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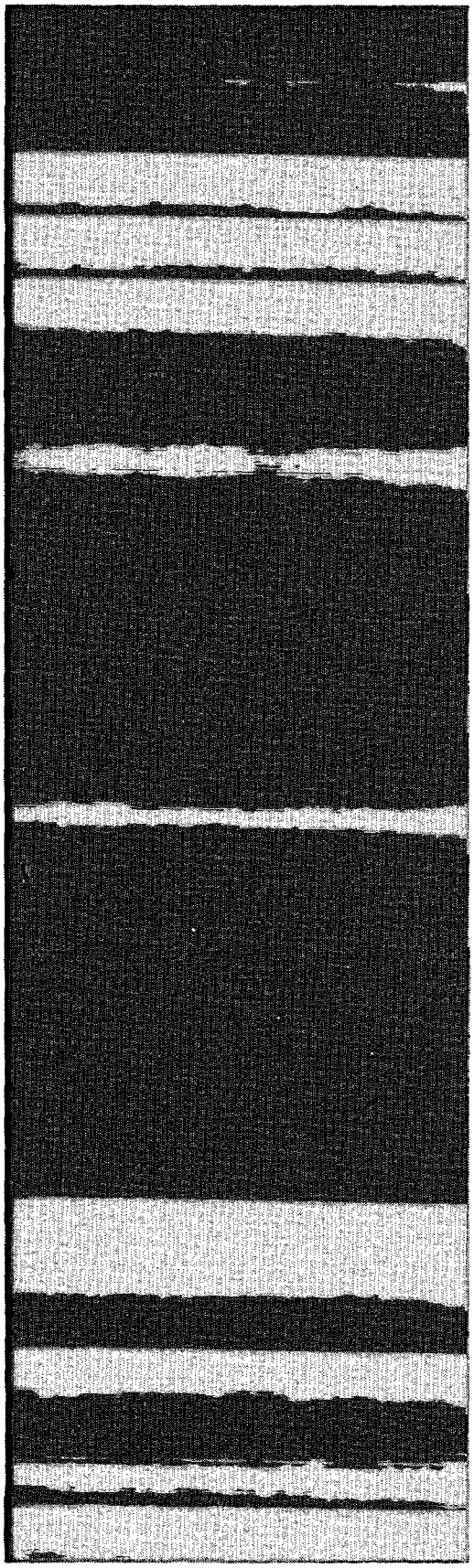

Los Alamos National Laboratory
Yucca Mountain Site Characterization Project
1991 Quality Program Status Report

102.7

Los Alamos

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Los Alamos National Laboratory Yucca Mountain Site Characterization Project 1991 Quality Program Status Report

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Los Alamos National Laboratory
Yucca Mountain Site Characterization Project
1991 Quality Program Status Report

by

Stephen L. Bolivar

ABSTRACT

This status report summarizes the activities and accomplishments of the Los Alamos National Laboratory (Los Alamos) Yucca Mountain Site Characterization Project's (YMP) quality assurance program for calendar year 1991. The report is divided into three Sections: Program Activities, Verification Activities, and Trend Analysis.

Program Activities are discussed periodically at quality meetings. The most significant problem addressed has been the timely revision of quality administrative procedures. Steps were taken to resolve this issue and all procedures are now being examined and revised as appropriate. Other accomplishments include the establishment of various distribution lists, resolution of personnel verification issues, completion of 32 grading packages, revision of several quality administrative procedures, and development of flow-down and regulation-guide matrixes.

Semiannual meetings and information brochures were used to bring awareness of quality issues to Los Alamos YMP personnel. The training program was examined and a new indoctrination class developed; 52 other training classes were held. The software quality assurance program was implemented, with 49 software packages approved for distribution.

The Project Office conducted four surveys and two audits of Los Alamos YMP activities in 1991. Internal verification activities resulted in 15 audits and 9 surveys. Four stop work orders were issued and three were closed. In 1991, 65 deficiencies were issued, a 50% decrease compared to 1990.

The procedure for auditing was revised and the auditing process streamlined, resulting in a more efficient reporting system. The deficiency reporting data base was transferred to Los Alamos. Problems with writing acceptable deficiency reports were resolved and the deficiency reporting procedure was revised. These efforts have helped reduce the backlog of outstanding deficiencies.

A trend analysis was conducted for the period January 1990 to December 1991. When the number of deficiencies issued by the Project Office are examined, the number issued to Los Alamos compared to other participants is minimal, suggesting Los Alamos is following Project Office quality assurance guidelines. Los Alamos has continually reduced the number of deficiencies issued them annually for the last 5 years.

Los Alamos deficiencies are categorized by the procedure that was violated, by the group responsible for the infraction, and by probable cause. Several adverse trends are recognized but most can be attributed to poorly written procedures and all are being tracked by previously issued deficiency reports or stop work orders.

1.0 INTRODUCTION

This status report is for calendar year 1991 and summarizes the activities, accomplishments, and future goals of the Los Alamos National Laboratory (Los Alamos) Yucca Mountain Site Characterization Project (YMP or Project) quality assurance program (hereafter referred to as the quality program). By identifying the accomplishments of the quality program, we establish a baseline that will assist in decision making, improve administrative controls and predictability, and allow us to annually identify long-term trends and to evaluate improvements.

Quality issues are discussed at quality meetings, which are held every two to three weeks. Attendance at these meetings is mandatory for the contributors of this report. These individuals constitute the quality organization. They may bring any quality issue before the meeting for discussion. As appropriate, these discussions, consequent guidance, and decisions or philosophies are documented herein.

This report is divided into three sections: Program Activities, Verification Activities, and Trend Analysis. Trend Analysis contains an evaluation of deficiencies and identification of adverse trends. Since this is the first progress report, the Trend Analysis contains data for calendar years 1990 and 1991.

1.1 Organization

Software, training, records, and document control activities do not administratively fall under the auspices of the quality assurance project leader (QAPL). They are discussed herein because these activities are an integral part of the overall quality program; representatives from these activities attend quality meetings, and the QAPL and administration and control project leader work closely to ensure that the needs of the Los Alamos YMP are met. A discussion of the Los Alamos YMP organization is thus included herein to clarify the responsibilities of these entities.

The Los Alamos YMP quality program consists of four organizations, each managed by a project leader: the Test Coordination Office, with Hemi Kalia head; Site and Regulatory Investigations, with Julie Canepa as Project Leader; Administration and Control, headed by Karen West (ACPL); and Quality Assurance, lead by Stephen Bolivar (QAPL). These four project leaders report to the Technical Project Officer (TPO), Richard Herbst.

Interactions between technical groups and the quality organization are normally handled by Quality Assurance Liaisons (QALs) who report to the QAPL. Personnel responsibilities are identified in Table 1. Audit, survey, and verification functions are administered by a Verification Coordinator, who also reports to the QAPL (Fig. 1).

Software, Training, Records, and Document Control coordinators report to the ACPL. Resident File Custodians (RFC) who maintain resident files where quality records are stored also report to the ACPL. Because the YMP requires dual storage of quality records, the Records Coordinator maintains a Records Processing Center (RPC) where the other set of dual-stored records are kept. The relationships between these groups are also depicted in Fig. 1.

Approximately 130 people work on the Los Alamos YMP. Personnel fall roughly into the following categories:

Earth and Environmental Science (EES) Groups EES-1,4,5,13,15	40%
Isotope and Nuclear Chemistry (INC) Division Groups INC-4,7,11	18%
EES-13/Las Vegas	10%
Verification Contractor	10%
Other contractor	19%
Other Laboratory groups	3%

Table 1. Quality Assurance Liaison (QAL) Responsibilities

QAL	Responsibilities
Carol LaDelfe	Group EES-1; Group EES-5; Subcontractor University of New Mexico; Alternate to Configuration Control Board.
Andrew Burningham	Group EES-13/LV TOC; EES-13/LV Volcanism; Subcontractors University of New Mexico, Ohio State University, University of California (Riverside), and Golder Associates.
Mike Clevenger	Group EES-13; Deficiency report coordinator; Signature authority for QAPL
Donna Williams	Group EES-15; Group LS-2; Member of Configuration Control Board; Chairperson Commercial-Grade Software requests; Assists with all vendor qualifications; Handles personnel verification coordination; Quality Concerns Liaison.
Terry Morgan	Groups INC-4, -7, and -11; Subcontractors Hydro Geo Chem, Lawrence Berkeley Laboratory and Stanford University.

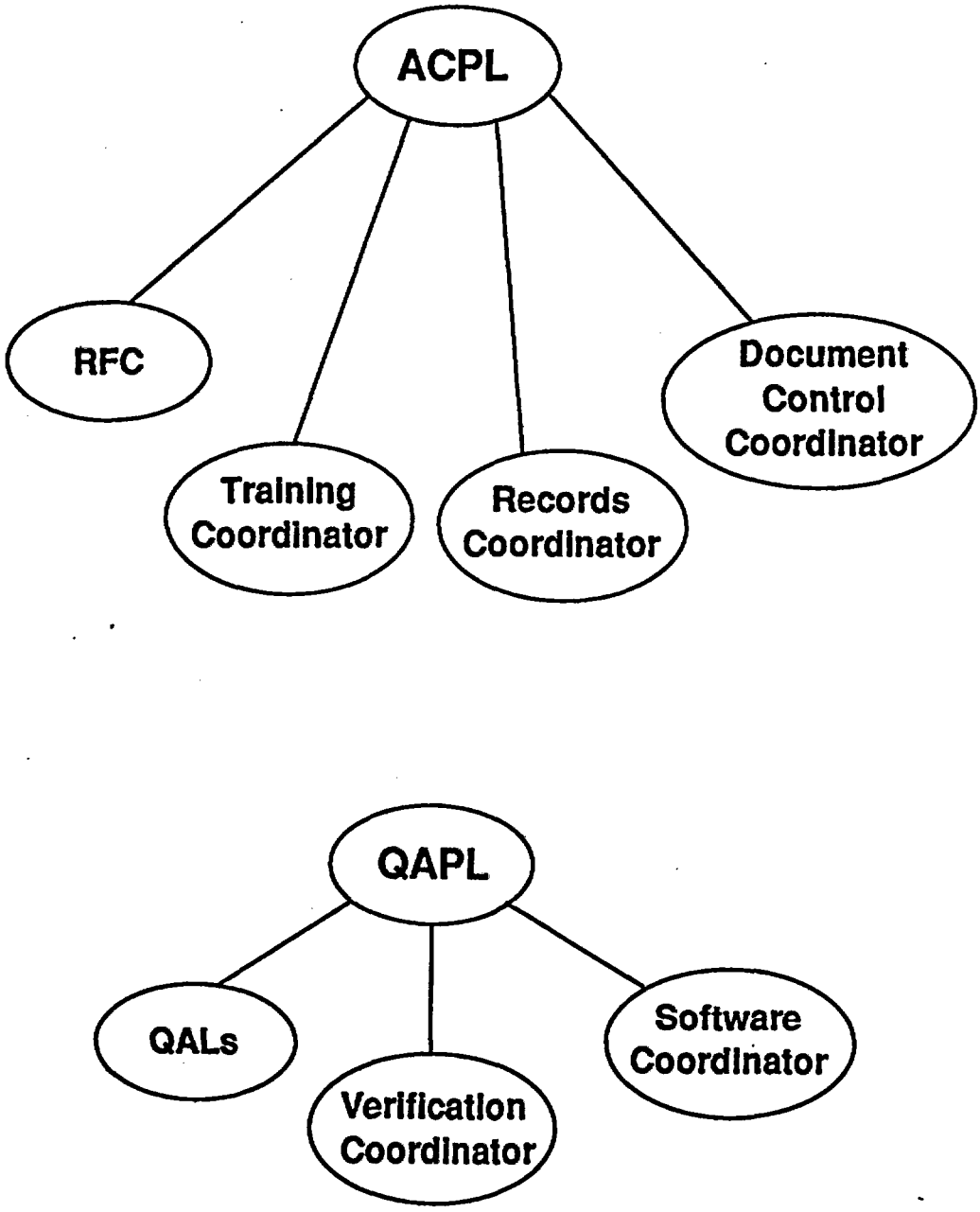

Figure 1. Organizational Reporting Responsibilities

2.0 PROGRAM ACTIVITIES

2.1 Program Development

Most program development activities are initiated and discussed in quality meetings. Action items are assigned to all individuals. Their status is tracked via an action item data base. This data base is used to ensure that all items are resolved. Action items cover simple tasks, such as making a phone call, to more involved tasks such as revising a procedure. The status of open items is determined at the beginning of each quality meeting.

