Duke Energy®

JAMES R. MORRIS
Vice President

Catawba Nuclear Station
4800 Concord Rd. / CN01VP
York, SC 29745-9635

803 831 4251
803 831 3221 fax

January 9, 2007

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Subject: Duke Power Company LLC d/b/a Duke Energy Carolinas, LLC (Duke)
Catawba Nuclear Station, Unit 1
Docket Number 50-413
Operating Report for Cycle 16 Operation with Mixed Oxide (MOX) Fuel Lead Assemblies

Reference: Letter from NRC to H.B. Barron, Duke, "Final Safety Evaluation for Duke Topical Report DPC-NE-1005P, "Nuclear Design Methodology Using CASMO-4/SIMULATE-3 MOX"," dated August 20, 2004

The reference letter constituted the NRC staff's Safety Evaluation (SE) associated with Duke's use of MOX lead assemblies at Catawba. In Section 1.0 of the SE (item 4), the NRC stipulated that Duke will prepare an operating report for each operating cycle with MOX fuel lead assemblies and for each unit operating with partial MOX fuel cores until the equilibrium cycle is reached. Each operating report will contain comparisons of predicted to measured monthly power distribution maps and monthly boron concentration letdown values. Duke will provide each cycle operating report to the NRC within 60 days of the end of the fuel cycle.

Pursuant to the above requirement, this letter provides the associated report.

This submittal contains information that is proprietary to Duke. The specific information that is proprietary in Attachment 1 is identified by enclosure in brackets. In accordance with 10 CFR 2.390, Duke requests that this information be withheld from public disclosure. Attachment 2 is a redacted version of the

A001

report with proprietary information removed. An affidavit is included that attests to the proprietary nature of the information in this submittal.

There are no regulatory commitments contained in this submittal. Inquiries on this matter should be directed to L.J. Rudy at (803) 831-3084.

Very truly yours,

James R. Morris

LJR/s

Attachments

xc (with attachments):

W.D. Travers, Administrator, Region II
U.S. Nuclear Regulatory Commission
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, GA 30303-8931

J.F. Stang, Jr., NRC Senior Project Manager
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Mail Stop O-8 H4A
Rockville, MD 20852-2738

A.T. Sabisch, NRC Senior Resident Inspector
Catawba Nuclear Station

AFFIDAVIT OF James R. Morris

1. I am Vice President of Duke Power Company LLC d/b/a Duke Energy Carolinas, LLC (Duke), and as such have the responsibility of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear plant licensing and am authorized to apply for its withholding on behalf of Duke.

2. I am making this affidavit in conformance with the provisions of 10 CFR 2.390 of the regulations of the Nuclear Regulatory Commission (NRC) and in conjunction with Duke's application for withholding which accompanies this affidavit.

3. I have knowledge of the criteria used by Duke in designating information as proprietary or confidential.

4. Pursuant to 10 CFR 2.390, Duke seeks to protect from disclosure specific analytical information contained in the document "Special Operation Report for Catawba Unit 1 Cycle 16 with Mixed Oxide Fuel Lead Assemblies."

5. Pursuant to the provisions of 10 CFR 2.390(b)(4), the following is furnished for consideration by the NRC in determining whether the proprietary information sought to be protected should be withheld from public disclosure:

   (i) The information is of a type that is customarily held in confidence by Duke. This information is proprietary to Duke, and Duke seeks to protect it as such. The information consists of analysis methodology details, analysis results, and supporting data that provide a competitive advantage to Duke. Duke submits that a rational basis therefore exists for treatment of this information as proprietary.

   (ii) The information was transmitted to the NRC in confidence and, under the provisions of 10 CFR 2.390, it is to be received in confidence by the NRC.

   (iii) The information sought to be withheld is not available from public sources to the best of Duke's knowledge and belief.

   (iv) Public disclosure of the proprietary information Duke seeks to protect is likely to cause substantial harm to Duke's competitive position within the meaning of 10 CFR 2.390(b)(4)(v). The proprietary information has substantial commercial value to Duke. For example:

      (a) Duke uses this information to reduce vendor and consultant expenses associated with supporting the operation and licensing of its nuclear power plants.

      (b) Duke could sell the information to nuclear utilities, vendors, and consultants for the purpose of supporting the operation and licensing of other nuclear power plants.

      (c) The subject information could only be duplicated by competitors at similar expense to that incurred by Duke.

(d) Public disclosure of this information is likely to cause harm to Duke because it would allow competitors in the nuclear industry to benefit from the results of a significant development program without requiring a commensurate expense or allowing Duke to recoup a portion of its expenditures or benefit from the sale of the information.

For all of the reasons discussed above, Duke requests that this proprietary information be withheld from public disclosure in its entirety.

I affirm that I, James R. Morris, am the person who subscribed my name to the foregoing, and that all of the matters and facts herein are true and correct to the best of my knowledge.

James R. Morris, Vice President

Sworn to and subscribed before me this 9th day of JANUARY, 2007.

Witness my hand and official seal.

Notary Public

My commission expires: 7-10-2012

SEAL

Attachment 2

Non-Proprietary Version of Catawba Unit 1 Cycle 16 Operating Report

Special Operation Report for
Catawba Unit 1 Cycle 16 with
Mixed Oxide Fuel Lead Assemblies

Introduction

Duke Power utilized the core design methodology defined in reference 1 for Catawba Unit 1 Cycle 16 (C1C16) which contains four mixed oxide (MOX) fuel lead assemblies. In reference 2 the Nuclear Regulatory Commission (NRC) transmitted the safety evaluation which documented NRC approval of reference 1. That safety evaluation identified Duke commitments to submit a startup report and an operation report for each fuel cycle containing MOX fuel.

The startup report identified in reference 3 compares predicted to measured data from zero power physics tests and power distribution maps taken during initial power escalation of C1C16. The startup report also describes the core arrangement, fuel assembly batch characteristics, burnable poison loading, control rod locations, incore detector locations, and MOX fuel assembly placement.

The operation report to follow compares measured to predicted data from monthly power distribution maps and soluble boron concentration letdown. MOX fuel lead assemblies are located in core locations C-08, H-03, H-13, and N-08. All 4 MOX lead assemblies are located in instrumented core locations.

Flux Maps

Flux maps taken after the initial power escalation are tabulated below. All maps were taken at 100 %FP with steady state core conditions. Figures 1 through 17 compare predicted and measured assembly average relative power factors. All acceptance criteria were met for all assemblies for each flux map taken.

Flux Map	EFPD	%FP
FCM/1/16/012	16	100
FCM/1/16/013	44	100
FCM/1/16/014	72	100
FCM/1/16/015	100	100
FCM/1/16/016	128	100
FCM/1/16/017	155	100
FCM/1/16/018	183	100
FCM/1/16/019	212	100
FCM/1/16/020	240	100
FCM/1/16/021	268	100
FCM/1/16/022	295	100
FCM/1/16/023	323	100
FCM/1/16/024	357	100
FCM/1/16/025	385	100
FCM/1/16/026	413	100
FCM/1/16/027	441	100
FCM/1/16/028	476	100

Soluble Boron Letdown

A comparison of measured and predicted reactivity letdown is performed at approximately 30 EFPD intervals throughout the cycle depletion. Each measured boron concentration is normalized to hot full power, equilibrium xenon and samarium, a reference hot moderator temperature, all control rods out of core, and a reference boron-10 content in the soluble boron. The table below summarizes soluble boron letdown measurements and compares each to the predicted value. The acceptance criteria of 50 PPMB is easily achieved for all measurements.

Cycle Exposure EFPD	Measured PPMB	Predicted PPMB	Difference PPMB
4			10
9			10
15			4
22			7
29			9
36			6
43			13
63			16
91			6
119			8
147			11
175			16
203			11
231			13
259			15
287			13
316			18
342			12
349			21
376			0
406			1
432			8
460			5
488			8

Conclusion

Inclusion of four MOX fuel lead assemblies was accomplished without significant perturbation to normal low leakage fuel management techniques. Flux map power distribution measurements compared well with prediction. The MOX fuel lead assemblies operated at power levels that are representative of feed fuel, but were never the highest power assembly in the core.

As with all fuel cycles, Duke will continue to monitor the performance of the fuel throughout the C1C17 fuel cycle. In accordance with the commitments in Reference 2, Duke will document C1C17 startup and operating performance in separate reports that will be provided to the NRC within 60 days of the final power escalation flux map and within 60 days of the end of cycle.

