



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NOV 25 1992

MEMORANDUM FOR: Robert L. Baer, Chief
Engineering Issues Branch
Division of Safety Issue Resolution
Office of Nuclear Regulatory Research

THROUGH: Frank Cherny, Section Leader B
Engineering Issues Branch
Division of Safety Issue Resolution
Office of Nuclear Regulatory Research

FROM: Owen Rothberg, Task Manager
Engineering Issues Branch
Division of Safety Issue Resolution
Office of Nuclear Regulatory Research

SUBJECT: REPORT OF MEETING WITH NUMARC AND NUCLEAR INDUSTRY
REPRESENTATIVES ON OCTOBER 19-21, 1992 TO DISCUSS NUMARC'S
VERIFICATION AND VALIDATION (V&V) PROGRAM FOR THE INDUSTRY
IMPLEMENTATION GUIDANCE FOR THE MAINTENANCE RULE (10 CFR
50.65)

On October 19, 20, and 21, 1992, members of the NRC staff attended meetings at NUMARC headquarters with representatives of NUMARC, EPRI, INPO, and several nuclear utilities. The purpose of these meetings was to continue discussions on the verification and validation of NUMARC'S proposed guidance document, NUMARC-93-01, Revision 2A, July 9, 1992, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." Previous meetings were held on August 19-20 and September 29-30. Please refer to my meeting reports to you dated August 27, 1992 and October 20, 1992 respectively.

NUMARC sent a letter to J. Snieszek, DEDO dated October 14, 1992 to outline the V&V program status and lessons learned through September 25, 1992.

The meeting agenda sheets are attached in enclosure 1. Walt Smith of NUMARC chaired the meeting. Although a number of program descriptions and handouts were provided for discussion, most of this material was returned to NUMARC by the NRC participants because it is preliminary and not ready for distribution.

The meeting on the afternoon of October 19 was held for the purpose of discussing progress on the determination of risk significance of SSCs by various methods including probabilistic risk assessment (PRA).

The discussion of PRA methods to identify risk significant SSCs continued on October 20. Conclusions were; an understanding of the PRA model is required by the investigators, there are nomenclature problems between the PRA and maintenance perspectives, and all methods give "similar" results. After related discussions of software, expert panels, and the guidance provided

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thusfar, the overall conclusion was that "method 2," as described in NUMARC 93-01, coupled with "expert opinion" would be the best approach. The NUMARC guidance is to be modified to reflect this conclusion. It was also concluded that there is a need to train plant personnel concerning the use of risk based methods.

The participating utility representatives gave reports on their progress in identifying SSCs within the scope of the rule and risk significant SSCs. One conclusion is that the databases in the plants are not integrated and are of limited capability with respect to identification of performance history at the system level. This is mainly due to the fact that plant equipment data is compiled at the component level.

Some utility representatives reported that their verification and validation efforts revealed that actual performance of the selected systems and trains was much different than had been thought. Their realizations resulted from having to evaluate system/train performance as opposed to individual component performance. In two reports presented, both utility representatives noted that poor system/train performance, taken from an availability perspective, was due to inadequate root cause determinations of failed equipment and resulting inappropriate or ineffective maintenance. The licensees determined that this finding was beneficial and the insights gained from the system/train perspective would give them a much clearer picture of the effectiveness of their maintenance activities.

Removal of SSCs from the scope of the maintenance rule was discussed. One proposal was to remove SSCs that proved to be "very reliable" over a long period. The NRC staff representatives pointed out that the scope of the maintenance rule is fixed by the rule and does not depend on the performance of SSCs. The monitoring of SSCs, very reliable or otherwise, would vary according to performance. The rule does not allow removal of SSC's from the scope of the rule unless the SSC is removed physically from the plant through modification or the modification results in such a change to the SSC that it no longer meets the criteria that placed it in the rule originally.

The requirements of the NUMARC guidance with respect to the effect on safety of simultaneous removal of equipment from service was discussed. NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management" is referenced in NUMARC 93-01, although this reference has not been reviewed or endorsed by the NRC. The NUMARC guidance was discussed and several changes were suggested to make the guidance clearer and more useful. These changes will be edited and discussed again.