2.1.1 Issues

In January 1991, the quality organization identified the need for distribution lists of the various Los Alamos YMP entities. Subsequently, lists were developed for YMP master distribution, Principal Investigators (PIs), and quality group. All distribution lists are now administratively handled by EES-13.

There have been delays in completing some Los Alamos personnel verifications for the last two years. Responsibility for this issue was assigned to D. Williams (a QAL) who resolved the problems with the Los Alamos Personnel Group. Personnel verifications are now in progress.

Obtaining Project Office acceptance of Los Alamos grading reports has been a lengthy process. Of the 32 reports that have been submitted for approval in 1991, 27 have been approved, 3 have been withdrawn, and 2 are in review at the Project Office. Los Alamos has been fortunate in that the majority of these packages have been prepared by one individual. This has helped to keep interactions with the Project's Quality Review Board focused.

Grading Report 32, Postclosure Tectonics, was accepted without requiring any revisions. This was a unique and highly unusual situation because most reports go through several modifications before acceptance. After the Project Office releases its revised grading procedure, the QAPL will determine if Los Alamos needs its own grading procedure.

The Test Coordination Office expressed a need for quality support in early 1991. The QAPL and various QALs attempted to fill this need, but it became obvious that an on-site QAL was needed. Andrew Burningham was selected to fill this position in September. Subsequently, Donna Williams was selected as QAL with responsibility for selected groups. QAL position descriptions were revised to better reflect duties, and QAL responsibilities were reassigned (Table 1).

2.1.2 Goals

The goals for 1992 are as follows:

- Quality organization meetings will be held the first Thursday of the month.
- Los Alamos YMP personnel will be encouraged to bring quality items of concern before the quality group for discussion.
- Determine if a Los Alamos grading Quality Administrative Procedure (QP) is needed.

2.2 Procedure Revisions

The Los Alamos quality program uses two types of procedures: quality administrative procedures (QPs) and detailed technical procedures (DPs). Preparation of either type follows formal guidelines as described in QP 6.2 and 6.3. In addition, QPs are edited and formatted by the EES-13 office.

2.2.1 Issues

In calendar year 1991, several procedures were revised and issued (Appendix A). Top priority is given to revisions needed to resolve Project Office corrective action reports (CARs) and Los Alamos deficiency reports (DRs). Before procedures are revised, issues of concern are discussed at quality organization meetings. These issues are debated until a resolution is reached.

We have had difficulty in revising procedures in a timely manner in early 1991. When a procedure needs to be revised but is not wrong or outdated, guidance may remain in effect. To resolve this problem, it was determined that DPs would be prepared by technical personnel and only the cover page and history of revisions page would be done through the EES-13 office. QPs will still be edited by EES-13. A flow scheme for writing procedures was developed (Table 2), and office personnel were identified to handle expected work loads.

In February, in response to a YMP survey finding, QP-6.1 (Document Control) was revised in 12 hours. This included correction of the problem, review of the new QP, and transfer of the document for distribution. This quick revision of a QP proves that procedures can be revised with fast turnaround time. However, the quality organization believes that procedure revisions should not be rushed, and that future revisions will be done in a more reasonable, yet timely manner.

The Los Alamos quality program currently has 38 QPs. In early 1991, only six were in the format recommended by QP-6.2; also, the majority of DPs were not in the format required by QP-6.3. Because the process of going from the old format (used before 10-10-90) to the new format is time consuming, it was decided in October 1991 that as many QPs as possible would be revised before the end of the calendar year. Once all procedures are in the required new format, revisions can be done more efficiently.

CAR-91-041, a Project Office deficiency, was issued in March 1991. The deficiency essentially states that the Los Alamos Quality Assurance Program Plan (QAPP) is not consistent with the guidance found in the QPs. Los Alamos's quality program is described and implemented by QPs; however, changes in QPs were not always concurrently incorporated into the QAPP.

The Project plans to issue a Quality Assurance Requirements and Policy Document (QARD) by early 1992. Many QPs may have to be revised to incorporate the latest QARD requirements. However, this document will not require a QAPP. Once the necessary QPs are revised, the Los Alamos QAPP will be deleted from the quality assurance manual, and the Los Alamos YMP quality program plan will be described solely by QPs.

Table 2. Flow Scheme for Procedures

QUALITY ADMINISTRATIVE PROCEDURES (QPs)

1. Identify regulations that must be followed (e.g. Quality Assurance and Requirements Document [QARD], management plans).
2. Identify deficiencies that must be resolved (deficiency reports, stop work orders, observations, etc.).
3. Make flow chart.
4. Meet with YMP personnel, discuss and resolve any issues.
5. Write preliminary draft of procedure.
6. Have someone familiar with the QP do an informal edit.
7. Compare QP definitions with master definition list (get list from records coordinator).
8. Matrix QP requirements against QARD requirements.
9. Send draft of QP to QAPL for editing.
10. Incorporate QAPL comments (preparer makes revisions).
11. Send draft to EES-13 editor.
12. Incorporate editor comments (preparer makes revisions).
13. Send disk and hard copy to EES-13 for formatting.
14. Ask QAPL to write review letter and issue QP for review.
15. Resolve review comments; modify QP as appropriate.
16. Make sure QA review was done.
17. Send revised QP to EES-13 for final edit and preparation.
18. Recommend training level to QAPL. If classroom training is required, prepare lesson plan.
19. Get approval signatures; QAPL sends master copy for distribution.
20. General Guidelines:
    Keep number of forms to a minimum.
    10 pages or less of text.
    Make sure you are trained to QP-6.2.
    Put QP number on forms.
    Procedures are 'stand alone' (as much as practical).
21. Send records package to QAPL.

DETAILED TECHNICAL PROCEDURES (DPs)

1. Author prepares draft.
2. Author obtains QA and technical reviews.
3. Author incorporates review comments and revises procedure as appropriate.
4. Final version sent to EES-13 for cover and history of revisions pages.
5. Author obtains approval signatures.
6. QAPL sends master copy for distribution.
7. Author prepares and submits records package.

To further enhance our ability to revise procedures in an efficient and timely manner, the quality organization has decided to implement flow-down and QARD matrixes. A flow-down matrix that shows the requirement relationships between procedures will allow preparers to evaluate the effects a potential change in one procedure may have on other procedures. By matrixing QP requirements against QARD requirements, we will provide a check to ensure that all regulatory requirements have been met. This matrix will also allow authors to identify excessive commitments. The software needed to implement these matrixes has been developed, and one QP has been matrixed to provide time estimates. The matrixing will be implemented as soon as the new QARD is issued.

We have had some problems with our procurement procedures. This may have resulted from our taking a conservative approach to procurement, especially with commercial-grade items. QP-4.4 (Commercial-grade Items and Services) and QP-4.5 (Non Commercial-grade Items and Services) were revised in late 1990. However, a deficiency was identified during the annual YMP audit in March, and stop work order SWO-LA05 was issued against a section of QP-4.5. The Project Office auditors also identified problems with our interpretation of commercial-grade services, as well as many over commitments in QP-4.4. Both procedures have been revised to address these problems.

Commercial-grade services are not adequately discussed in Project Office regulatory documents. Los Alamos would like to qualify certain types of commercial-grade services by simply identifying acceptance criteria. For example, scientists usually submit blanks, duplicates, and standards with samples submitted for analysis. The acceptance of the data is then determined by the respective values of the blanks, duplicates, and standards. Currently, we are required to qualify these vendors before the service can be accepted. The Project Office auditors agreed with our philosophy, but were unable to support our position because of inadequate regulatory guidance. In November, the issue was submitted to the Project's Quality Integration Group and included in review comments of the new QARD.

Lastly, a large amount of time in quality meetings has been spent discussing various issues in criterion 3, in particular, notebook requirements (QP-3.5), study plans (QP-3.3), technical information products (QP-3.2), and technical reviews (QPs 3.2 and 3.16). To resolve these issues, notebooks were examined during 1991 audits and QP-3.5 was revised to clarify requirements. Existing notebooks will be closed out as soon as it is practical. QPs 3.2 and 3.3 are being combined into one procedure. The sections on technical reviews in QP-3.2 will be rewritten and incorporated into procedures requiring technical reviews.

2.2.2 Goals

The goals for 1992 are as follows:

- Revise all QPs so they are in the format recommended by QP-06.2.
- Revise QPs as required by the new QARD. Withdraw the QAPP as soon as required QP revisions are made.
- Determine if the new QARD requires a QP for grading or organization. If so, write the respective QP.
- Compile QARD and Flow-down matrices for revised QPs.
- Develop a better methodology for commercial-grade services.

2.3 Measuring and Test Equipment (M&TE)

These activities are administratively handled by a M&TE coordinator. The M&TE coordinator notifies individuals when calibrations are due.

2.3.1 Issues

The quality organization has determined that maintaining a qualified vendors list is not required by Project Office regulatory documents. However, the M&TE coordinator will administratively maintain such a list. A QAL has been assigned to assist with vendor qualifications. The M&TE coordinator will also work with the Laboratory's M&TE personnel to avoid duplication of effort as the Laboratory converts to more formal operations.

2.3.2 Goals

The goals for 1992 are as follows:

- Revise DP 601 to better define calibration procedures.
- Implement an automated tracking system.

2.4 Efforts to Increase Awareness of the Quality Program

Two major activities were used this year to foster recognition of the quality program. These were semiannual meetings and a YMP information brochure.

2.4.1 Issues

Semiannual meetings were held in March and December (Fig. 2). These meetings are designed to bring awareness to Los Alamos personnel about various YMP topics, not just quality issues. Attendance is strongly encouraged but is not mandatory. Technical presentations by B. Crowe and C. Harrington, and the "How to Survive an Audit" theatrical skit provided informative and entertaining information.

A Los Alamos YMP information brochure (The Quality Connection) was published intermittently. The brochure contains sections on new regulations, current quality topics, and discussions on quality issues. There is also a section that spotlights exceptional abilities of selected Los Alamos personnel. This brochure has been a successful method of informing Los Alamos YMP personnel of quality issues.

2.4.2 Goals

The goals of 1992 are as follows:

- Hold only one "semi-annual" meeting.
- Publish the Quality Connection bimonthly.

Agenda for the March 8, 1991 Meeting

9:00-9:30 Lynn Sanders, Records Coordinator.
Supplemental Training to QP-17.3 (Records).
(Attendance required for RFCs, QALs, and anyone who handles a lot of records.

9:30-11:00 General Meeting
(Attendance is strongly urged.)

- Stephen Bolivar, QAPL
  Update on QA Program
- Theater Presentation
- Bruce Crowe, EES-13/LV
  Eruptive Thoughts
- Richard Herbst, TPO
  A View from the Top of the Pyramid

11:05-11:45 Sample Overview Committe
(Attendance urged for personnel involved in any aspect of sample collection.)