References

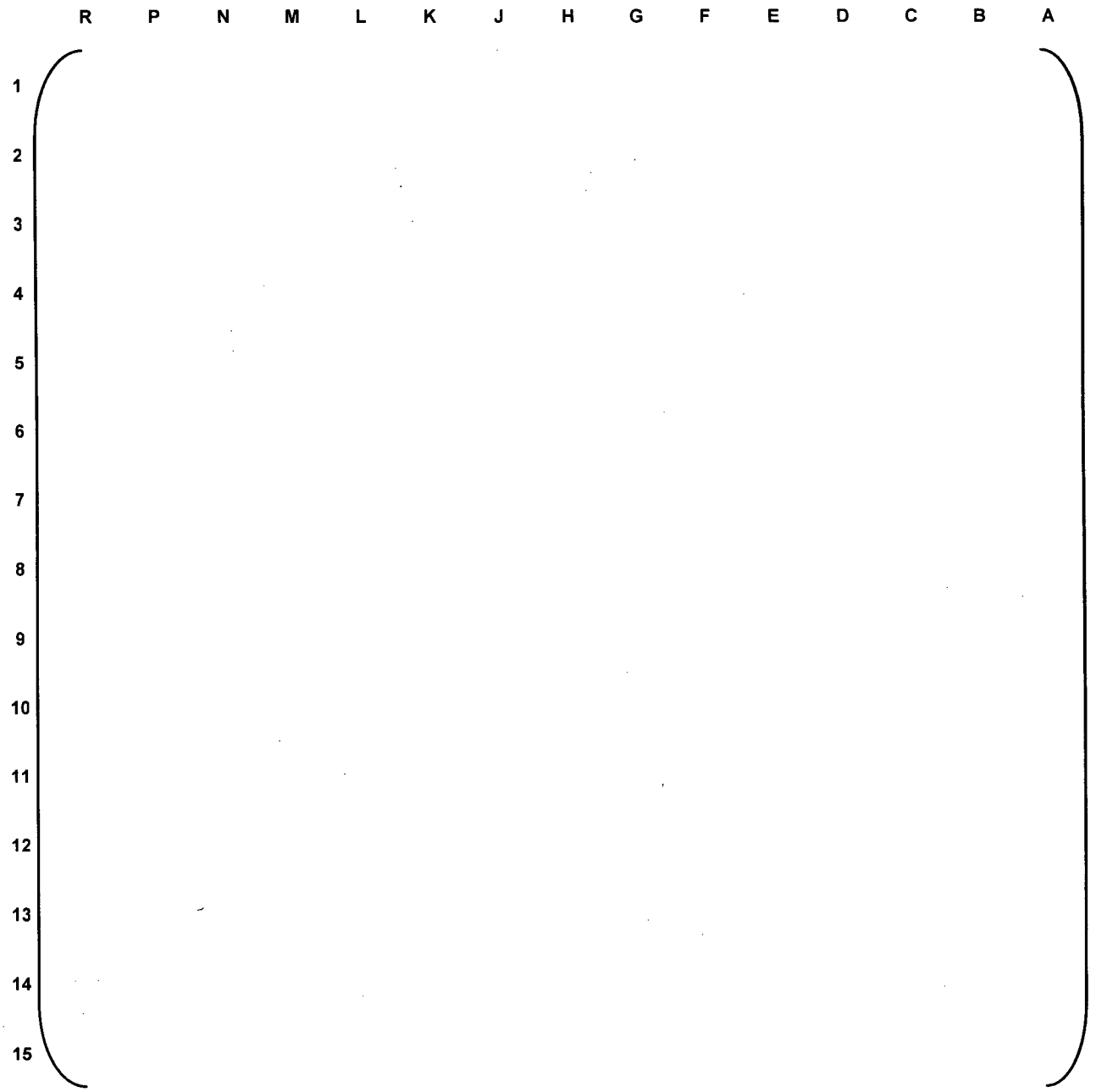
1. DPC-NE-1005-P-A, Nuclear Design Methodology Using CASMO-4 / SIMULATE-3 MOX, Duke Power Company, August 2004.

2. Letter, Robert E. Martin (USNRC) to H.B. Barron (Duke), Final Safety Evaluation for Duke Topical Report DPC-NE-1005-P, Nuclear Design Methodology Using CASMO-4/ SIMULATE-3 MOX, August 20, 2004.

3. Letter, James R. Morris (Duke) to U. S. Nuclear Regulatory Commission, Catawba Unit 1 Cycle 16 Startup Report, August 3, 2005.

Figure 1

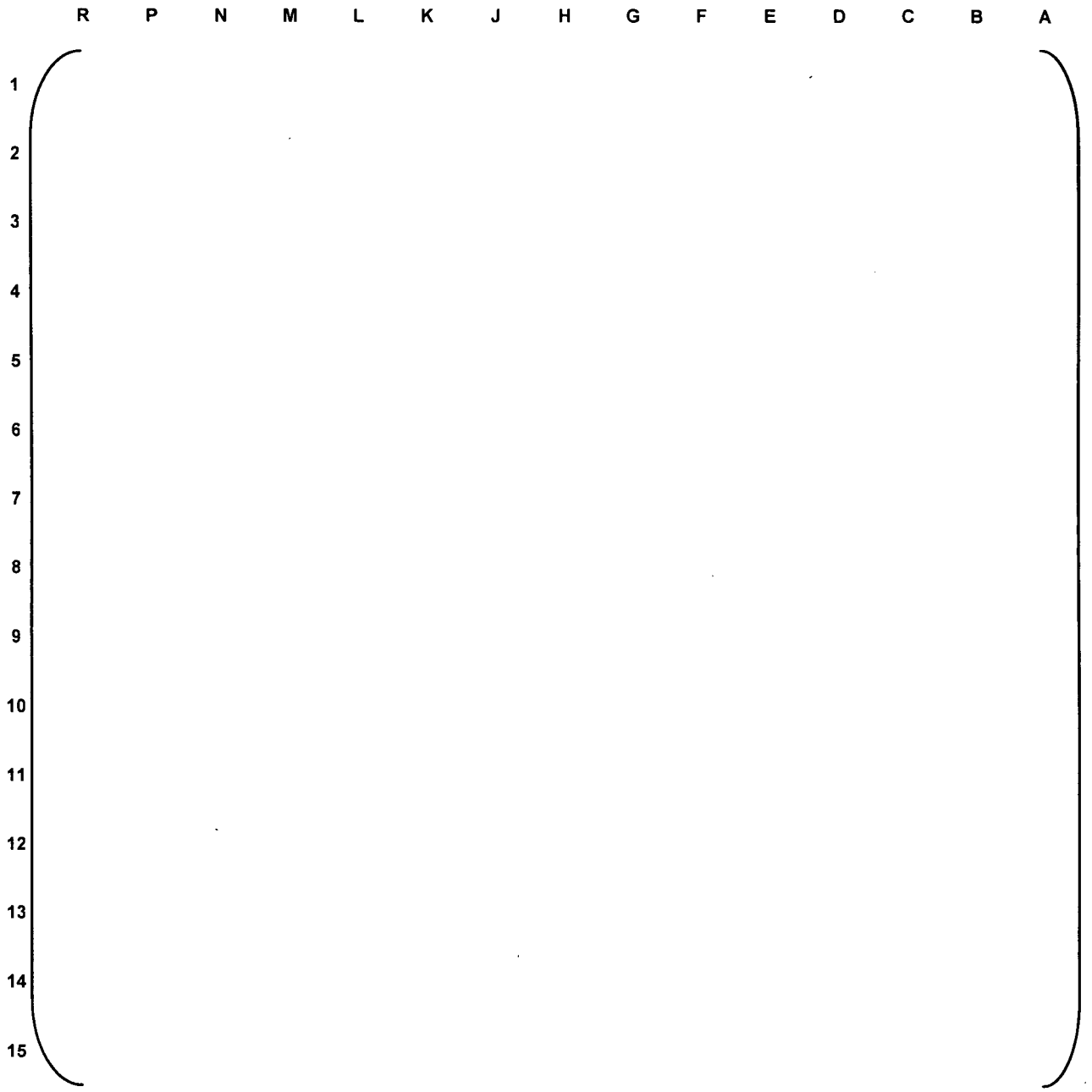
FCM/1/16/012 MWHA 23Jun05
16 EFPD 100 %FP



	Deviation
RMS	1.7%
Core Max	-6.6% at P-13
MOX Max	-3.8% at H-13

Figure 2

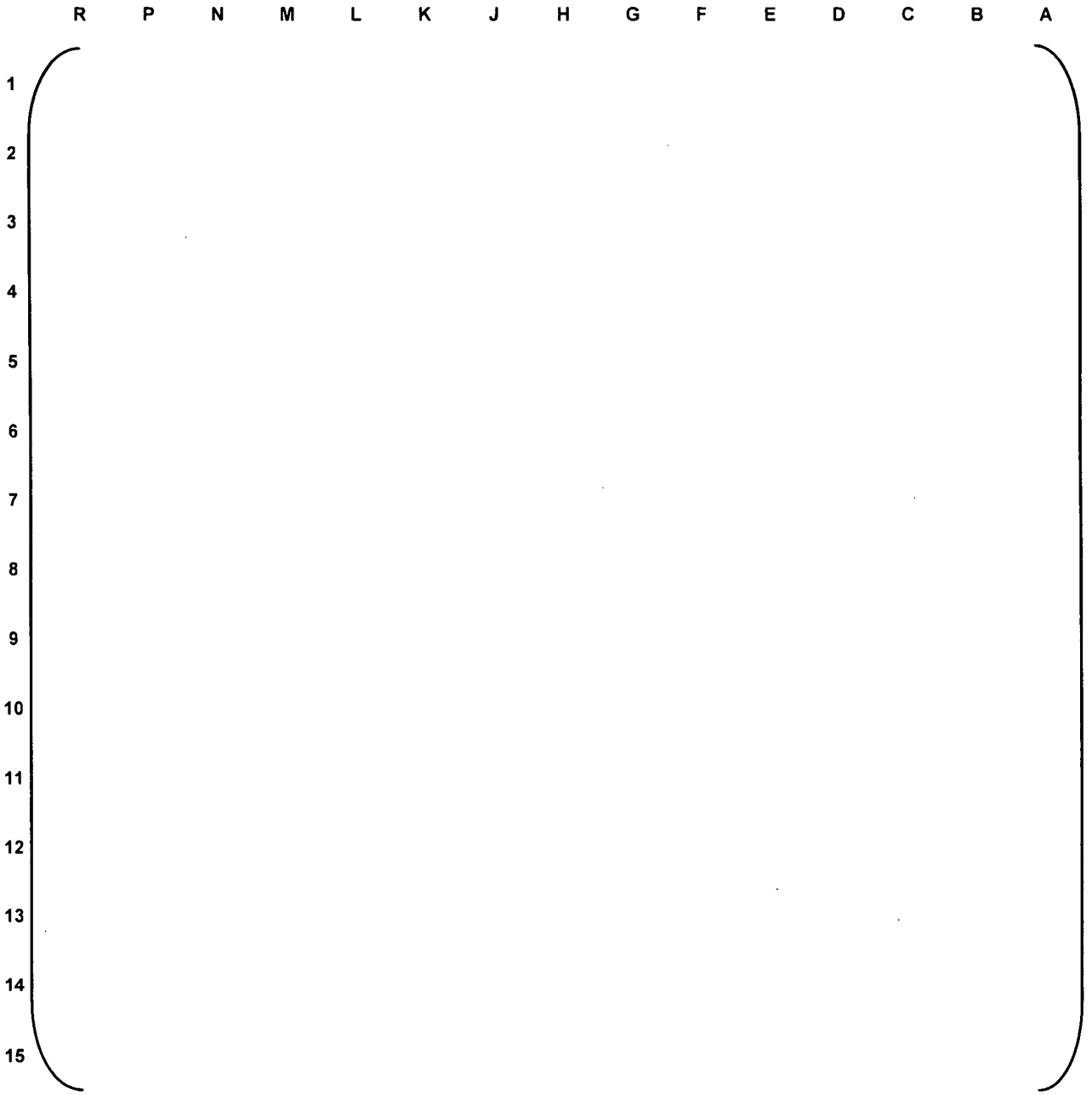
FCM/1/16/013 MWJB 21Jun05
44 EFPD 100 %FP