The relationship of the activities undertaken to satisfy the maintenance rule with respect to license renewal was discussed. NUMARC representatives indicated that they may contact NRC to arrange a joint meeting on this subject.

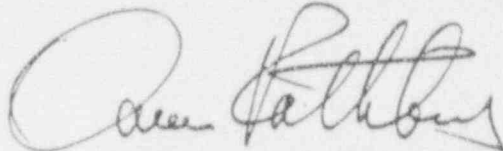
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A "lessons-learned" report was received from NUMARC on November 20, 1992. This report was presented in draft form at the meeting on October 19-21. A copy is attached as enclosure 3.

The next meeting is to be on November 16-19, 1992. A copy of the agenda for this meeting, as well as the attendance list from the October 19-21 meeting, was recently received from NUMARC and is attached in enclosure 2.

A handwritten signature in dark ink, appearing to read "Owen Rothberg". The signature is fluid and cursive, with the first name "Owen" written in a large, looping script, and the last name "Rothberg" written in a more compact, cursive style.

Owen Rothberg, Task Manager
Engineering Issues Branch
Division of Safety Issue Resolution
Office of Nuclear Regulatory Research

Enclosures: As stated

cc: See Next Page

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Enclosure 1

MAINTENANCE V&V AD HOC ADVISORY COMMITTEE

*Meeting Agenda
October 19, 1992
2:00 p.m. to 5:00 p.m.*

- PECO presentation - Peach Bottom risk significant method determination
- Discussion regarding approaches to identify risk significant systems at Grand Gulf
- input by EPRI, NRC, and Grand Gulf
- Discussion of other methods used to determine risk significance
- Results of survey on software
- Comments and disposition regarding proposed changes to industry maintenance guideline risk significance methodology
- Development of task list and schedule for comparing and reporting the results of the PRA/expert panel approaches to risk significance

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MAINTENANCE V&V AD HOC ADVISORY COMMITTEE

*Meeting Agenda
October 20 and 21, 1992*

- Report on risk significant comparison methodology
- Review position paper (attached) on the removal of systems from service (11.2.3) → removed
- Utility participant reports
 - Identify the method to be used for monitoring performance of all systems and structures identified as within the scope of the rule (9.3.2)
 - For risk significant systems, define the performance criteria and goals established for selected systems and their bases (9.3.3 and 9.3.4)
 - Plant level criteria selected and evaluation of trend performance
 - Trend of operating and standby SSC performance over the last six operating quarters and one shutdown period (12.2.2)
 - Identify SSCs that contributed to the trend (12.2.2)
 - Assess acceptability of system performance to the trend including effectiveness of cause determination and corrective action (12.2.3)
 - Determine if additional goal setting is appropriate
 - Identify all EOP and nonsafety-related SSCs and those that are to be deleted from the rule scope and basis (8.2.1.3)
 - Performance of selected standby and operating V&V SSCs
 - Identify benefits to be derived from rule implementation in accordance with the industry guideline (quantify)
 - Identify the cost estimate of implementation (by paragraph)
- INPO identify two problem components in each selected system to each utility participant for evaluation of cause of failure and corrective action in accordance with V&V program plan, paragraph 9.4.4. Utility participant to evaluate for generic and common cause failures.
- NRC identify 10 examples from its LER database to identify LER performance indicated as maintenance related per V&V program plan, paragraph 9.4.5. Utility participants will verify the failures as maintenance preventable functional failures.
- Action item closure

Agenda October 21, 1992

Supplementary Agenda

W/M

- o Removal of systems from the scope of the rule - All
- o Simultaneous SSTC removal effects on safety - D. Johnson & G. Czeschin
- o Monitoring demand failures - D Worledge
- o Counting failures - D Worledge
- o Comments on the minutes - All
- o Action item review - ALL
- o SSC Comparison of input to latest computer dump - All
- o Format for EOP Analysis (T. Jenkins)
- o Potential changes to Guideline Rev 2a based on lessons learned and other reviews and comments
 - Public comment and NRC disposition
 - Internal NRC review including ACRS
 - Risk Significance determination - PRA input to expert Panel
 - Clarification of basis for removing SSTC from scope of the rule
 - Clarification of SSCs that perform both an operating & standby function
 - Definition of standby and operating

AHAC FOR V&V OF INDUSTRY MAINTENANCE GUIDELINE

Meeting Agenda
November 16, 17, and 18, 1992

November 16, 1992 (2:00 p.m. - 6:00 p.m.)