- General SOC news
- Field Operations Center Update
- Apache Leap Video (8 minutes)
- Tunnel-Boring Machine Video (10 minutes)

Agenda for the December 6, 1991 Meeting

8:15-9:15 Chernobyl Video (optional)

9:30-12:00 General Meeting

- *Quality Changes in YMP*
  Steve Bolivar, QAPL

- *Tiger Tracks and Quality Operations Office - Where ARe We Going?*
  Bob Patterson, QOO

- *Paint Your Outcrop*
  Chuck Harrington, EES-1

- *Budget Go's Budget No's*
  Dick Herbst, TPO

1:30-4:00 Quality Meeting at the LATA Conference Room (QALs must attend; YMP personnel are invited)

Figure 2. Agendas for the Semi-Annual Quality Meetings

2.5 Training

The ACPL determined in 1991 to examine the entire Los Alamos YMP training program and make changes as appropriate. This effort was begun by selecting Prestina Chavez as Training Coordinator in September of 1991. Joan March, training specialist, was assigned to examine Los Alamos's YMP training efforts.

2.5.1 Issues

J. March conducted extensive interviews of selected Los Alamos YMP participants to determine their views on problems with our training efforts. She found that some of the current Los Alamos YMP training classes are not as effective as they could be. Efforts were then directed towards an examination of the existing indoctrination class by interviewing about 10% of Los Alamos YMP personnel. Interviewees requested that a mandatory, half day, comprehensive indoctrination class be developed. Subsequently, a new class, titled "Orientation to the Los Alamos Yucca Mountain Site Characterization Program," was developed.

A pilot class was critiqued by about 25 Los Alamos YMP personnel in October. All reviewers found the new class to be a worthwhile effort and tremendous improvement over the current indoctrination class. After reviewing the course content, the QAPL decided to require mandatory attendance. Since the class will take 5 hours, a complimentary lunch will be provided. Preparations are now being made to provide this class periodically.

One side benefit from developing the new class was the production of a video, titled "Say the Right Thing." This video shows both correct and incorrect responses to auditor enquiries. It has been shown at two Project meetings and has received many compliments.

The quality organization also examined current training practices and philosophies. They determined that in addition to the new orientation class, mandatory training will be required for QPs 16.3 (Deficiency Reporting) and 17.3 (Records Management). Personnel are to train to other procedures only as needed. Formerly, all personnel trained to most procedures whether they were being used or not. Also, new and revised procedures must address the training needs in section 9.0. Concepts of conflict resolution, stop work order, etc. will be taught in the new orientation class. A needs assessment study will be conducted to determine training needs for other parts of the Los Alamos YMP.

In response to a Project Office deficiency, a method was developed to allow "limited function" employees to work on the Los Alamos YMP. The limited function employee is one whose job responsibility only requires a limited amount of quality assurance training. This option was incorporated into QP-2.5.

All QALs were asked to implement a computerized training data base for their respective groups. This task was completed by March. These data bases are used to assist principle investigators in evaluating training needs. A long-term planning objective will be to connect the various data bases into the master training data base being developed by the Training Coordinator.

Training classes in 1991 were offered upon request (Appendix B). Fifty-two classroom training classes were held with 247 employees attending. The quality organization has suggested that a specific time period for classes be identified and that classes be offered only at that time.

Training tapes for the software quality assurance plan (SQAP) and QPs 3.17-3.22 were made available on video cassettes. Because training to the entire SQAP takes several hours, these tapes helped provide a very reasonable training media for individuals not living in Los Alamos. Because of the success with SQAP videotapes, this media is being considered for other training classes.

The procedure for Indoctrination and Training Development (QP-2.8) was withdrawn from the quality assurance manual. In the past, certain classes depended solely on one instructor's availability, sometimes creating scheduling conflicts. The Training Coordinator is revising QP-2.8 to incorporate new training management plan requirements and to address training needs for instructors.

2.5.2 Goals

Training goals for 1992 are as follows:

- Make classroom training informative and more than just a repeat of the text in a procedure.
- Develop training classes for QP-16.3 (Deficiency Reporting) and QP-17.3 (Records Management).
- Revise QPs 2.8 and 2.7.
- Set up a Los Alamos project-wide computerized training data base, which QALs can access.

2.6 Software

The Los Alamos SQAP was accepted by the Project Office in December 1990. Stop work order SWO-LA01 was subsequently lifted in January. Initial efforts were spent on developing the system; they are now being directed towards making the process more efficient.

Requests to accept or modify software packages are submitted via a software change request form. These are evaluated by a Configuration Control Board (CCB), and after selected documents are produced and reviews conducted, a software package can be accepted. One hundred and fifteen software change requests were submitted in 1991; of these, 49 have been approved for distribution (Table 3).

2.6.1 Issues

Comments from Los Alamos YMP personnel on the software program have been mixed. Investigators have found that the system does work but that approval of some software packages may take a long time. Unfortunately, some software programs may not be submitted by investigators because of the high time overhead needed to qualify them. However, the SQAP received high marks for effectiveness in the Project Office March audit.

Table 3. 1991 Software Packages Approved for Release

Date	Release Label
4/15/91	FORTRAN_STD-01-00-00
5/3/91	CCC_STD-01-00-00
5/3/91	MAC_OS-01-00-00
5/3/91	CCC_DATABASE-01-00-00
5/3/91	4D_DATABASE-01-00-00
5/24/91	INGRES_4GL-01-00-00
5/24/91	UNIX-01-00-00
5/24/91	NETCDF-01-00-00
5/24/91	DISSPLA-01-00-00
6/5/91	FILELIST_STD-01-00-00
6/14/91	VAX_VMS-01-00-00
6/14/91	INGRES_RDBMS-01-00-00
6/26/91	DOS-01-00-00
6/26/91	DIFFRAC5000-01-00-00
6/26/91	SHELXTL-01-00-00
6/26/91	GSAS-01-00-00
6/26/91	VACCELERATOR-01-00-00
6/26/91	VAX_PDF2_CDIF-01-00-00
6/28/91	FORTRAN_COMPILERS-01-00-00
6/28/91	C_COMPILERS-01-00-00
8/12/91	ADEM-01-00-00
8/13/91	Spyglass-01-00-00
8/13/91	PL-THERMAL-01-00-00
8/22/91	GEO-CALC_PTA/PTX-01-00-00
9/11/91	SQ-01-00-00
9/11/91	TASK8-01-00-00
9/11/91	IDENT-01-00-00
9/12/91	OS9-01-00-00
9/12/91	FLEX-01-00-00
9/13/91	VISTA-01-00-00
9/17/91	ADA_STD-01-00-00
9/16/91	NCSA_IMAGE-01-00-00
10/3/91	TRI-CARB_2500TR-01-00-00
10/18/91	LOTUS_123-01-00-00
10/18/91	PLANPERFECT-01-00-00
10/18/91	COBRA-01-00-00
10/18/91	STRUCTURED_LANGUAGE_STD-01-00-00
10/18/91	SHELL_SCRIPT_STD-01-00-00
10/18/91	DCL_STD-01-00-00
11/13/91	MINFILE-01-00-00
11/13/91	MS_FORTRAN-01-00-00
12/3/91	SIEMGETPUT-01-00-00
12/9/91	DIONEX_AI450-01-00-00
12/6/91	K_AR-01-00-00
12/9/91	VERSATERM-01-00-00
12/9/91	TMENU-01-00-00
12/9/91	MS_DOS-01-00-000
12/9/91	DIGIMATIC-01-00-00
12/9/91	MS_C-01-00-00

Delays in software approvals can be attributed to three areas. First, the submitter may be slow in preparing the required documentation. Second, reviews, particularly of large codes, take a long time, and there are only a few individuals willing to conduct these reviews. Lastly, software documentation must be in a particular format, and not all investigators are familiar with this formatting package.

These problems have been addressed. Various committees were formed to more efficiently handle software requests; this resulted in much faster reviews and shorter CCB meetings. Second, more reviewers were sought. Thirdly, the inconvenience of working with the new formatting package has been resolved by most investigators.

In an effort to make the system more efficient, the Software Coordinator formed a Special Processes Committee. This group will examine the approval process and make recommendations to improve the system. Further, some software requirements may change in the new QARD. Thus, the SQAP may be revised, depending on the Special Processes Committee recommendations and new QARD regulations.

2.6.2 Goals

The goals for 1992 are as follows:

- Provide an awareness software course for auditors.
- Revise the SQAP and associated QPs as appropriate.

2.7 Records

Sandy Martinez was hired to assist the Records Coordinator. The YMP Records Management Plan (RMP) was recently reissued and will require revision of QP-17.3 (Records Management).

2.7.1 Issues

Some investigators have been submitting unacceptable records to the Records Coordinator. Part of the problem was caused by contradictory guidance in QPs 3.5 (Scientific Investigations) and 17.3 (Records Management) on how to make records corrections and part by conflicting Project Records Office guidance. To address these issues, a supplemental training class to QP-17.3 was offered in March and stop work order SWO-LA06 was issued against QP-3.5. Record labeling and how to avoid submitting unnecessary records were also addressed.

There has been confusion as to how the Project Office wants records submitted, whether a "best available copy" stamp could be used, and which documents should be included in record packages. Project Office guidance was inconsistent or changing to fast to allow for implementation at the participant level. Consequently, stop work order SWO-LA05 was issued until QP-17.3 could be revised. Since the new RMP has been issued, these issues can now be addressed. Unfortunately, examining records to conform to the new RMP guidance will still be very time consuming.

In July, the Los Alamos records organization was reviewed by the Project Office and received a complimentary evaluation.

2.7.2 Goals

The goals for 1992 are as follows:

- Revise QP-17.3 (Records Management).
- Prepare a formal training class for QP-17.3.
- Lift SWO-LA07.

- Better standardize record indexing.
- Enhance the record inventory system to facilitate traceability.

2.8 Controlled Documents

Betty Romero was selected as Controlled Document Coordinator. Because the majority of controlled documents issued are QPs and DPs (Appendix A), a distribution logging system was developed. The Controlled Document Coordinator is also changing all controlled documents to paper with the red 'controlled' marking.

2.8.1 Issues

As a result of procedural changes to QP-6.1 (Document Control), several issues have been resolved. QPs and DPs were formerly issued as part of the quality assurance manual. These controlled documents are now available individually or in groups of selected procedures. The quality assurance manual now only contains QPs; the SQAP and six software procedures are distributed in a separate binder. DPs may also be issued in separate binders. These controlled documents can be ordered for specific intervals of time, which will allow one to work to a controlled procedure under difficult field conditions without having to take along an entire quality assurance manual. Lastly, all manuals held by persons other than Los Alamos YMP personnel are now considered uncontrolled.

2.8.2 Goals

The goals for 1992 are as follows:

- All controlled documents will be issued on paper with the red controlled marking.
- The Controlled Document Coordinator will notify violators only once when receipt acknowledgments are overdue. If the violation continues, the appropriate Project Leader will be notified.
- Develop a more effective tracking system.

2.9 Travel and Presentations

Quality organization representatives attend Project Office meetings, workshops, training classes and provide presentations as required. For example, the QAPL and Verification Coordinator attended Project quality assurance committee meetings. These provided a forum to discuss quality issues and are an excellent arena to review proposed changes to the quality. Travel and presentations are listed in Table 4.