	Deviation
RMS	1.8%
Core Max	-6.5% at P-13
MOX Max	-3.4% at H-13

Figure 3

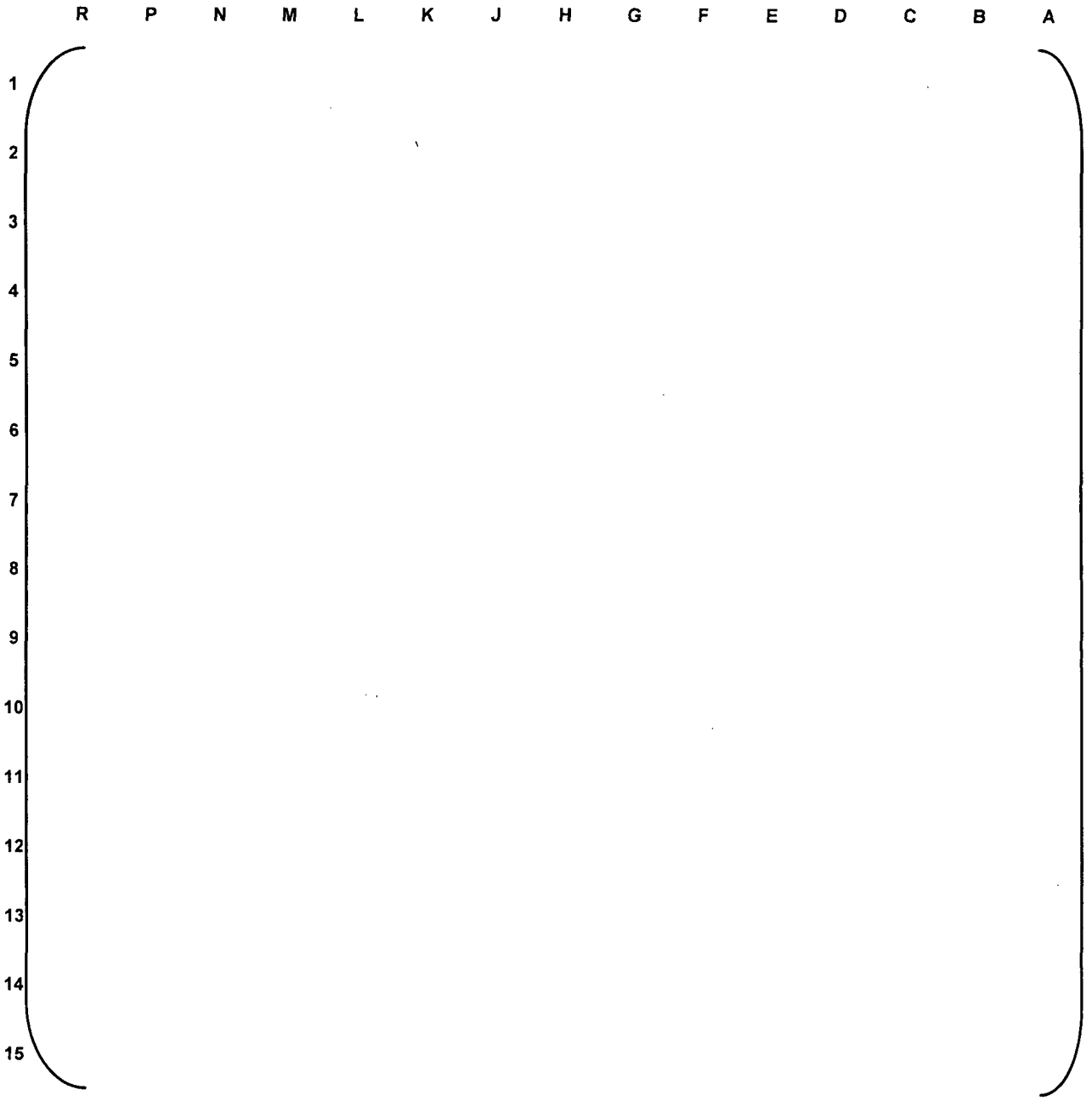
FCM/1/16/014 MWJC 18Aug05
72 EFPD 100 %FP



	Deviation
RMS	1.7%
Core Max	-6.6% at P-13
MOX Max	-3.8% at H-13

Figure 4

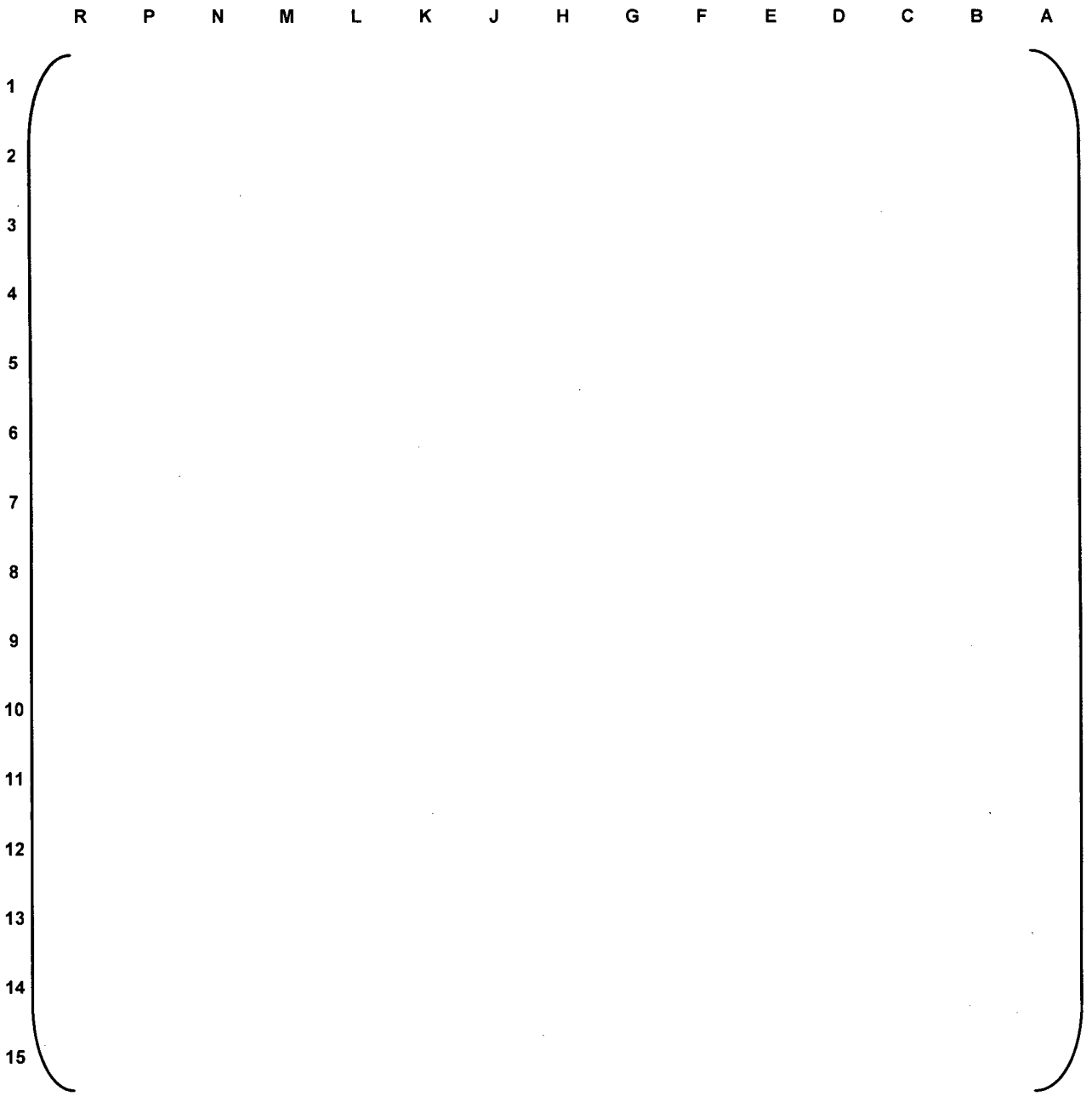
FCM/1/16/015 MWHA 15Sep05
100 EFPD 100 %FP



