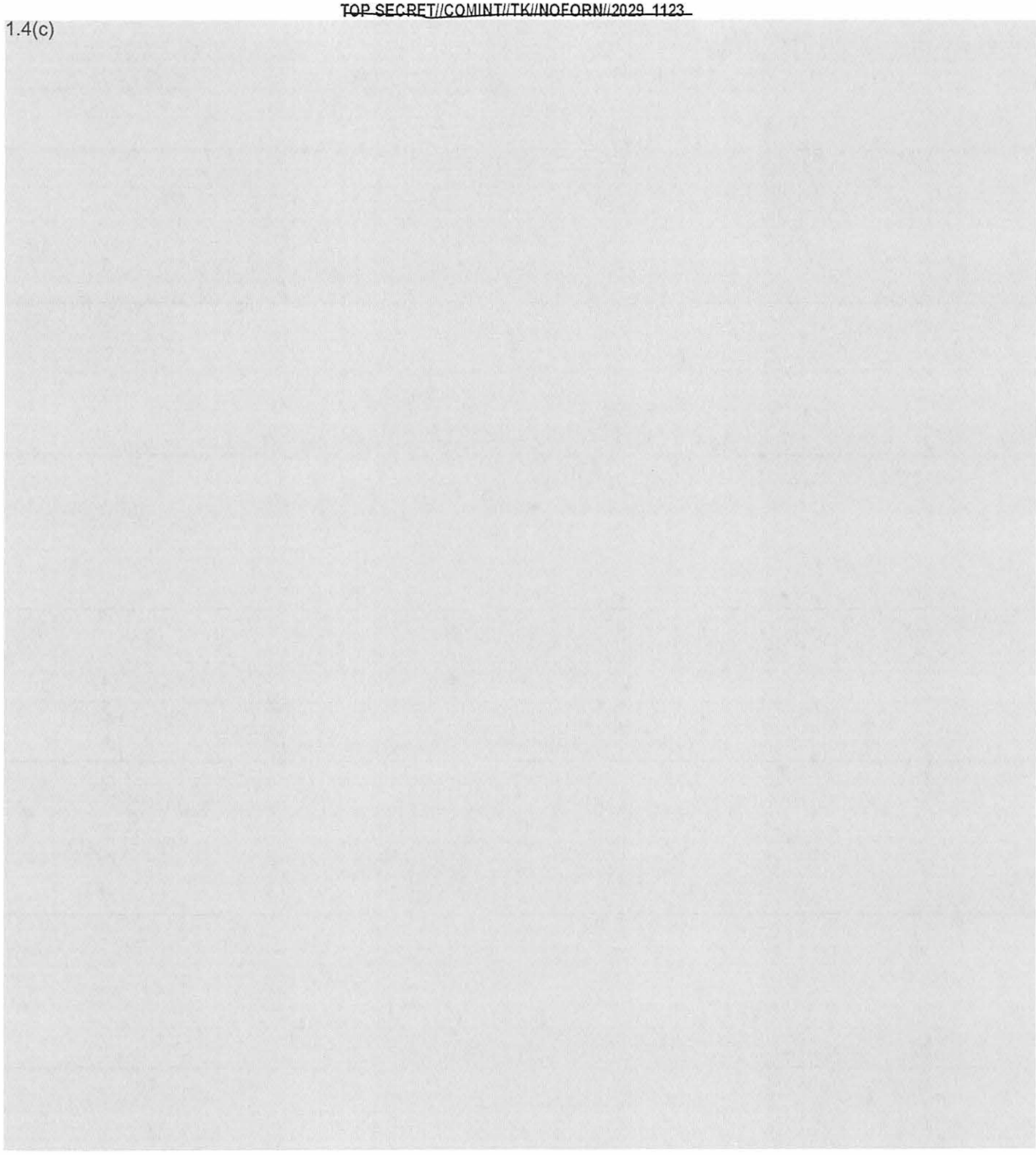


Appendix B

(U) This appendix is a summary listing of many of the various DEFSMAC automation projects from 1960 through 1999.