Table 4. 1991 Meetings, Training, and Presentations

Meetings	Name	Date
Training Representatives	K. West, C. Chavez, J. Day	Jan., April, Aug.
Project Quality Assurance Committee	S. Bolivar, J. Day	Monthly
Records Coordinators	L. Sanders	Feb., May, Sept.
DOE/National Archives and Records Administration Workshop	L. Sanders	July, Aug.
Association of Records Changers and Administrators, Inc. Workshop	L. Sanders	Sept.
American Society Quality Control (ASQC) 18th Annual Energy Division	S. Bolivar, T. Morgan, J. Day	Oct.
International Waste Management Conference	T. Morgan, S. Bolivar	March
International High-Level Radioactive Waste Management Conference	S. Bolivar	April
Grading Workshops	S. Bolivar, M. Clevenger, C. Milligan	Various
Software Quality Assurance Workshop	J. Day, S. Bolivar	December

Training	Name	Date
d Base IV	S. Bolivar, D. Williams, M. Clevenger	April
Performance-Based Audits with Focus on Tiger Teams	S. Bolivar	Feb.
TQM Workshop (Sponsored by ASQC)	T. Morgan	Oct.
Root Cause Training (Sponsored by YMP)	J. Day, G. Rand, A. Burningham	April, June
Managing Priorities	S. Bolivar,M. Clevenger	Oct.

Presentations	Name	Audience
Status of the Los Alamos Quality Program	S. Bolivar	Project Quality Assurance Committee; March
Los Alamos Records Management Organization; and 'Say the Right Thing' (video)	L. Sanders	Records Coordinator Meeting; Sept.
The Los Alamos Quality Assurance Program and How to Survive an Audit	S. Bolivar	Stanford U. and LBL in Aug; U. of New Mexico in Sept.; TCO in March, Aug., June
Training Approaches to Los Alamos and 'Say the Right Thing" (video)	D. Jay	Training Representatives Meeting

2.9.1 Goals

The goal for 1992 is to present a paper, "The Role of the QAL," at a professional meeting.

2.10 Miscellaneous Activities

In May, Fred Hawkins, with DOE HQ, provided a series of presentations at Los Alamos on DOE Order 5600.6C (Quality Assurance). Although the Los Alamos YMP will be exempt from this order, the talk provided excellent insight on the quality controls the DOE and Laboratory are heading towards. Many Los Alamos YMP procedures are being used as guidelines in responding to these new regulations.

Dr. John Bartlett, Director, Office of Civilian and Radioactive Waste Management, spoke at a Laboratory-wide colloquium. Dr. Bartlett also visited with Los Alamos YMP personnel and discussed several quality issues.

Representatives of the Technical Review Board met at Los Alamos and discussed various topics with selected personnel. Project Office representatives J. Caldwell and K. Martin met with Los Alamos YMP personnel in March to discuss a data workshop.

In October, 15 YMP personnel, most of them members of the quality organization, visited the Waste Isolation Pilot Plant (WIPP) in Carlsbad, NM. The trip was a very positive experience and provided insight as to what a future repository might look like and some of the problems that might be encountered.

Because the WIPP trip proved so beneficial, the quality organization discussed the possibility of a retreat. The retreat would emphasize long-range planning.

3.0 VERIFICATION ACTIVITIES

3.1 Project Office Audits and Surveys

The Project Office conducted four surveys and two audits in 1991 (Table 5). YMP audit 91-03, conducted in March, was the last large-scale audit where all 18 criteria could be examined. The Project Office's first fiscal year limited-scope audit was held in October and utilized a smaller team and a more focused approach. The Los Alamos YMP currently has five open Corrective Action Reports (CARs). Four are expected to be resolved by early 1992 (Table 6).

3.2 Los Alamos Internal Audits, Surveys, and Stop Work Orders

Los Alamos YMP audits and surveys are coordinated by the Verification Coordinator. In addition to a team of professional auditors, QALs and technical personnel may be used as technical auditors. The Los Alamos YMP currently has five certified lead auditors. In May, Paul Gillespie joined the audit team.

Table 7 shows the 1991 Los Alamos internal audit schedule. All groups, but especially subcontractors, showed improvements in attitude and awareness of quality issues. Several surveys were conducted to address specific issues of concern (Table 8).

3.2.1 Issues

In 1990, audits were conducted by work breakdown structure (WBS) element. This resulted in some investigators who worked on tasks for different WBS elements being audited almost continually. In 1991, audits were conducted by group, and emphasis was made to audit individuals only once. This proved to be a much more effective method of auditing.

The reporting efficiency of audits and surveys became a minor issue when two audit plans became overdue. Consequently, a guideline that audit plans be prepared and distributed at least two weeks before an audit is held was initiated.

To speed up the process of producing audit reports, QP-18.1 (Audits) was revised so that audit checklists do not become a quality record. Instead, computerized checklists are utilized. This information is then incorporated into the audit report. A method for transmitting audit plans and reports to the QAPL and RPC was also developed.

Subcontractors sometimes feel they are not an important part of the Los Alamos YMP. This perception is primarily the result of being physically distant from Los Alamos and not being involved in Los Alamos YMP day to day activities. To foster better interactions, the QAPL attended several of the subcontractor preaudit meetings and provided presentations on the status of the Los Alamos YMP quality program and on how to be audited. The "Say the Right Thing" and "Quality Concerns" video tapes were also shown.

As the result of discussions at quality organization meetings, two changes in philosophy were incorporated. First, auditors were allowed to submit QP (or DP) action requests. Auditors may easily recognize problems inherent in procedures, thus this option has proven very beneficial in helping to identify needed procedure revisions.

Table 5. 1991 YMP Audits and Surveys of Los Alamos

Activity	Date	Results
YMP-SR-91-009; Survey to determine compliance with selected QPs (Criteria 2, 6, 15, 17)	2/25-27/91	No findings
YMP Audit 91-03; All criteria	3/25-29/91	CAR-91-041 issued; 9 deficiencies fixed during audit
YMP-SR-91-014; Survey to determine compliance with selected QPs (Training and Design Information)	4/15-25/91	One deficiency fixed during survey
YMP-SR-91-022; Survey to evaluate criteria 16, 17 and 18	7/15-17/91	No findings
YMP-SR-91-038; Survey to evaluate compliance to criteria 5 and 6	9/17-19/91	One deficiency fixed during survey
YMP Mini Audit YMP-92-001; Criteria 4, 7, 13, and 12	10/2-5/91	3 CARS issued: YMP-92-002, and YMP-92-003

Table 6. 1991 YMP Deficiencies Issued to Los Alamos

Deficiency	Result of	Status
YS-91-014	YMP Survey 91-014	Fixed
CAR-91-041	YMP Audit 91-03	Open
CAR-92-001	YMP Audit 92-01	Open
CAR-92-002	YMP Audit 92-02	Open
CAR-92-003	YMP Audit 92-03	Open
YA-91-03-1	YMP Audit 91-03	Fixed During Audit
YA-91-03-2	YMP Audit 91-03	Fixed During Audit
YA-91-03-3	YMP Audit 91-03	Fixed During Audit
YA-91-03-4	YMP Audit 91-03	Fixed During Audit
YA-91-03-5	YMP Audit 91-03	Fixed During Audit
YA-91-03-6	YMP Audit 91-03	Fixed During Audit
YA-91-03-7	YMP Audit 91-03	Fixed During Audit
YA-91-03-8	YMP Audit 91-03	Fixed During Audit
YA-91-03-9	YMP Audit 91-03	Fixed During Audit
*SDR 597	YMP Survey 91-002	Open

YA, YS Deficiency fixed during Audit (YA-xx-xxx) or Surv ey (YS-xx-xxx)

CAR Corrective Action Report

SDR Standard Deficiency Report

* This was issued in 10/90 but put on hold by YMP until 10/91.

Table 7. 1991 Los Alamos YMP Audit Schedule

AUDIT No.	DATE	LOS ALAMOS GROUP	I/E[a]	CRITERIA TO BE AUDITED													
				1	2	3	4	5	6	7	8	12	13	15	16	17	18
LANL-AR-91-001	02/04-06	EES-1/LV	I	*	*	*	*	*	*	*	*			*	*	*	
LANL-AR-91-002	02/06-08	EES-13/LV	I	*	*	*	*	*	*	*	*			*	*	*	
LANL-AR-91-03	03/11-15	EES-1	I	*	*	*	*	*	*	*	*	*	*	*	*	*	
LANL-AR-91-04	06/10-12	EES-4	I	*	*	*	*	*	*	*	*	*	*	*	*	*	
LANL-AR-91-05	05/06-10	EES-5	I	*	*	*	*	*	*	*	*	*	*	*	*	*	
LANL-AR-91-06	06/12-14	EES-15	I	*	*	*	*	*	*	*	*	*	*	*	*	*	
LANL-AR-91-07	07/29-08/02	EES-13	I	*	*	*	*	*	*	*	*	*	*	*	*	*	
LANL-AR-91-08	07/08-19	INC-4/7/11	I	*	*	*	*	*	*	*	*	*	*	*	*	*	
LANL-AR-91-09	_____	Combined with LANL-AR-91-08															
LANL-AR-91-10	11/21-22	OSU (EES-13/LV)	E	*	*	*	*	*	*	*	*	*				*	
LANL-AR-91-11	09/09-11	Stanford (INC)	E	*	*	*	*		*	*	*	*	*	*	*	*	
LANL-AR-91-12	09/11-13	LBL (INC)	E	*	*	*	*	*	*	*	*	*	*	*	*	*	
LANL-AR-91-13	10/03-04	UNM (EES-13/LV)	E	*	*	*	*	*	*	*	*			*	*	*	
LANL-AR-91-14	10/24-25	HydroGeoChem (INC)	E	*	*	*	*	*	*	*	*	*		*	*	*	
LANL-AR-91-15	11/05-07	LS-2	I	*	*	*	*	*	*	*	*	*	*	*	*	*	
LANL-AR-91-16	12/03-05	EES-13 (Verification Group)	I	*	*			*	*					*	*	*	*

a. I - INTERNAL, E - EXTERNAL

Table 8. 1991 Los Alamos Surveys

Survey No.	Organization Surveyed	Date of Survey	Deficiency Reports Issued
LANL-SR-91-001	EES-13	04/15-17/91	None
LANL-SR-91-002	All LANL YMP Groups	05/21-22/91	None
LANL-SR-91-003	Lawrence Berkley Laboratory	05/21/91	None
LANL-SR-91-004	EES-13/LV	06/12/91	None
LANL-SR-91-005	EES-13	07/16/91	None
LANL-SR-91-006	EES-13/LV	09/23-27/91	None
LANL-SR-91-007	EES-13/LV	09/23-27/91	None
LANL-SR-91-008	Retain Instrument	10/10/91	None
LANL-SR-91-009	SIMCO	12/18/91 - 01/17/92	None

Second, investigators are now allowed to fix deficiencies during audits, provided the deficiency was isolated in nature and investigative action was completed or not required. These deficiencies are still identified in the audit report.

Four stop work orders (SWOs) were issued in 1991 and three were closed (Table 9). SWOs are not to be used as a punitive measure, but rather to selectively stop activities. One conflict resolution was brought before the QAPL and was discussed and resolved (Table 9).

3.2.2 Goals

The goals for 1992 are as follows:

- There will be a concerted effort to produce audit plans and reports in a timely manner.
- Close all open SWOs.
- QALs are required to participate as an auditor on one audit.

3.3 Deficiency Reporting System

Mike Clevenger was selected as deficiency report coordinator. Subsequently, the deficiency reporting data base was transferred from Las Vegas to Los Alamos in January 1991. The software that controls this database was modified to better reflect required actions in QP-15.2 (Deficiency Reporting).