Risk Significant Sub-task

- Sequoyah results - David Worledge
- Callaway results - Gary Czeschin
- Catawba results - Duncan Brewer
- Millstone results - Tom Galloway
- Grand Gulf results - Carl Johnson
- NRC presentation - Carl Johnson
- Proposed rewrite of guideline risk significant discussion
- Summary conclusions and recommendations

November 17, 1992 (9:00 a.m. - 7:00 p.m.)

November 18, 1992 (9:00 a.m. - 4:00 p.m.)

- Summary conclusions from risk significant sub-task committee
- Plant Reports - 20 Minutes per utility *
 - Verification that all guideline paragraphs have been addressed
 - Use of qualified expert panel where PRA is incomplete
 - Conclusions
 - Recommendations
 - Overview of at least one system
 - Root cause review of NRC (LERs) and INPO problem component input
- Plant reports are requested in hardcopy and on 3.5" disk (WordPerfect 5.1) prior to the AHAC Meeting of November 16, 1992

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AHAC FOR V&V OF INDUSTRY MAINTENANCE GUIDELINE

Meeting Agenda (continued)
November 16, 17, and 18, 1992

- Issues and position papers distributed
 - Monitoring and goal setting for Non-risk significant repetitive failures - Rick Branch
 - Removal of SSCs from the scope of the Rule - Dan Rains
 - Need for an implementing guideline not in regulatory space and the need to expand the guideline document - Dan Rains
 - Normalized core damage, sub-division of systems, use of multiple goals and criteria - Dwight Johnson
 - Industrywide experience - Walt Smith
 - Application of shutdown risk considerations to maintenance guideline (NUMARC 91-06) - Jim Eaton
 - Recommendations regarding NPRDS application to Rule implementation
 - Status of action items - Dan Rains
- Validation of documentation matrix (NUMARC to supply floppy discs)
- Schedule of activities to complete

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MEETING ATTENDANCE

COMMITTEE/SUBCOMMITTEE: Verification & Validation AHAC		
DATE: October 19, 1992		TIME: 2:00 p.m.
LOCATION: Technical Conference Room		
NAME	ORGANIZATION	TELEPHONE
David Worledge	EPRI	(415) 855-2342
Gary Czeschin	UE - Callaway	(314) 676-8430
Earl Page	Detroit Edison	(313) 586-4266
Howard Whitcomb	Detroit Edison	(313) 586-1535
Thomas J. Galloway	Northeast Utilities	(203) 447-1791 x5042
Greg Kreuger	Philadelphia Electric	(215) 640-6579
Gabor Fodor	Northeast utilities	203) 444-5254
Walt Smith	NUMARC	(202) 872-1280
Dan J. Rains	NUMARC	(202) 872-1280
Owen Rothberg	NRC/RES	(301) 492-3924
Tom Thurmon	Entergy - Grand Gulf	(601) 437-6792
Tom Stetka	NRC	(817) 860-8247
Richard Correia	NRC	(301) 504-1009
Joseph Solymossy	INPO	(404) 953-5449
Warren Hall	NUMARC	(202) 872-1280
Jim Eaton	NUMARC	(202) 872-1280
Jorge Ramirez	Detroit Edison	(313) 586-1337