	Deviation
RMS	1.7%
Core Max	-6.6% at P-13
MOX Max	-3.2% at H-13

Figure 5

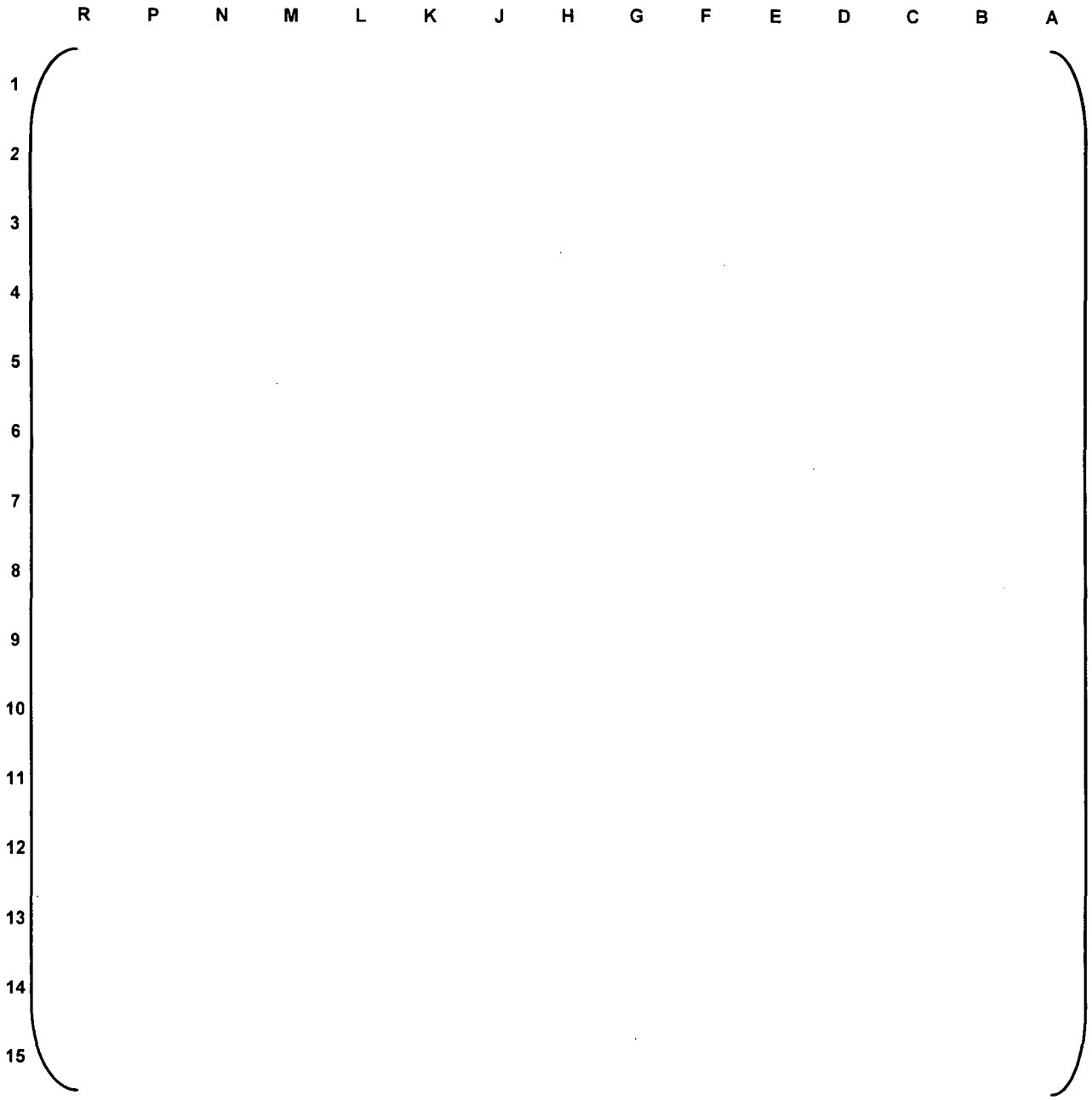
FCM/1/16/016 MWHA 13Oct05
128 EFPD 100 %FP



	Deviation
RMS	1.7%
Core Max	-6.3% at P-13
MOX Max	-3.6% at H-13

Figure 6

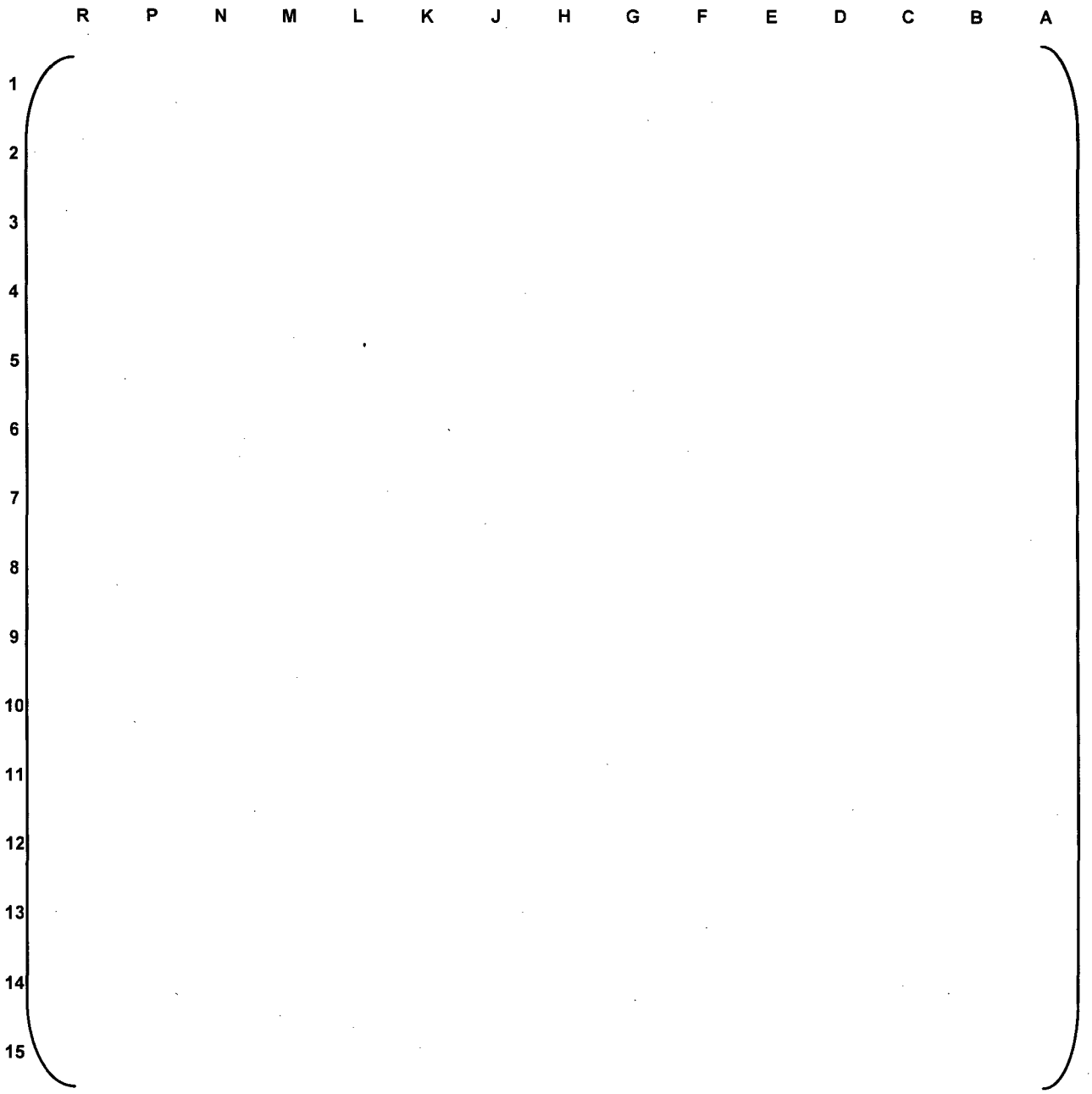
FCM/1/16/017 MWJB 09Nov05
155 EFPD 100 %FP