In 1990, 128 deficiencies were written. In 1991, 65 were written. Of these, about 50 remain open. Although this may seem a large number, investigators are still responding to the initial backlog and no outstanding DRs are overdue. More importantly, the total number of DRs written in 1991 has decreased by over 50%.

3.3.1 Issues

There have been problems both in writing acceptable deficiency descriptions and in responses with some individuals. However, the Verification Coordinator and deficiency report coordinator have worked with those involved to resolve the problem. QP-15.2 was revised and issued as QP-16.3. This revision merely fine tunes the deficiency report (DR) process.

Two major problems still exist: there has not been a trending or management assessment report issued in 1991. Both are outstanding deficiencies that are in the process of being resolved. The TPO has taken action to have the management assessment conducted and this deficiency should be resolved in 1992. The trending analysis will probably become part of this annual progress report. In addition, a trending module is being added to the DR data base that will allow for automatic trending on a quarterly basis.

Table 9. Status of Los Alamos
Stop Work Orders (SWO) and Conflict Resolutions (CR)

SWO or CR	Description	Status
SWO-LA01	Software Stopwork	Closed
SWO-LA02	SEA failed to follow QPs in criterion two	Open
SWO-LA03	Volcanism/USGS failed to follow QPs	Open
SWO-LA04	Hydrogeochem had inadequate QA program	Closed
SWO-LA05	Bid evaluation section lacking QP-4.5	Closed
SWO-LA06	QPs 3.5 and 3.17 in conflict	Open
SWO-LA07	Prevent sending records to YMP until QP-17.3 revised	Open
LA-CR-001	Purchase request protocol	Resolved

3.3.2 Goals

The goals for 1992 are as follows:

- Reduce the number of open DRs to less than 20.
- Develop a formal training class for QP-16.3.
- Incorporate an automatic trending module in the DR database that will help identify adverse trends.

3.4 Quality Concerns

In August, the Project Office introduced a new Quality Concerns Program to Los Alamos YMP personnel. Donna Williams was appointed quality concerns coordinator. Quality concerns information brochures have been posted at various locations in the Los Alamos and Las Vegas offices.

4.0 TREND ANALYSIS

4.1 Introduction

The purpose of this trending report is to identify repetitive conditions adverse to quality for the period January 1990 to December 1991. This report is a requirement of quality administrative procedure QP-16.2, R1 (Trending).

QP-16.2, R1 requires that adverse trends be identified and compared to previous adverse trends and that the status of significant conditions adverse to quality (SCAQ) be identified. However, since there were no adverse trends at the time this report was written, none are mentioned here. There has only been one SCAQ issued by the Los Alamos verification program. This was deficiency report DR-LANL-007, which was issued in 5-90 for not implementing an audit schedule. It was closed in November 1990.

An adverse trend is defined as a repetitive significant condition adverse to quality, a frequent occurrence of a condition adverse to quality, or occurrence of similar conditions adverse to quality that suggest a systematic weakness in the quality program. In this study, adverse trends are recognized and causes are investigated. If corrective action is warranted and an adverse trend is not being tracked by a deficiency report, stop work order, or similar mechanism, a deficiency report (DR) can be written in accordance with QP-16.3 (Deficiency Reports). Because a trend analysis is only valid for a point in time, adverse trends in this trending report can be compared with future reports to evaluate the direction the quality program is headed.

4.2 Trending Data Base

The trending data base used in this study was developed from YMP and Los Alamos audits, surveys, and deficiency reports; Los Alamos deficiency report log; and stop work orders and conflict resolution logs from Los Alamos verification activities. Deficiencies fixed during both YMP and Los Alamos audits and surveys have been included in the data base.

In calendar year 1990, 128 internal deficiencies were reported. These were derived, in part, from 12 internal audits (Table 10) and 6 surveys (Table 11). Deficiencies issued as part of one YMP audit and three YMP surveys were also examined (Table 12).

In calendar year 1991, 65 internal deficiencies were reported. These were derived, in part, from 15 internal audits (Table 7) and 9 internal surveys (Table 8). Deficiencies issued as the result of two YMP audits and three surveys were also examined (Table 6).

The number of deficiencies issued in 1991 decreased by about 50% when compared to the number of deficiencies issued in 1990. When this study was conducted, there were no delinquent DRs, although about 40 DRs remained to be closed. Approximately 75% of Los Alamos DRs were written as the result of the audit process; 25% were written by Los Alamos YMP personnel not part of the audit teams.

Table 10. 1990 Los Alamos YMP Audit Schedule

Date	Los Alamos Group	I/E*	WBS	Criteria to be Audited													
				1	2	3	4	5	6	7	8	12	13	15	16	17	18
6/6-6/8	LANL (EES-13/LV)	I	1.2.3.2.5.5.1	*	*	*	*	*	*		*			*	*	*	
			1.2.3.2.5.1.1	*	*	*	*	*			*			*	*	*	
			1.2.3.2.5.1.2	*	*	*	*	*			*			*	*	*	
6/4-6/6	LANL (EES-1/LV)	I	1.2.3.1	*	*	*	*	*	*					*	*	*	
			1.2.6.1.1	*	*	*	*	*			*			*	*	*	
			1.2.6.1.3	*	*	*	*	*			*			*	*	*	
			1.2.6.8.4	*	*	*	*	*			*			*	*	*	
6/25-6/29	LANL	I				*	*			*						*	
7/9-7/13	LANL	I						*	*				*			*	
7/30-8/3	LANL	I		*	*						*	*				*	
8/20-8/24	LBL (INC)	E	1.2.3.4.1.3	*	*	*	*	*	*	*		*	*	*	*	*	*
8/20-8/24	Stanford (INC)	E	1.2.3.4.1.2	*	*	*	*		*			*	*	*	*	*	
9/24-9/28	Golder (EES-1/LV)	E	1.2.3.1	*	*	*			*		*			*	*	*	
11/5-11/6	UNM (EES-13/LV)	E	1.2.3.2.5.5.1	*	*	*		*	*		*			*	*	*	
11/7-11/8	UCO (EES-13/LV)	E	1.2.3.2.5.5.1	*	*	*	*		*		*	*		*	*	*	
11/13 - 11/14	Hydro Geo Chem (INL)	E	1.2.3.3.1.2	*	*	*	*	*	*	*	*	*	*	*	*	*	
11/28-11/30	LANL	I												*	*	*	
12/3-12/5	LANL (QAS)	I	—													*	*

* I = INTERNAL, E = EXTERNAL

Table 11. 1990 Los Alamos Surveys

Survey No.	Organization Surveyed	Date of Survey	Deficiency Reports Issued (List by No.)
LANL-SR-90-001	LS-2	03/19/90	None
LANL-SR-90-002	QA Manual Holders	03/05/90 - 03/12/90	LANL-0001
LANL-SR-90-003	INC-7/11	04/18/90 - 05/22/90	LANL-0013 LANL-0014 LANL-0016
LANL-SR-90-004	EES-13	06/18/90 - 09/07/90	None
LANL-SR-90-005	INC-7/11 and QAS	07/02/90 - 09/07/90	None
LANL-SR-90-006	LANL (All)	10/03/90 - 10/12/90	None

Table 12. 1990 YMP Deficiencies Issued to Los Alamos

Deficiency	Result of	Status
SDR 490	YMP Survey SR-90-018	Closed
SDR 491	YMP Survey SR-90-018	Closed
SDR 511	YMP Audit 90-01	Closed
SDR 512	YMP Audit 90-01	Closed
SDR 513	YMP Audit 90-01	Closed
SDR 515	YMP Audit 90-01	Closed
SDR 562	YMP Survey SR-90-032	Closed
SDR 597	YMP Survey SR-91-002	Open
YA-90-01-1	YMP Audit 90-01	Fixed during audit
YA-90-01-2	YMP Audit 90-01	Fixed during audit
YA-90-01-3	YMP Audit 90-01	Fixed during audit
YA-90-01-4	YMP Audit 90-01	Fixed during audit
YA-90-01-5	YMP Audit 90-01	Fixed during audit
YA-90-01-6	YMP Audit 90-01	Fixed during audit
YA-90-01-7	YMP Audit 90-01	Fixed during audit
YA-90-01-8	YMP Audit 90-01	Fixed during audit
YA-90-01-9	YMP Audit 90-01	Fixed during audit
YA-90-01-10	YMP Audit 90-01	Fixed during audit
YA-90-01-11	YMP Audit 90-01	Fixed during audit
YA-90-01-12	YMP Audit 90-01	Fixed during audit

4.3 Methodology

The Los Alamos DR log was examined to determine the status of DRs. Individual DRs were then examined and categorized. First, DRs were grouped according to the quality administrative procedure the deficiency occurred in. The procedure's revision number and section that the violation occurs in are recorded, if known (Appendix C). This allows identification of procedures that are habitually violated.

Deficiencies are then categorized according to the Los Alamos group that the deficiency was assigned to. Examination of this category will reveal groups that are assigned large numbers of deficiencies.

The probable causes of deficiencies, when available, are examined and categorized into (a) not trained to procedure, (b) failure to follow procedural guidance, (c) conflicting procedural guidance, and (d) oversight. There also is a category for deficiencies written against measuring and test equipment (M&TE) out of calibration. It is possible for a single deficiency to occur in more than one category.

A similar categorization is done for corrective action reports (CARs) received from YMP audits and surveys. However, the group category is not identified because the deficiency may be a project-wide occurrence.

Lastly, YMP and Los Alamos audit and survey reports and Los Alamos conflict resolution and stop work order logs (Table 9) are examined. Most deficiencies are captured in the Los Alamos DR log; therefore, these reports are used predominantly to identify deficiencies that have been fixed during audits and surveys. Conflict resolution and stop work order logs are examined on a case by case basis because they may not be associated with a deficiency.

4.4 Discussion

4.4.1 Participant Comparisons

To determine the status of the Los Alamos quality program with respect to other Project participant's programs, the number of deficiencies identified during 1991 YMP audits and surveys were plotted for each participant (Fig. 3). This figure shows data for deficiencies issued during annual audits and for deficiencies issued during audits and surveys. The bars representing deficiencies issued during all audits and surveys must be considered a minimum value because not all participant survey reports are sent to Los Alamos. These bars also include deficiencies fixed during audits and surveys and are probably more representative of a participant's overall quality program.

Many factors contribute to the success of a participant's quality program. However, the Los Alamos quality program favorably compares to other participant's program when one examines the total number of deficiencies issued (and fixed) during YMP audits and surveys for calendar year 1991 (Fig. 3).

Deficiencies issued to Los Alamos for the period 1987 to 1991 are displayed in Fig. 4. As above, bars are shown for deficiencies issued only during annual audits as well as for total deficiencies issued.