MEETING ATTENDANCE

COMMITTEE/SUBCOMMITTEE: Verification & Validation AIIAC		
DATE: October 20, 1992		TIME: 9:00 a.m.
LOCATION: USCEA Board Room		
NAME	ORGANIZATION	TELEPHONE
Mark Ring	NRC/Region III	(708) 790-5602
David Worledge	EPRI	(415) 835-2342
Dwight J. Johnson	Entergy Operations, Inc.	(501) 964-3208
Gary Czeschin	UE - Callaway	(314) 676-8430
Rick Branch	BG&E - Calvert Cliffs	(410) 260-4434
Earl Page	Detroit Edison	(313) 586-4266
Ed Rogers	Entergy	(501) 964-8855
Howard Whitcomb	Detroit Edison	(313) 586-1535
Thomas J. Galloway	Northeast Utilities	(203) 447-1791 x5042
Greg Krueger	Philadelphia Electric	(215) 640 6570
Gabor Fodor	Northeast utilities	203) 444-5254
Tom Stetka	NRC/Region IV	(817) 860-8247
Walt Smith	NUMARC	(202) 872-1280
Dan J. Rains	NUMARC	(202) 872-1280
Owen Rothberg	NRC/RES	(301) 492-3924
Ted Jenkins	TU Electric	(817) 897-6022
Roger Murgatroyd	Florida Power Corporation	(904) 795-6486
Gary Sullins	Entergy - ANO, Unit 1	(501) 964-6679
Tom Thurmon	Entergy - Grand Gulf	(601) 437-6792
Richard L. Warden	CP&L	(919) 546-3440
Carl Johnson	NRC	(301) 492-3548

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COMMITTEE/SUBCOMMITTEE: Verification & Validation AHAC		
DATE: October 20, 1992		TIME: 9:00 a.m.
LOCATION: USCEA Board Room		
NAME	ORGANIZATION	TELEPHONE
Richard Correia	NRC	(301) 504-1009
Joseph Solymossy	INPO	(404) 953-5449
Bob Bauman	INPO	(404) 951-5337
Craig R. Treubel	Entergy - Grand Gulf	(601) 437-2127
Warren J. Hall	NUMARC	(202) 872-1280
Jim Eaton	NUMARC	(601) 437-2127

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MEETING ATTENDANCE

COMMITTEE/SUBCOMMITTEE: Verification & Validation AHAC		
DATE: October 21, 1992		TIME: 9:00 a.m.
LOCATION: USCEA Board Room		
NAME	ORGANIZATION	TELEPHONE
Mark Ring	NRC/Region III	(708) 790-5602
David Worledge	EPRI	(415) 855-2342
Dwight J. Johnson	Entergy Operations, Inc.	(501) 964-3208
Gary Czeschin	UE - Callaway	(314) 676-8430
Rick Branch	BG&E - Calvert Cliffs	(410) 260-4434
Ed Rogers	Entergy	(501) 964-8855
Howard Whitcomb	Detroit Edison	(313) 586-1535
Thomas J. Galloway	Northeast Utilities	(203) 447-1791 x5042
Gabor Fodor	Northeast utilities	203) 444-5254
Tom Stetka	NRC/Region IV	(817) 860-8247
Walt Smith	NUMARC	(202) 872-1280
Dan J. Rains	NUMARC	(202) 872-1280
Owen Rothberg	NRC/RES	(301) 492-3924
Ted Jenkins	TU Electric	(817) 897-6022
Roger Murgatroyd	Florida Power Corporation	(904) 795-6486
Gary Sullins	Entergy - AND, Unit 1	(501) 964-6679
Tom Thurmon	Entergy - Grand Gulf	(601) 437-6792
Richard L. Warden	CP&L	(919) 546-3440
Carl Johnson	NRC	(301) 492-3548
Richard Correia	NRC	(301) 504-1009
Joseph Solymossy	INPO	(404) 953-5449
Bob Bauman	INPO	(404) 951-5337
Craig R. Treubel	Entergy - Grand Gulf	(601) 437-2127



ENCLOSURE 3

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NUCLEAR MANAGEMENT AND RESOURCES COUNCIL

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(202) 872-1280

Thomas E. Tipton
Vice President & Director
Operations, Management and
Support Services Division

November 20, 1992

Mr. James H. Sniezek
Deputy Executive Director
Office of Nuclear Reactor Regulation
Regional Operations and Research
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Sniezek:

The purpose of this letter is to provide you with the second interim lessons learned report (Enclosure 1) from the Maintenance Rule Industry Guideline Verification and Validation (V&V) program. Also provided is the major project milestones (Enclosure 2) and the results achieved by the NUMARC V&V Ad Hoc Advisory Committee (AHAC) participants through October 30, 1992.