Approximate Year	Project Name	Computer Name	Program Function
1960s	PL 86-36/50 USC 3605		
1963		UNIVAC 490/494	Remote job entry for trajectory calculations
1965		IBM 360	Collection databases
1966		NSA Built	Convert track data for processing on IBM 7094
1966		IBM 7094	Trajectory calculations
1967		CDC 6400/6600	Follow-on to trajectory calculations on IBM 7094
1967			Trajectory graphics
1968		APD-30	Replaced PL
1968		IBM 360	Databases
1969		UNIVAC 490/494	Generalized software for DEFSMAC and NSOC
1969		UNIVAC 490/494	OPSCOMMs connected to PL for automatic data transfer
19__			FIS collection results database for DEFSMAC
1970s			
1970		UNIVAC 494	Front-end communications processor
1971		UNIVAC 494	Provided imagery summary data from CIA
1974 ?		UNIVAC 1100/83	Central computer for DEFSMAC and NSOC (Replaced PL
1975 ?		SEL 840MP	Graphics applications for DEFSMAC
1975*		DEC 10	Interactive graphics for missile/space flight paths (Replaced PL 86-36/50
1975			Retrieval of non-TK product reports
1976		IBM 370	Retrieval of ELINT data
1979		INCOTERM 20/40	Analytic terminal support system
1980s			
1980		PL 86-36/50 USC 3605	NSAs generalized packet switched comms network
1980			Scientific data processing
1985			Upgrade of several data communications systems
1987*			DEFSMAC development system