	Deviation
RMS	1.6%
Core Max	-5.9% at B-03
MOX Max	-3.0% at H-13

Figure 7

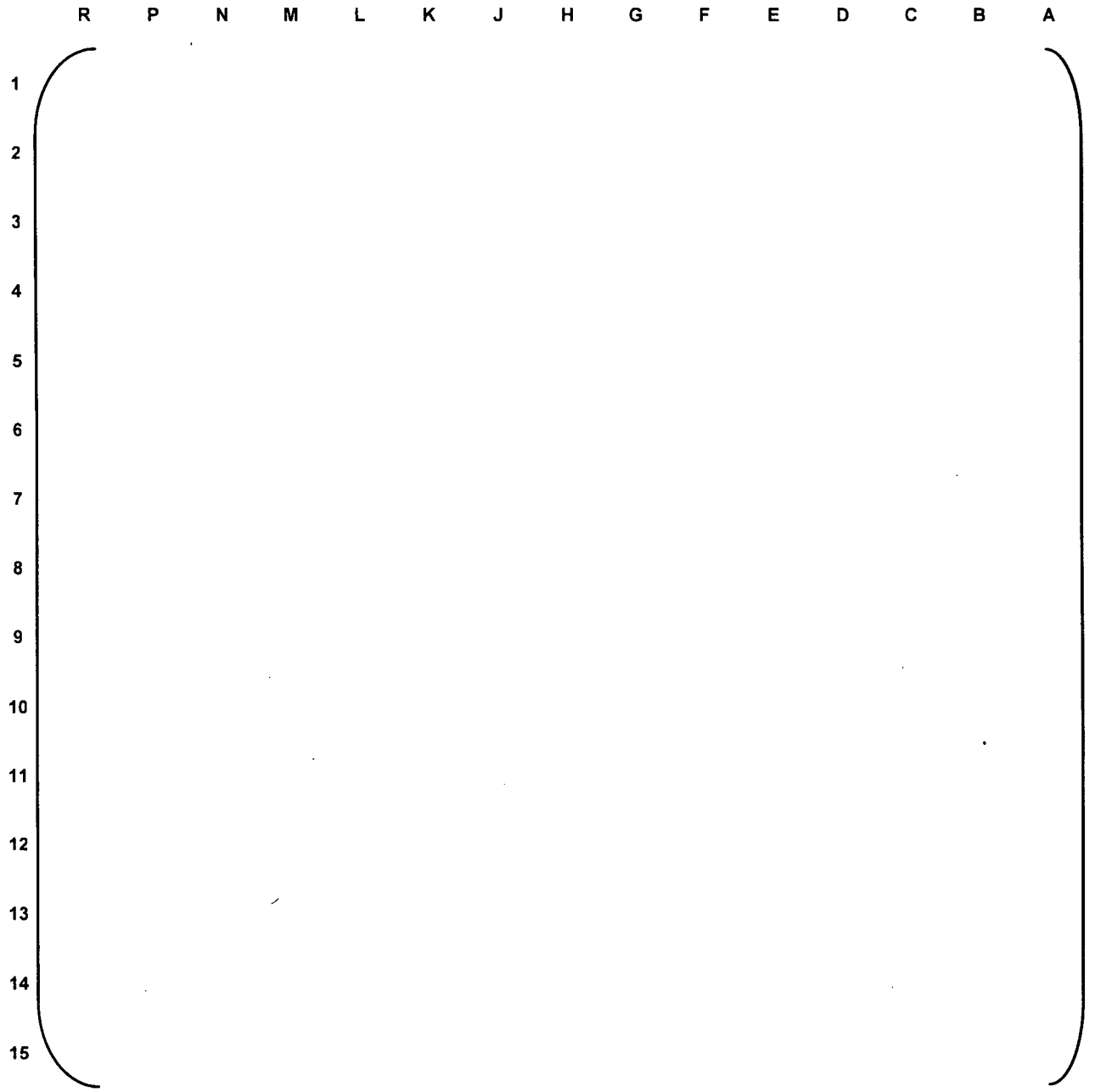
FCM/1/16/018 MWHA 07Dec05
183 EFPD 100 %FP



	Deviation
RMS	1.5%
Core Max	-5.9% at B-03
MOX Max	-3.6% at H-13

Figure 8

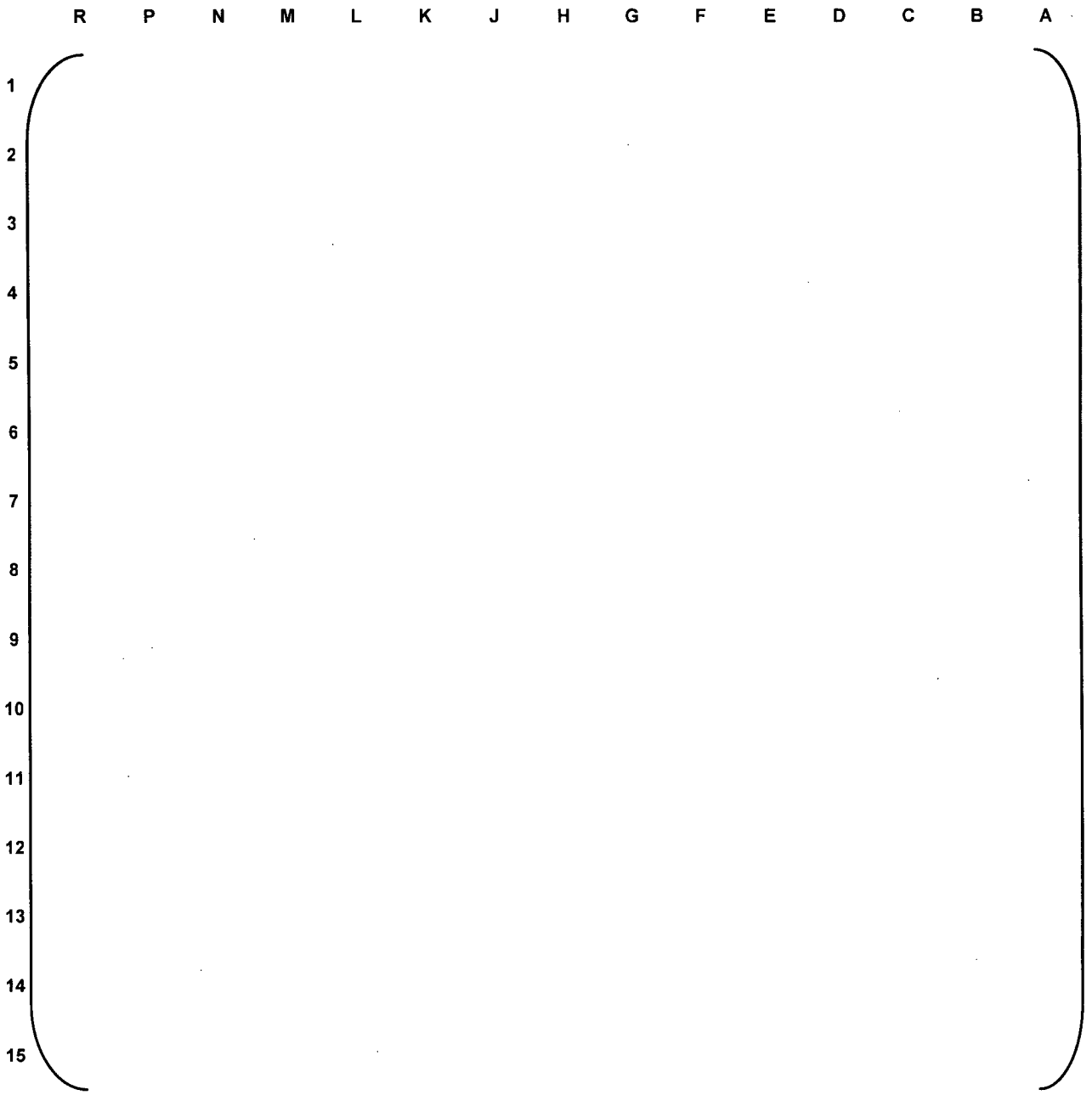
FCM/1/16/019 MWKD 05Jan06
212 EFPD 100 %FP



	Deviation
RMS	1.4%
Core Max	-5.2% at B-03
MOX Max	-2.8% at H-13

Figure 9

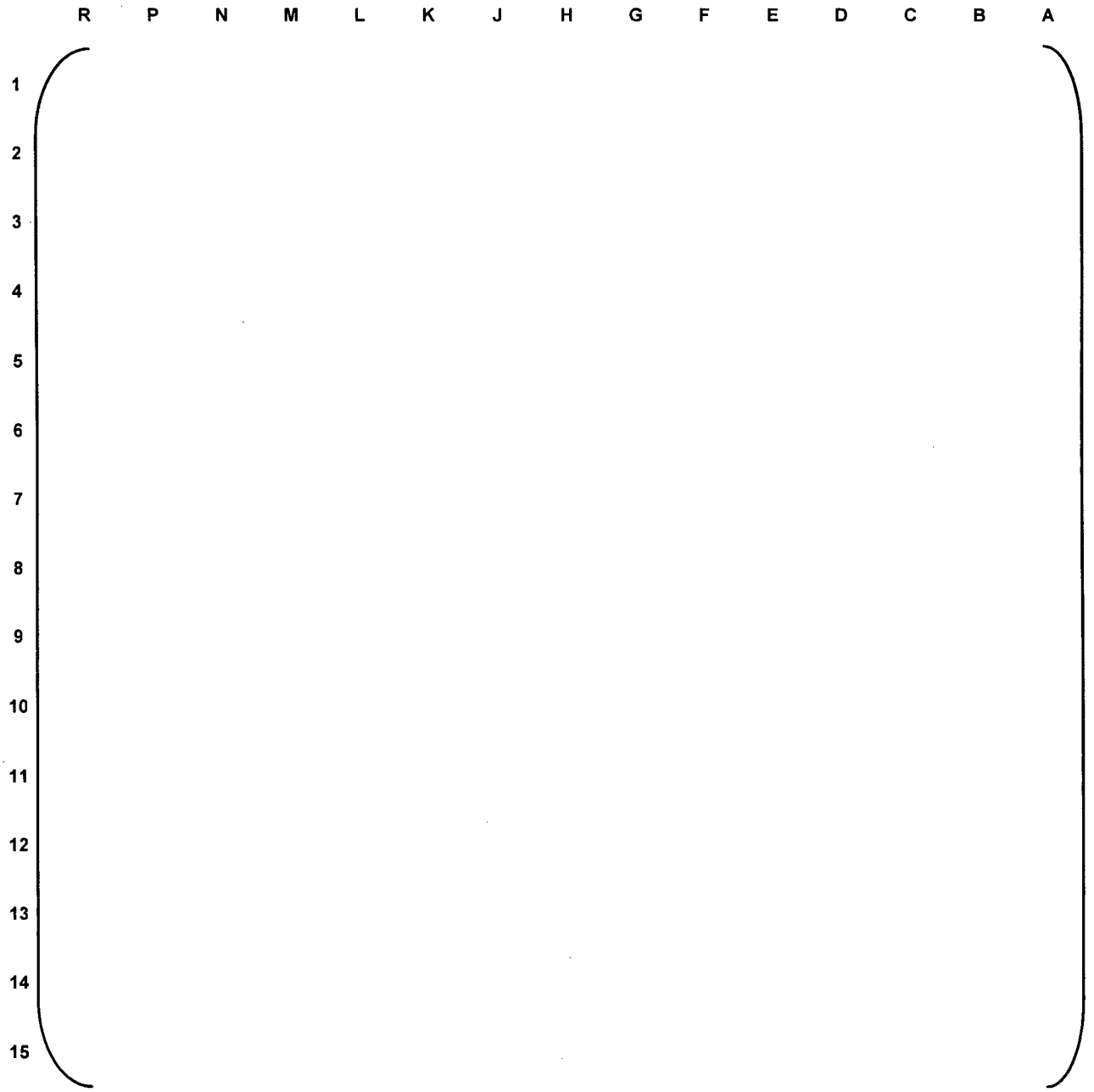
FCM/1/16/020 MWKJ 02Feb06
240 EFPD 100 %FP