The V&V program is being implemented by nine units representing all four principal NSSS suppliers with additional participation by EPRI, INPO, NUMARC, and the Nuclear Regulatory Commission. The V&V program was initiated in May 1992 and is scheduled to conclude with a final NUMARC report in December 1992. The next interim lessons learned report is expected to be issued the week of November 30, 1992.

The active participation of the NRC working group continues to provide meaningful input. We are confident that this involvement will benefit the NRC, the public, and the industry.

Should you have any questions regarding the enclosed information, please contact me or have members of your staff contact Warren Hall, Walt Smith, or Dan Rains.

Sincerely,

Warren J. Hall
for

Thomas E. Tipton

TET/DJR:sp
Enclosures

cc: Dr. Thomas E. Murley, NRR
Mr. Eric S. Beckjord, RES
Mr. William T. Russell, NRR
Mr. Clemens J. Heltemes, Jr., RES
Mr. Richard P. Correia, NRR
Mr. Hernan Alderman, ACRS

Enclosure 1

SECOND INTERIM LESSONS LEARNED REPORT
OCTOBER 1992

Summary Lessons Learned/Problems Encountered

- *SOME RISK SIGNIFICANT SYSTEMS ARE NOT INCLUDED IN NPRDS*

Instrument air, considered by some utilities as risk significant, is not currently required to be entered into NPRDS and, therefore, data are not available for comparison.
- *UTILITY COMPARISONS OF DATA TO SIMILAR NSSS UNITS*

The differences among similar NSSS units are predominantly associated with legitimate differences in design, boundary definition, nomenclature, and vintage as opposed to criteria interpretation. Comparisons between units has been identified as time intensive. However, the comparison of more than one NSSS data set can narrow real differences by driving decisions to be rethought against peer questioning.
- *DATA HISTORY RETRIEVAL*

The collection and performance analysis of some systems requires a significant amount of data especially when viewed over a number of operating cycles. Preplanning for the implementation of the rule will be essential to minimizing resource dilution. Utilities should consider what data sources will be required for collecting on going operational data prior to the rule effective date of July 1996. The data collected and the collection time period should be sufficient to allow a basis for dispositioning SSCs to (a)(1) or (a)(2). One utility with generally good data retrieval capability found that gaps in document history caused delays and difficulty in the determination of the cause of outages.

MODIFICATION OF DATA SYSTEMS TO PROVIDE SYSTEM/TRAIN FOCUS

Utility participants indicated many data systems are in existence that emphasize component level data collection. This focus does not adequately reinforce the evaluation of trends at the system and/or train performance monitoring level. This is true because failures at the component level do not necessarily result in an unacceptable loss of function. Additionally, many data bases appear to supply overlapping data as well as omit data that is needed. Some utilities consider the change in their data systems to be mandatory to meet the performance monitoring aspects of the rule. It appears that these modifications can be significant in some cases and minor in others, for example:

A primary lesson learned by one utility participant was the inadequacy of any single plant data base to provide the necessary information to perform evaluations.

A common equipment reference at the system/sub-system/function level appears to be needed so that all groups impacted by the Maintenance Rule (PRA, OPS, ENG, etc.) are speaking a "common language."

Need to track data requirements to existing organizational functions to clarify requirements, eliminate redundancy, and ensure completeness.

The current system hierarchal structure must be reassessed to allow improved scoping. Logical subdivision of the current systems list from the top down could allow for the number of implied in-scope components to be reduced. This approach would be preferable to screening each component individually against all criteria. Revising the RCM system selection and boundary definition process based on V&V insights appears necessary.

events like this accentuate the need for good root cause analysis and documentation to support system performance reviews.

• *DATA RETRIEVAL TO SUPPORT REPETITIVE FAILURE DETERMINATION*

One utility indicated that the identification of repetitive failures required a data base to be established to accumulate this information. Several other utilities have also identified the need to establish special data bases for this purpose.