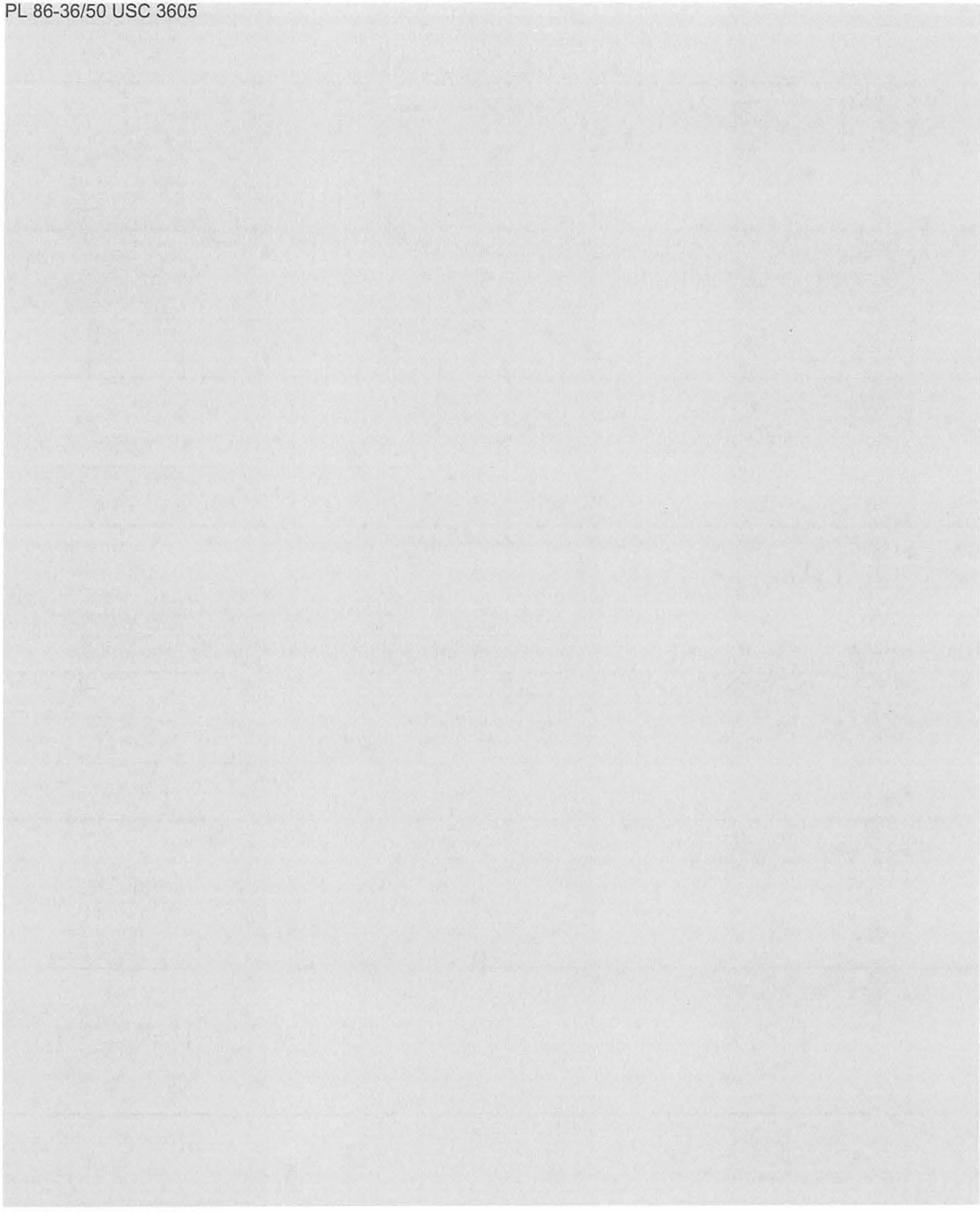
Approximate Year	Project Name	Computer Name	Program Function
1986	[redacted]	PL 86-36/50 USC 3605	DEFSMAC's application processing component (APC). Replaces PREFACE.
1987*			
1987*			Replaced PL [redacted] (DEFSMAC clusters ANGEL and SWORD)
1987*			DEFSMAC databases
1987*			Input/Output to PL [redacted] BM ASTW
1987*			Replaced hand sorting of incoming IDDF Messages
1987*			Artificial Intelligence for Watch Event Planning (IOC in 1990. Used in Desert Storm for IR)
1987*			Contractor (CSC) Developed Soviet Recon/ASAT Reporting (Cancelled in 1987)
1987*			
1987*			Graphics display of geoposition data. Replaces OMNIBUS-FLY among others
1987*			PL 86-36/50 [redacted] Testbed and Host. (Upgraded to a part of W1 Analytical Distributed VAX 11/785 in 1989) processing system Has PLATFORM access.
1987*			Part of W1 Analytical Distributed (Has Britton-Lee processing system. Has IDM700 database) PLATFORM access.
1987*			
1987*			Replaces PL [redacted] MOD 28s with ASTWs. Allows chatter OPSCOMS
1987*			Move of DEFMAC to 3rd floor (never happened)
1987			DSP Teletype user data entry terminal
1987*			OMNIBUS upgrade and replacement
1987			Replaced some TIDE SOCOMM and CRITICOM and some HOLDER links
1987*			Replacement of open source wews Mod 28s
1987*			Configuration mgmt of NTSS systems
1987*			Networks DEFSMAC to office of Space and Missiles Divisions
1986***			Primary NSA FIS data management system.
1989			DEFSMAC Local Network via BACKLIGHT HYPERchannel network
1989			Revised message ident. software for PL 86-36/50 USC 3605

Approximate Year	Project Name	Computer Name	Program Function
1989	PL 86-36/50 USC 3605		
1989			
1990s			
1990**			
1990**			
1990**			
1990**			
1990***			
1990**			
1990**			
1990**			
1990**			
1990**			
1999			
1999			

Notes:

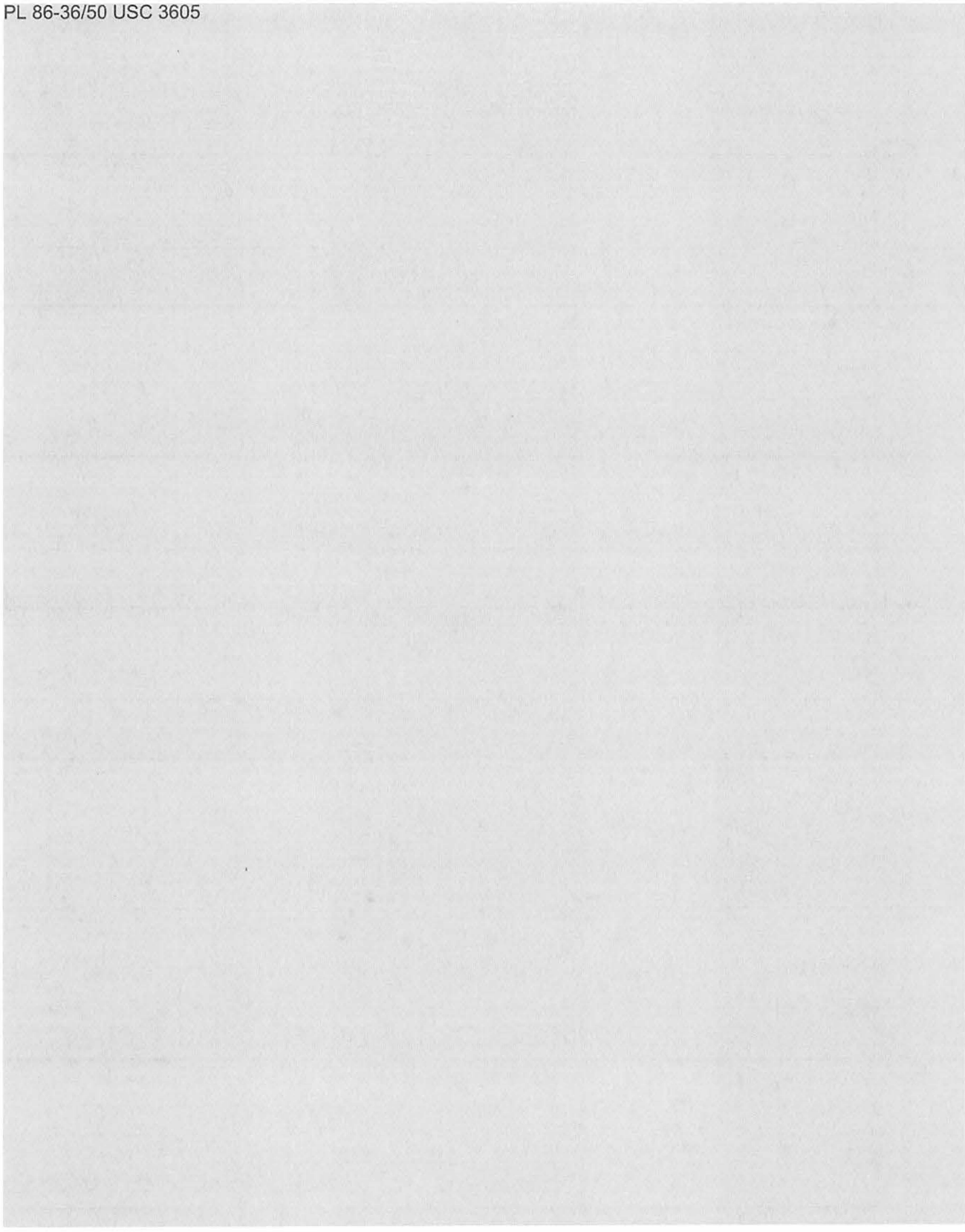
PL 86-36/50 USC 3605

PL 86-36/50 USC 3605



PL 86-36/50 USC 3605

PL 86-36/50 USC 3605



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(U) In addition to the interviews listed above, unclassified discussions and/or notes and photographs from retired NSA personnel and other government and industry personnel:

Mr. Joseph Amato, early USAFSS/SMITIG and NSA telemetry analyst and later manager and senior executive at NSA

Mr. PL 86-36/50 USC 3605 early USAF radar officer, USAF/ANEEG and NSA/COSA signal processing engineer, and later director DEFSMAC

Mr. David Norlander, formerly from EDL/ Sylvania involved in 1960s telemetry systems testing and operations