	Deviation
RMS	1.2%
Core Max	-5.0% at B-13
MOX Max	-3.1% at C-08

Figure 10

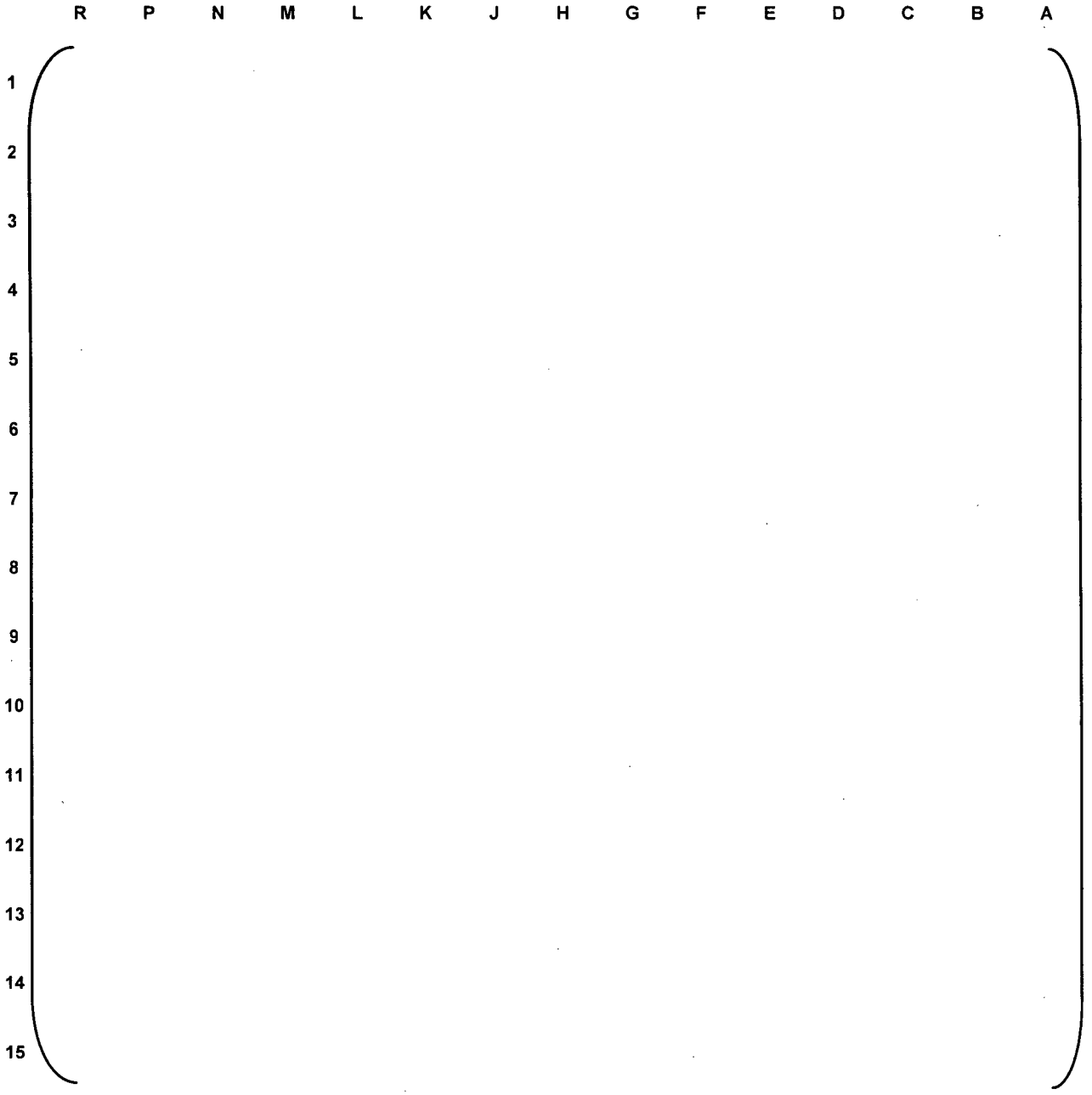
FCM/1/16/021 MWKN 02Mar06
268 EFPD 100 %FP



	Deviation
RMS	1.1%
Core Max	-4.4% at B-03
MOX Max	-2.6% at C-08

Figure 11

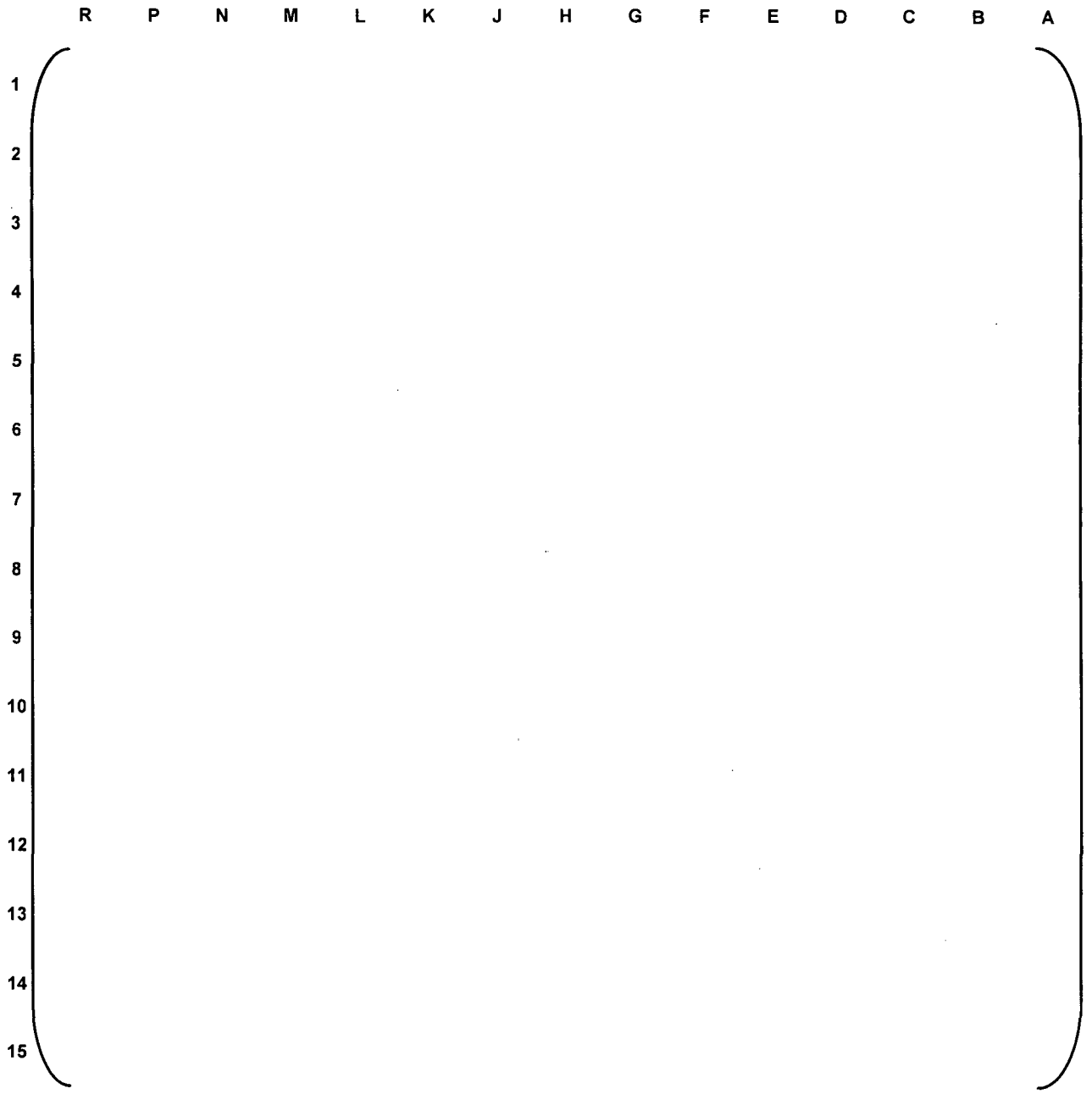
FCM/1/16/022 MWHA 30Mar06
295 EFPD 100 %FP