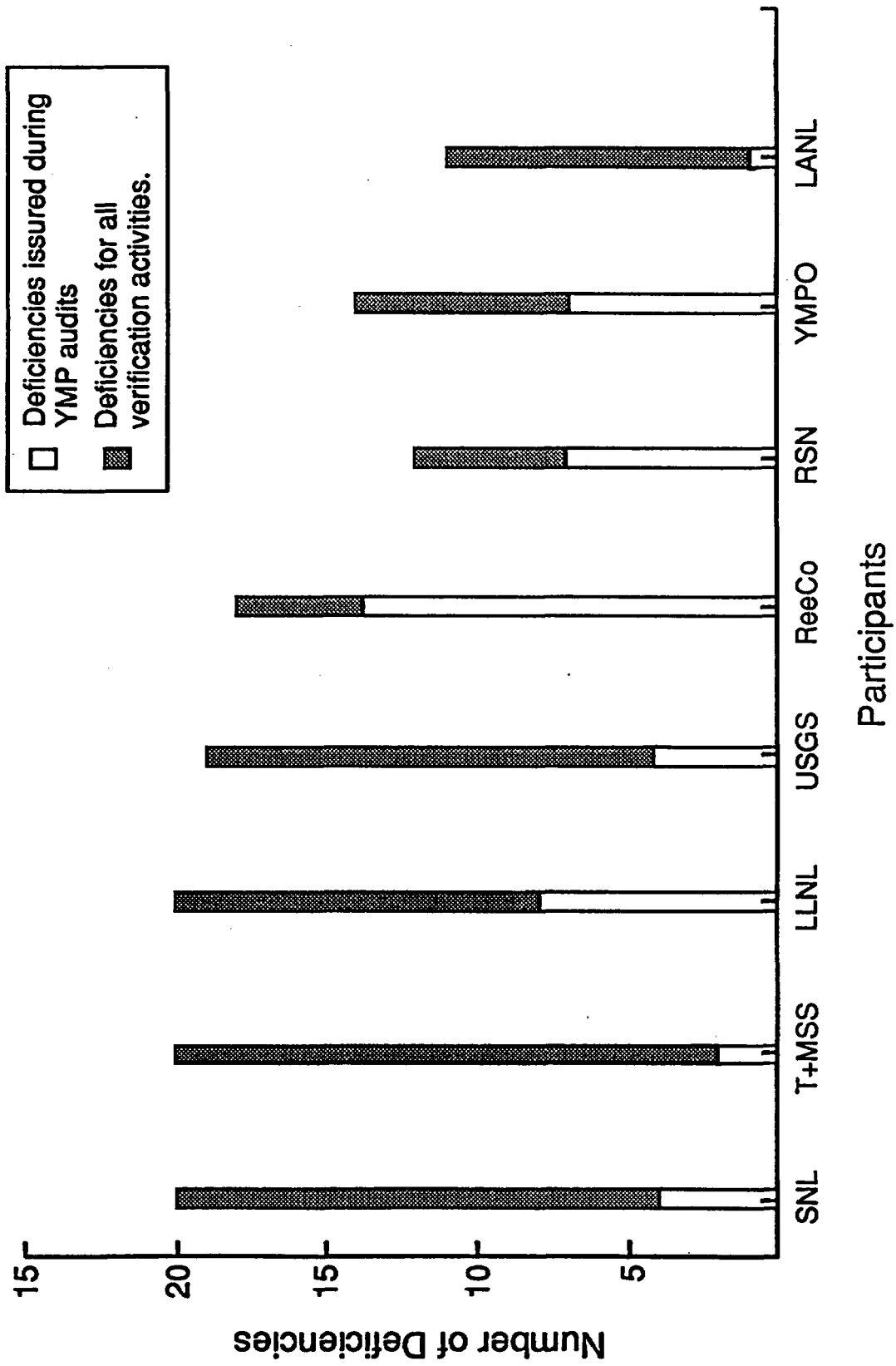

Figure 3. Comparisons of Project Office Issued Deficiencies for 1991

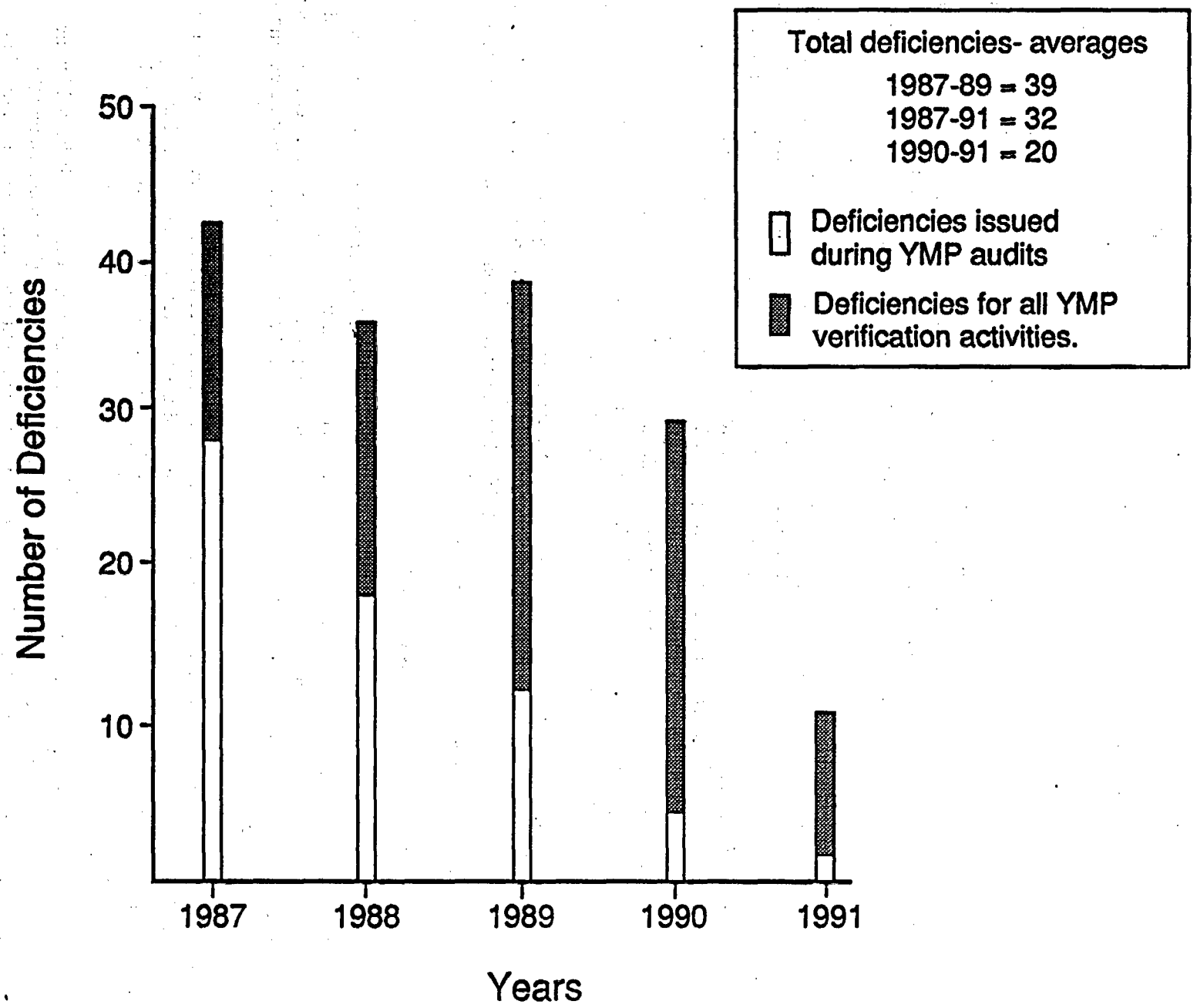

Figure 4. Deficiencies Issued by YMP to Los Alamos for 1987-1991

The number of deficiencies issued decreases from 1987 to 1991 indicating annual improvement. There also is a noticeable decrease in the number of deficiencies issued in 1991 compared to previous years.

4.4.2 Group Trends

During the calendar year the Los Alamos Verification Coordinator conducted several internal audits of various groups, including subcontractors, working on Los Alamos YMP activities. The number of internal deficiencies issued against these groups is shown in Table 13. The data for 1990 cannot be clearly correlated with groups because most audits were conducted according to work breakdown structure elements. However, 1991 audits were conducted by group activities and trends are easier to identify.

The number of deficiencies a particular group receives reflects several factors. For example, management groups might have more deficiencies simply because all activities are coordinated through these offices. Certain organizations, e.g., records management, might have several deficiencies simply because of the volume of activity associated with records management. In other words, the number of deficiencies issued against a procedure or group must be placed in overall context.

In an effort to normalize this information, the number of deficiencies issued against a group has been compared to the percentage of YMP personnel in the group. These results are shown in Fig. 5. Deficiencies fixed during audits and surveys have been included in the totals.

If one assumes that the percentage of expected deficiencies will approximate the percentage of YMP personnel in the group, then the two bars for each group in Fig. 5 should be about equal. Very few organizations have a higher percentage of DRs than expected. After reviewing the audit reports for these groups, no adverse trends are recognized.

4.4.3 Trends Associated with Procedures

The DR log was examined by categorizing deficiencies with the criterion the deficiencies occurred in. A large number of associated DRs does not necessarily signify an adverse trend but does help identify areas of concern. Figure 6 shows this data grouped by criteria; obviously criterion three is one area of concern. However, to determine if an adverse trend exists, the data must be examined in greater detail.

Table 14 shows the number of deficiencies issued for respective QPs. Several adverse trends are identified and are listed in Table 15. Recognition of adverse trends by this method is very subjective, and most adverse trends are simply identified by an excessive number of DRs or by a particular section of a QP being repeatedly cited.

Two possible trends in Table 14 are not identified as adverse. These are indicated by the number of DRs issued against QPs 2.7 and 6.1. Section 6.2 in QP-2.7 (Personnel Training) is repeatedly associated with DRs. This section is cited when training requirements for a procedure have not been met. More detailed examination revealed that individuals were not all deficient to a particular procedure and that no one procedure was associated with an excessive number of DRs. When comparing data for 1990 and 1991, the trend is very favorable. The number of DRs issued against QP 6.1 (Controlled Documents) is not considered excessive because of the volume of activity related to controlled documents.

Table 13. 1990-1991 Los Alamos Internal Deficiencies by Group

Group	DRS 1990 Audits Only	DRS 1990 Totals[1]	DRS 1991 Audits Only	DRS 1991 Totals[1]
EES-1	U	5	4-5F	10
EES-4	U	0	1-1F	3
EES-5	U	7	5	7
EES-13	U	40+SWO-01	9	10
EES-15	U	11	2-1F	2
EES-13/LV	6	7	0-4F	4
EES13/VOLC	9	21+SWO-03	0-3F	3
A1	U	2	NA	NA
LS-2	U	9	4-1F	5+CR-01
INC-DO, 4	U	U[2]	U	0
INC-7	U	U[2]	U	5
INC-11	U	27[2]	5-4F	9
UNM	4	4	2-3F	6
LBL	7	7	3-8F	13
SU	2	3	2-3F	6
HGC	0	0+SWO-04	2-2F	4
OSU/CS	4	5	1-2F	3
GOLDER	0	0	NA	NA
MEC	0	2	0	CAR
Records	U	6	NA+SWO-07	1
Documents	U	2	NA	1
Audits	0	0	TBD	3
QA Organization	1	22	SWO-05+06	7

1 Totals are for DRs both issued and fixed (F) during audits

2 Combined groups INC-DO,-4, -7, & -11, were audited together; division total given for INC-11

Abbreviations:

U	Unknown
TBD	To be Determined
SWO	Stop Work Order
DR	Deficiency Report
NA	Not applicable
CR	Conflict Resolution
CAR	Corrective Action Report