Dr. William "Bill" Perry, early Sylvania Electronic Defense Laboratory (EDL) systems engineer and manager, then the founder and chief executive of Electronic Systems Laboratories (ESL), and later to become the DoD Undersecretary for Defense Research and Engineering (DDR&E) and the U.S. Secretary of Defense

Mr. John Reese, formerly from EDL/Sylvania and ESL/TRW involved in early telemetry intelligence analysis and later system planning manager for telemetry collection/analysis systems

Mr. R. Steven Smith, a former DEFSMAC director (1992-1994) and long-time participant in FIS collection, operations, and management

Mr. Roger Stubblefield, early USAF/SMITG, USAF/ANEEG and NSA/COSA collection manager and signal processing and signal analysis manager

Dr. Albert "Bud" Wheelon, early Space Technology Laboratory (STL) scientist and later a CIA senior executive.

(U//FOUO) Extensive discussions and documents provided by DEFSMAC, NSA, or DIA personnel:

Mr. PL 86-36/50 USC 3605 W9D Associate Leader for Intelligence, who has over twenty-five years' experience with the DEFSMAC, Air Force and DIA TELINT reporting efforts

Mr. James M. Kline, W9D Associate Leader for Operations, who has over thirty-five years experience with TELINT collection and DEFSMAC operations efforts

Mr. Robert J. Richmond, W9D senior missile analyst, who has over thirty-five years' of experience in DEFSMAC missile analysis and reporting

Mr. Walter J. Stevens, W9D1 Technical Advisor, who has over thirty-five years' association with the NSA/CSS TELINT collection and DEFSMAC efforts

(U) NSA archived records and selected long- term storage and retired records in D32.

(U) DEFSMAC history files and records, and existing oral history interviews of former DEFSMAC directors and others

(U) W Group partnership and Organizational files pertaining to missile and space activities; and related files in engineering/support organizations. e.g., K43

(U) Selected NSA Congressional Budget Justification Book (CBJB) extracts

(U//FOUO) Various CIA project histories, monographs, and extracts from the DDS&T History series. (In coordination with Mike Warner, CIA Center for the Study of Intelligence History Staff)

(U) Selected photos, interviews, and material provided by U.S. contractors on the referenced TELINT systems/facilities/assets

Other Readings

(U) Matthew M. Aid and Cees Wiebes, *Secrets of Signals Intelligence during the Cold War and Beyond*, London, England: Frank Cass Publishers, 2001. PL 86-36/50 USC 3605 PL 86-36/50 USC 3605

(U) PL 86-36/50 USC 3605 "Telemetry: Its Definition, Collection, Analysis, and Intelligence Value – A Tutorial (U)," National Foreign Assessment Center document WI78-10023J, November 1978, CCH History Collection, NSA, Bernard papers. 1.4(c) 1.4(c)

(U) James Bamford, *Body Of Secrets – Anatomy of the Ultra-Secret National Security Agency*, New York: Random House, Inc., 2001. (A few brief discussions of telemetry and DEFSMAC.)

(U) James Bamford, *The Puzzle Palace – A Report on NSA, America's Most Secret Agency*, Boston, MA: Houghton Mifflin Company, Boston, 1982. (Contains several discussions on TELINT and DEFSMAC.)

(U) Melville J. Boucher, "Talomatry and How it Grew – Part II," *Cryptologic Spectrum*, Winter 1972. (S-CCO)

(U) Robert L. Brown, "Expert Witness," *Smithsonian Air and Space* magazine, November 2003, page 69. PL 86-36/50 USC 3605 PL 86-36/50 USC 3605

(U) Ashton B. Carter and William J. Perry, *Preventive Defense – A New Security Strategy for America*, Washington, D.C.: Brookings Institution Press, 1999. (Discusses a pragmatic set of policies recommended by the authors for reducing foreign proliferation of weapons of mass destruction, a topic that Dr. Perry has pursued in one way or another during his entire career.)