• *NO BENEFIT IN COST AVOIDANCE FOR SOME UTILITIES*

Direct significant savings in power replacement costs due to improved maintenance as a result of the Maintenance Rule are not expected at some utilities because of the existing effectiveness of their programs. However, initial costs to implement the rule will be incurred because of the generic application of the rule.

- *IMPROVED APPLICATION OF RESOURCES*

Identification of risk significant systems will provide better focus for maintenance resources and improved scheduling. This improvement in redirecting resources under some RCM programs has reduced, added, and modified maintenance programs. Although untested, this redirection of resources is expected to improve performance.

- *POTENTIAL APPLICATION TO LICENSE RENEWAL*

The potential exists for taking credit for Maintenance Rule performance monitoring to reduce prescriptive License Renewal requirements. Demonstrated performance and risk significance determination could reduce the need for unnecessary analytical justification of aging mechanisms.

- *OPPORTUNITY FOR TESTING SCOPE REDUCTION*

Early reported results of the V&V participants indicate that many valves and penetrations that are locally leak rate tested have not failed since 1985 and as such, based on the performance aspects of the Maintenance Rule, testing frequency could be extensively reduced.

Enclosure 2

*MAINTENANCE VERIFICATION AND VALIDATION PROGRAM PLAN
AND COST ESTIMATING BASELINE
MAJOR PROJECT MILESTONES STATUS*

October 1992

Status of Major Steps in V&V Program

1. Identify all structures, systems, and components (SSCs) that are within the scope of the Maintenance Rule. (Complete)
2. Compare the selected SSCs between common NSSS participants and assure the differences are valid. (In-Process)
3. Compare the selected SSCs between all participating plants and assure the differences. (In Process)
4. Identify the method for identifying risk significant criteria for the selection of risk significant SSCs. (Complete - Will test PRA and Expert Panel methods and identify observations relative to the use of reliability approaches to maintenance)
5. Identify the criteria selected for the determination of risk significant SSCs. (Complete)
6. Establish plant level criteria and target trends. (In Process)
7. Identify and verify the methodology for evaluating the performance of standby systems that are risk significant or non-risk significant. (In Process)
8. Develop the criteria for the selection of the SSCs that the V&V program will address and recommend a candidate list. (Complete)
9. Select the SSCs that will be addressed in the V&V program. Note that only a sample of SSCs will be selected with results extrapolated to all SSCs. (Complete)
10. Identify all SSCs included in EOPs. (In Process)
11. Identify EOP categories to be recommended for deletion from the scope of the Maintenance Rule. (See lessons learned/problems encountered, September 1992)
12. Evaluate the performance (over the last three refueling cycles) of risk and non-risk significant SSCs that are normally in the standby mode and establish the type and value of goals that are appropriate. (In Process)

Major Project Milestones

September through November 1992	Interim lessons learned reports
November 1992	Reg Guide issued in Federal Register for public comment
December 1992	Completion of industry V&V program
January 1993	NRC receipt of public comments
March 1993	NRC resolution of public comments
May 1993	Present ACRS/CRGR package - resolve comments
June 1993	Reg Guide issued by Federal Register notice
July/August 1993	NUMARC sponsored workshops
1994-1995	NRC pilot inspection program
July 1996	Industry full implementation

Future Activities

V&V program scheduled for completion December 1992.

Public comments on NRC Regulatory Guide to be provided in January 1993.

Based on V&V results/industry input:

- Revise guidance where appropriate; and
- Suggest (or petition) changes to Maintenance Rule.

Program must be implemented in sufficient time to meet the full implementation date of July 10, 1996.

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COMMITTEE/SUBCOMMITTEE: Verification & Validation AHAC		
DATE: October 21, 1992		TIME: 9:00 a.m.
LOCATION: USCEA Board Room		
NAME	ORGANIZATION	TELEPHONE
Warren J. Hall	NUMARC	(202) 872-1280
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NOV 25 1992

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OWFN 12 G18
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MNBB 9112
NLS 302
OWFN 10 A19
NLS 129
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