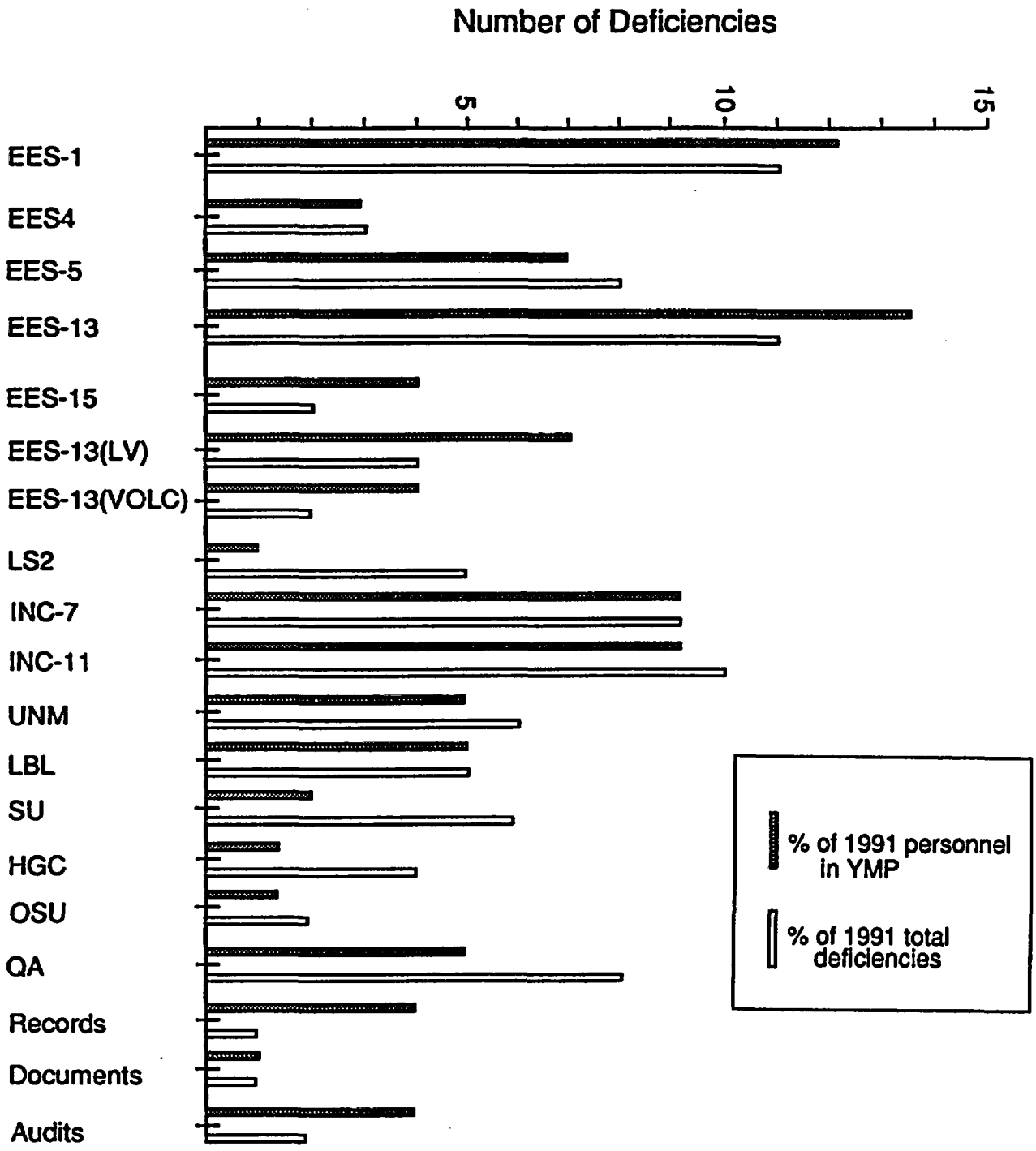

Figure 5. Normalized Comparisons for 1991/Personnel versus Expected Deficiencies

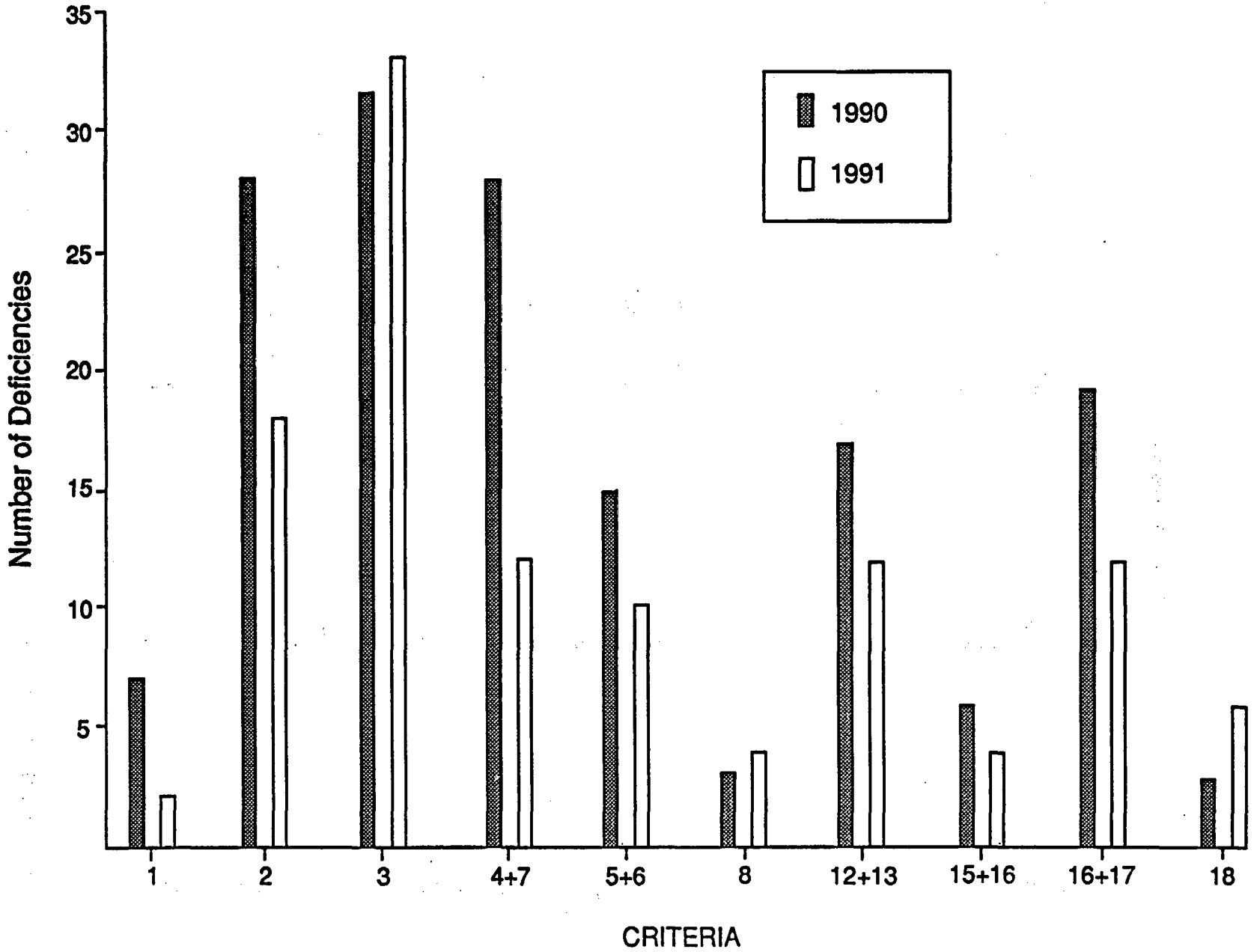

Figure 6. Comparison of Deficiencies Issued by Criteria in 1990 and 1991

Table 14. Deficiencies Issued Against Procedures

Plan or QP	1990	1991	Adverse Trend Identified
QAPP	11	6	AT-91-01
QP-1.1	3	2	
QP-1.2	2	0	
QP-2.5	5	11	AT-91-02
QP-2.6	6	3	No
QP-2.7	13	5	No
QP-2.9	4	1	
QP-3.2	9	8	AT-91-03
QP-3.3	8	4	AT-91-03
QP-3.5	14	24	AT-91-04
QP-4.1	22	1, Superceded	AT-91-05
QP-4.2	2	0, Superceded	
QP-4.3	4	2, Superceded	
QP-4.4	N/A	5	
QP-4.5	N/A	4	
QP-5.1	5	0, Superceded	
QP-5.2	2	1, Superceded	
QP-6.1	7	6	No
QP-6.3	0	3	
QP-8.1	3	1	
QP-8.2	0	2	
QP-12.1	17	12	AT-91-06
QP-15.2	4	4, Superceded	
QP-16.2	2	0	
QP-18.1	1	2	
QP-18.2	1	2	
QP-18.3	1	1	
QP-17.3	18	13	AT-91-07

Note: Only those procedures or plans with more than one issued deficiency are listed.

Table 15. Adverse Trends

Adverse Trend	Description	Status
AT-91-01	Excessive No. of DRs issued against QAPP. QAPP and QPs not consistent	Tracked by CAR-90-041
AT-91-02	Excessive No. of DRs issued against QP-2.5. QP needs to be revised.	Closed. (QP revised on 9-30-91 and only one DR issued since then; condition no longer adverse)
AT-91-03	Excessive No. of DRs issued against QP-3.3 and QP-3.2. Procedures hard to follow and Project guidance for QP-3.3 has changed. Procedure needs to be revised.	These QPs are being combined into QP-3.23; tracked by DRs 72, 73, 77 and 105
AT-91-04	Excessive No. of DRs issued against QP-3.5. Conflicting guidance with QP-17.3. Notebooks do not follow QP guidance. Need to revise QP.	Tracked by SWO-LA06
AT-91-05	Excessive No. of DRs issued against QP-4.1 in 1990. Requirements are confusing and overly restrictive. Need to revise QP.	Closed. QP-4.1 has been superceded by QP-4.4 (11-15-91) and QP-4.5 (12-23-91)
AT-91-06	Excessive No. of DRs issued against QP-12.1. Procedure is difficult to follow.	Tracked by DR 192
AT-91-07	Excessive No. of DRs issued against QP-17.3. Procedure needs to be simplified and new Project requirements incorporated.	Tracked by SWO-LA07

4.4.4 Trends Identified with Probable Cause Determination

After examining all Los Alamos internal DRs, it became evident that probable causes could be placed into a select number of categories. This assumes that the resolver of a DR did a correct probable cause determination, and this may not be valid for all DRs. However, this approach does reveal some interesting data.

The selected probable cause categories are (a) not trained, (b) failure to follow procedural guidance, (c) conflicting procedural guidance, (d) oversight, and (e) M&TE. These data are shown in Fig. 7. Large numbers of associated deficiencies do not necessarily identify an adverse trend; as mentioned above, the data must be placed into context of the overall program.

Probable causes attributed to a lack of training are shown in Table 16. In 1990, 21 DRs and 3 SWOs were issued; in 1991 8 DRs were issued. To determine if any one procedure was involved in a majority of recognized deficiencies, each DR in this category was matrixed against the appropriate QP or DP. There is a fairly even spread of values and no adverse trend is suggested.

The failure to follow procedural guidance category is difficult to quantify because there are a large number of possible causes. A procedure may be too difficult to follow. Or possibly, deficiencies may have been issued to individuals with an attitude problem. After examining individual DRs, it appears that this category is comprised of people who simply did not follow the procedure, even though they were trained. In 1990, 68 deficiencies and one SWO were issued; in 1991, 76 deficiencies were issued (Table 17). These totals include YMP and internal deficiencies fixed during audits and surveys. The data suggests that a root cause for this category may have something to do with training, although exactly what is unclear.

The question that remains is whether the deficiencies in 1990 and 1991 indicate an adverse trend. Figure 3 suggests that the Los Alamos quality program is adequate when compared to other participant's programs. Training, criterion 2, does not have an excessive number of deficiencies issued against it. Rather, it appears that training procedures are adequate, but possibly could be improved. However, after talking to individuals, there is an impression that training classes are just not effective.

In an effort to address this problem, the Administration and Control Project Leader evaluated training efforts. As the result of several surveys and interviews, a new indoctrination class was developed. This class uses several new approaches to training. All Los Alamos participants must retrain to this new class. Therefore, although no adverse trend is clearly identified, this potential problem has been addressed.