	Deviation
RMS	1.1%
Core Max	-4.7% at B-03
MOX Max	-3.3% at H-13

Figure 12

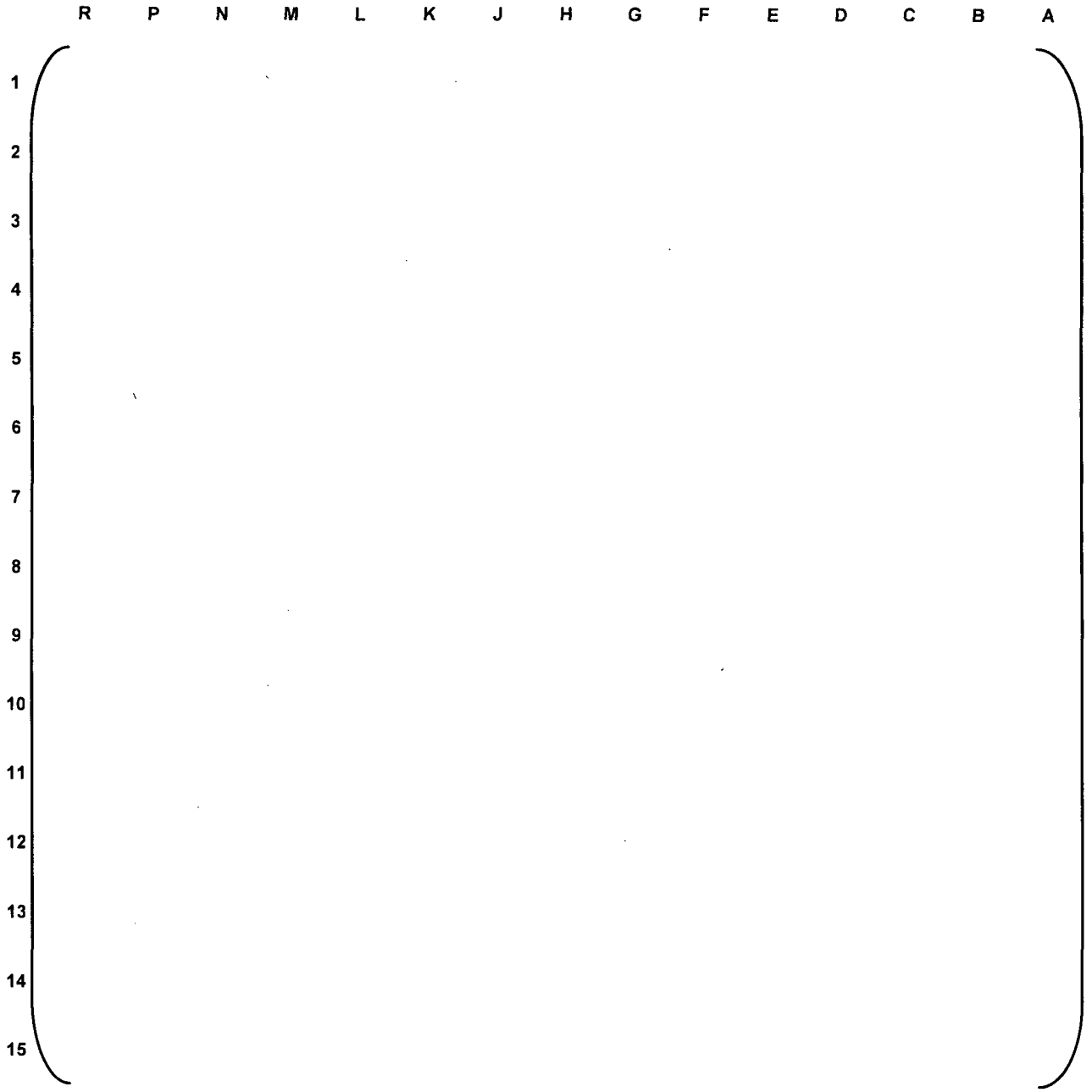
FCM/1/16/023 MWJG 27Apr06
323 EFPD 100 %FP



	Deviation
RMS	1.1%
Core Max	-4.7% at N-02
MOX Max	-3.1% at H-13

Figure 13

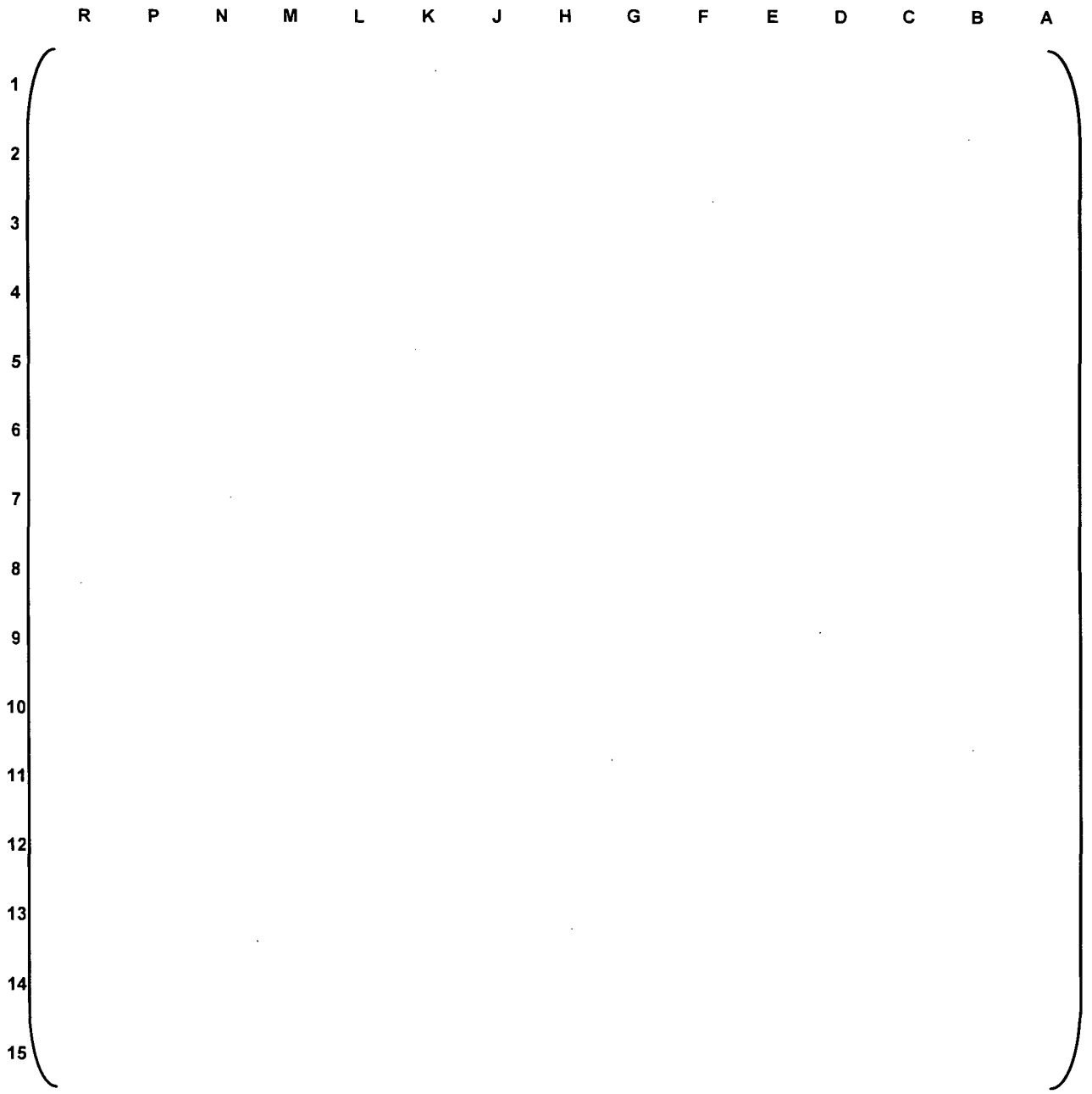
FCM/1/16/024 MWHA 22Jun06
357 EFPD 100 %FP



	Deviation
RMS	1.0%
Core Max	-3.8% at B-13
MOX Max	-2.4% at H-03

Figure 14

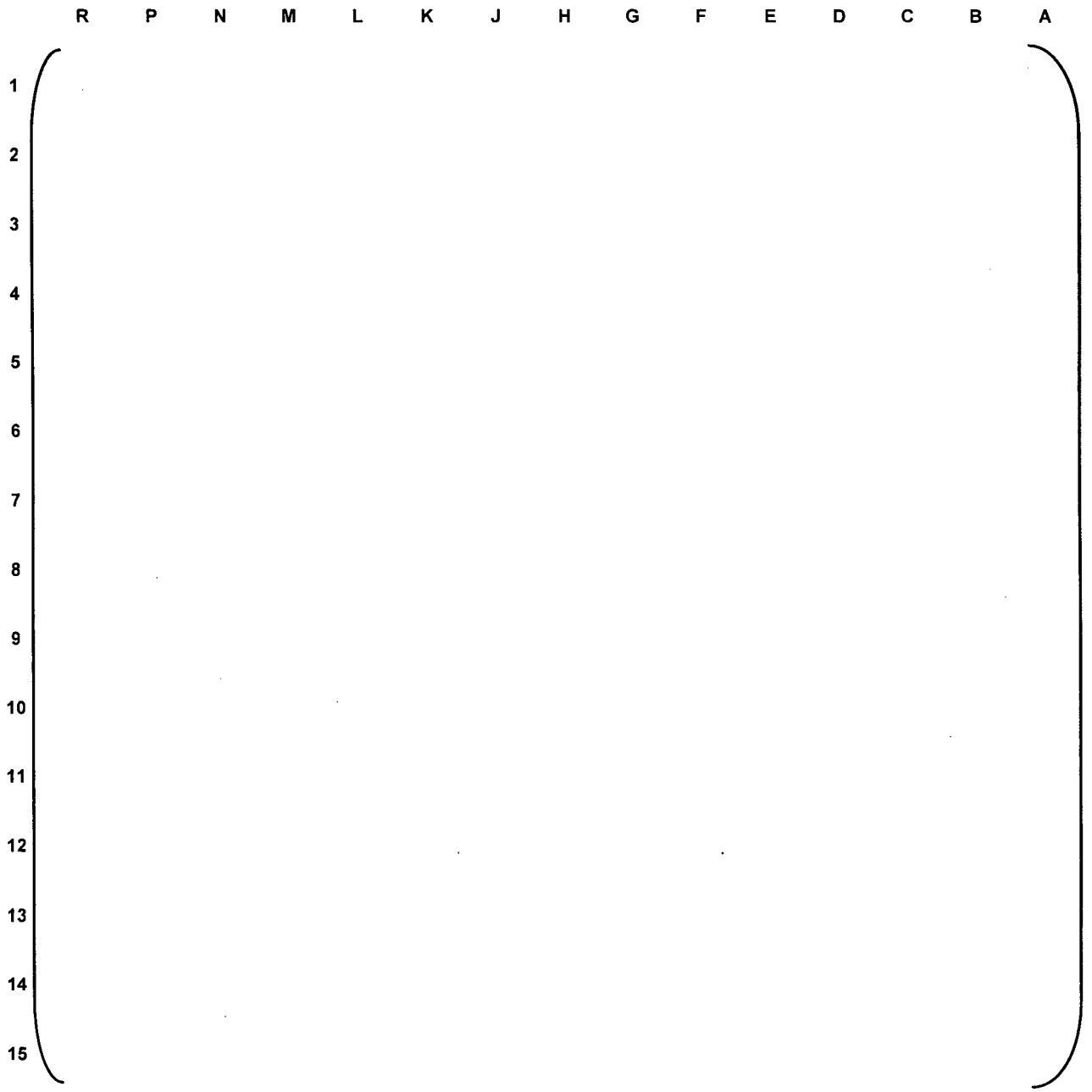
FCM/1/16/025 MWLL 20Jul06
385 EFPD 100 %FP