(U) (No Author Listed), "Defense Special Missile and Astronautics Center Soviet Space Launch Operations Working Aid (U)," 22 February 1990. (TS, TK-C Channels Jointly)

(U) Jeffrey T. Richelson, *A Century of Spies – Intelligence in the Twentieth Century*, New York: Oxford University Press, 1995. (Chapter 20, "The Technical Revolution Continues" and Chapter 23, "A New Decade," covers several U.S. programs and projects which are alleged to collect telemetry.)

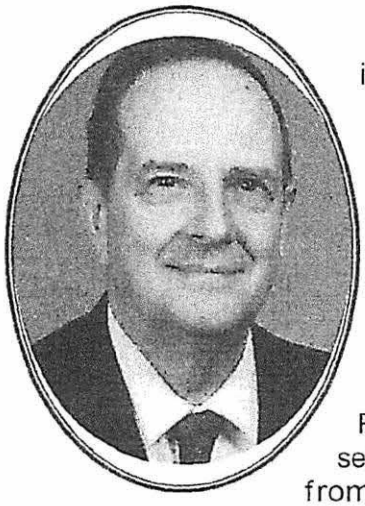
(U) Jeffrey T. Richelson, *The U.S. Intelligence Community*, Fourth Edition, Boulder, Colorado: Westview Press, 1999. (Discusses an extensive list of topics and projects that are, in the author's view, related to FISINT and DEFSMAC.)

(U) Jeffrey T. Richelson, *The Wizards of Langley: Inside the CIA's Directorate of Science and Technology*, Cambridge, MA: Westview Press, Perseus Books Group, 2001. (Contains discussion [redacted] PL 86-36/50 USC 3605
PL 86-36/50 USC 3605
the TACKSMAN sites in Iran, and the FMSAC. The book also alleges the U.S. had a base in Sinop, Turkey, a site named STONEHOUSE, and had access to information from [redacted] PL 86-36/50 USC 3605 The book also claims that the U.S. and the PRC concluded an agreement in 1979 for the PRC to work with the U.S. in monitoring Soviet SALT compliance, with two FIS collection facilities.)

(U) Robert E. Stevens, "SIGINT Collection and Satellite Reconnaissance (U)," an "Overhead Primer" prepared by GEOSPO, 27 June 1988, CCH History Collection, NSA, Bernard papers. (TS, TK, B-C Channels Jointly)

(U) Michael Stoiko, *Soviet Rocketry: Past Present, and Future*, New York: Holt, Rinehart and Winston, 1970. Provides unclassified history of Soviet missiles, satellites, and planetary problem through the 1960s with many photos and tables. CCH libraryTL 781.8.R9 St6. (U)

(U) Tina D. Thompson, "Space Log 1957-1991," *TRW* Volume 27, TRW Space & Technology Group,1992. (U)



(U//FOUO) Mr. Bernard is a consultant and volunteer in the NSA Center for Cryptologic History. He is a retired NSA Senior Executive with over thirty years' experience in SIGINT, primarily as a program manager and executive for developing field collection and processing systems. He began his career at NSA as a USAF second lieutenant in 1953 in computer engineering. He became an NSA civilian employee in 1954.

(U//FOUO) After transferring to an R&D Office in 1960, Mr. Bernard held staff positions until he joined the R&D organization responsible for developing the fledgling set of systems, called SPACOL systems, to obtain telemetry from the rapidly emerging Soviet missile and space program. He was the project manager for PL 86-36/50 USC 3605 the original U.S. name for PL 86-36/50 USC 3605 and for many other new systems and upgrades to several other field systems. Mr. Bernard then continued to plan and develop many COMINT, ELINT, and TELINT line-of-sight field systems over the next several years; he became office chief and then deputy group chief of NSA line-of-sight system development organizations. In 1980 he became director of the Defense Special Missile and Astronautics Center (DEFSMAC) and held that position for three years. Mr. Bernard has an electrical engineering degree and a Master of Engineering Administration degree. He is professionalized as an Electronic Engineer and was a charter member of the NSA Senior Cryptologic Executive Service.