	Deviation
RMS	0.9%
Core Max	-3.5% at B-03
MOX Max	-3.1% at C-08

Figure 15

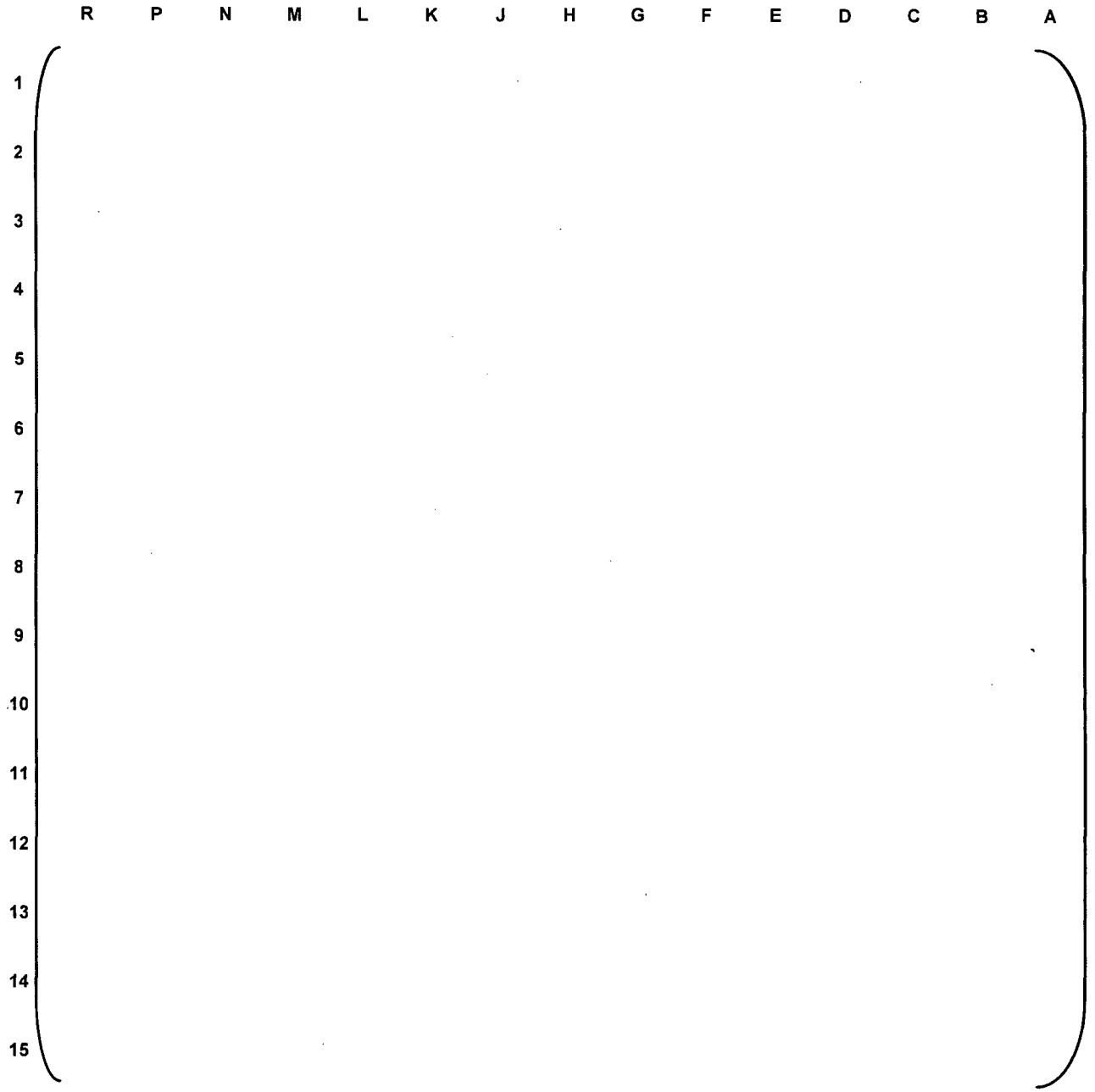
FCM/1/16/026 MWJN 17Aug06
413 EFPD 100 %FP



	Deviation
RMS	1.1%
Core Max	-4.7% at N-02
MOX Max	-2.4% at C-08

Figure 16

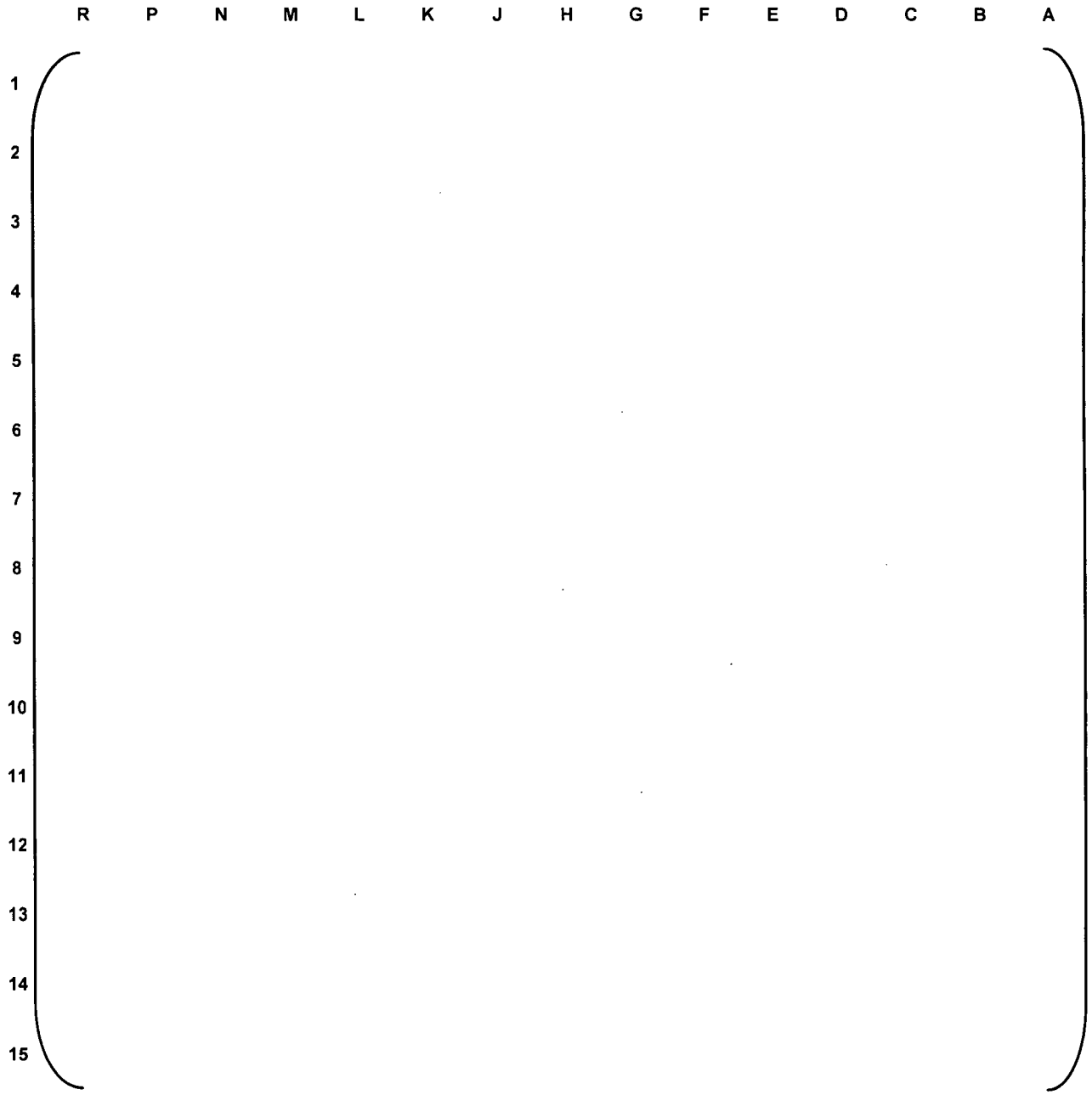
FCM/1/16/027 MWJP 14Sep06
441 EFPD 100 %FP



	Deviation
RMS	1.1%
Core Max	-4.7% at P-03
MOX Max	-2.7% at C-08

Figure 17

FCM/1/16/028 MWJQ 19Oct06
476 EFPD 100 %FP



	Deviation
RMS	1.1%
Core Max	-4.8% at B-03
MOX Max	4.0% at H-13