Table 18 identifies the probable cause category: conflicting procedural guidance (i.e., poorly written procedures). Because so many QPs are currently being revised, it is difficult to determine if an adverse trend truly exists. Many QPs will also be required to be revised as part of either resolution of CAR-90-041 or to satisfy requirements in the revised Quality Assurance Requirements Document (expected in early 1992). If a problem exists with any procedure, it probably will be addressed in the revision. No adverse trend is recognized.

Table 19 identifies the oversight (i.e., human error) category. This category contains a small number of deficiencies, respectively, and no trend is recognized.

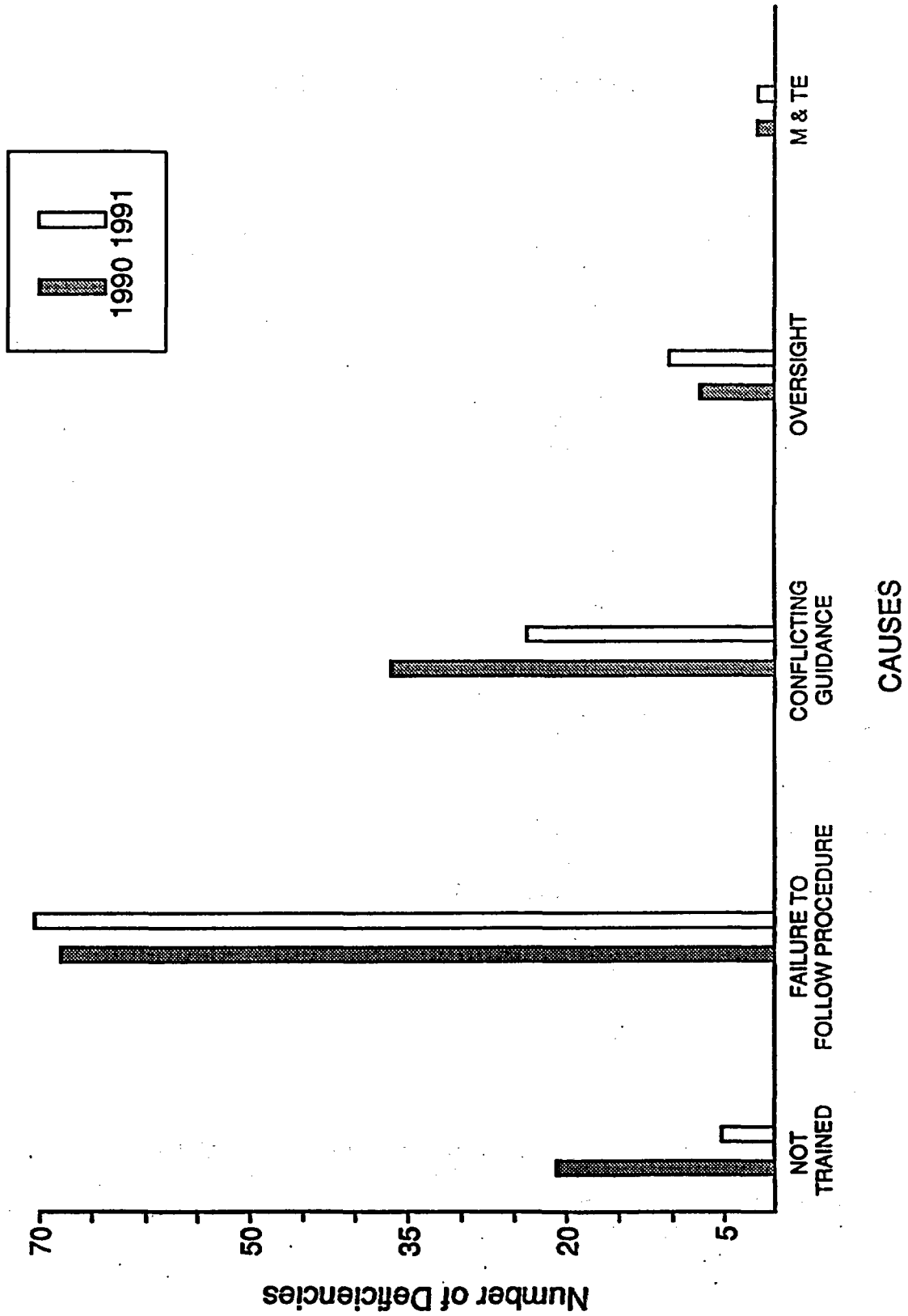

Figure 7. Deficiencies Grouped According to Cause

Table 16. Deficiencies Attributed to Lack of Training

1990 DRs - Associated Procedure		1991 DRs - Associated Procedure	
001	QP 6.1	133	QP 17.3
005	QP 3.5	145	QP 3.3
026	QP 1.1	147	QP 3.3
028	QP 1.1	150	QP 4.1
032	Indoctrination	156	SQAP
033	QP 15.2	173	QP 3.5
045	QP 6.1	192	DP 14
051	QP 12.1	187	DP 35
052	QP 1.2		
065	QP 4.1		
067	QP 3.2		
068	QP 3.2		
074	QP 3.3		
078	QP 4.1		
092	QP 1.1		
095	QPs 17.3, 2.9, 2.5, 2.6, 2.7		
096	QPs 17.3, 2.9, 2.5, 2.6, 2.7		
099	QP 12.1		
100	QP 12.1		
103	QPs 2.5, 2.6, 2.9		
113	QP 4.1		
SWO-LA02	QPs 2.5, 2.6, 2.7, 2.9		
SWO-LA03	QAPP		
SWO-LA04	QAPP		

1990

- Procedures listed with associated number of deficiencies: QAPP-2; QP 1.1-3; QP 1.2-1; QP 2.5-4; QP 2.6-4; QP 2.7-3; QP 2.9-4; QP 3.2-2; QP 3.3-1; QP 3.5-1; QP 4.1-3; QP 6.1-2; QP 12.1-3; QP 15.2-1; QP 17.3-2; Indoctrination.

1991

- Procedures listed with associated number of deficiencies: QP 3.3-2; QP 3.5-1; QP 4.1-1; SQAP-1; QP 17.3-1; DP14-1; DP35-1.

Table 17. Deficiencies Attributed to Ineffective Training

1990		1991	
DRs	DRs Fixed	DRs	DRs Fixed
002	YA-90-01-12	132	YA-91-03-1
003	YA-90-01-11	133	YA-91-03-2
004	YA-90-01-9	135	YA-91-03-7
010	YA-90-01-8	138	YA-91-03-9
014	YA-90-01-7	139	91-002-3
015	YA-90-01-6	140	91-003-1
018	YA-90-01-5	142	91-003-2
019	YA-90-01-4	144	91-003-4
021	YA-90-01-3	147	91-004-1
022	YA-90-01-2	148	91-004-3
023	YA-90-01-1	149	91-006-1
024		151	91-008-1
029		152	91-008-1
030		154	91-008-2
035		158	91-008-3
036		159	91-008-4
037		160	91-013-2
039		161	91-013-3
046		162	91-003-5
047		163	91-14-1
048		164	91-14-2
049		165	91-15-1
050		166	91-10-1
056, 107		167	91-10-2
059, 110		168	91-11-1
062, 112		CAR-91-041	91-11-2
063, 115		CAR-92-002	91-11-3
064, 117		CAR-92-001	91-12-2
070, 119		CAR-92-003	91-12-3
071, SWO-LA02		170	91-12-6
072, SDR 597		173	91-12-7
075, SDR 562		174	
081, SDR 515		178	
082, SDR 513		179	
087, SDR 512		180	
089, SDR 511		184	
090, SDR 491		185	
094		186	
102		189	
104		188	
106		187	
		191	
		190	
		192	
		193	

Table 18. Deficiencies Attributed to Poorly Written Procedures

1990		1991	
DRs	DRs Fixed	DRs	DRs Fixed
001	YA-90-01-8	131	YA-92-01-1
006	YA-90-01-10	136	YA-91-03-6
007		139	YA-91-03-8
008		141	YA-91-03-1
009		142	91-001-2
010		147	91-001-4
011		157	91-002-1
012		160	91-002-2
013		164	
020		165	
CR 001		169	
023		168	
026		CAR-91-041	
031		SWO-LA05	
032		SWO-LA06	
034		SWO-LA07	
036		CAR-92-002	
038		CAR-92-001	
040		CAR-92-003	
041		169	
042		172	
043			
051			
067			
072			
076			
086			
088			
101			
105			
108			
116			
118			
120			
121			
122			
126			
SDR 490			

Table 19. Deficiencies Attributed to Oversight

1990 DRS	1991 DRs	DRs Fixed
013	129	YA-91-03-3
016	130	YA-91-03-5
022	145	YA-91-03-4
027	153	91-001-1
044	146	91-001-3
046	157	91-003-3
049	162	91-004-2
050	170	91-013-1
058	171	91-012-1
076	174	91-012-4
085	177	91-012-5
091	178	91-012-8
109	182	
111	183	
114		
124		

Table 20 identifies M&TE equipment associated with a DR. Two balances have more than one associated DR; however, after examination of the cause for the deficiencies, it was determined that renovation in the laboratory required excessive moving of balances (which in turn required recalibration). This problem is not an adverse trend.

Table 20. Table Deficiencies Attributed to M&TE

1990		1991	
DR	Associated Instrument	DR	Associated Instrument
053	Balance PN 645140	137	Balance PN 625058
054	Balance PN 608838	YA-91-03-4	Balance PN 625058
055	Balance PN 405661	171	Balance PN 625058
057	Balance PN 645140		PN 608838
128	Balance PN 757322	176	Balance PN D09584
			PN 447337

5.0 SUMMARY

The Los Alamos quality organization, consisting of the authors of this report, met periodically to discuss and resolve YMP quality issues. Documentation of the results of these meetings are discussed herein. The biggest issue addressed has been the timely revision of quality administrative procedures. Successful steps were taken to resolve this problem and procedures are now being examined and revised as appropriate. The Project Office QARD will be revised in early 1992, and this may require additional revisions to QPs. Consequently, program development activities in 1992 will consist primarily of QP revisions.

Verification activities have helped the quality organization identify problems in the Los Alamos YMP. These problems are being addressed as resolution to numerous deficiencies issued as part of internal or Project Office verification activities. The number of deficiency reports issued in 1991 are about 50% less than the number issued in 1990. This is clearly a favorable trend. Efforts to revise the audit and deficiency reporting procedures, streamline the audit and survey reporting process, and moving the deficiency reporting data base to Los Alamos have helped reduce the backlog of outstanding deficiency reports to a manageable level.

A trend analysis was conducted for the period January 1990 to December 1991. Several adverse trends were identified (Table 9). However, probable causes for these trends were identified previously as part of Los Alamos verification activities and all are currently being tracked by internal DRs or SWOs. When the number of deficiencies issued by the Project Office is examined, the number issued to the Los Alamos YMP quality program is minimal compared to the number of deficiencies issued to other participants.

The Los Alamos YMP, as characterized in this report, is performing satisfactory work. The total number of deficiencies issued at both Project Office and Los Alamos audit and survey activities are decreasing over time, indicating that Los Alamos personnel are adapting to Project Office requirements.

ACKNOWLEDGMENT

Thanks to A. Sparks and E. Martinez for help in preparation of this document. This work was supported by the Yucca Mountain Site Characterization Program. The Project is managed by the U.S. Department of Energy, Yucca Mountain Site Characterization Project.

This trending section of this report was modified from the Los Alamos 1991 Trending Report (TWS-EES-13-01-92-029). This is a non quality-affecting report.

Appendix A

Controlled Documents Issued In 1991

DOCUMENT CONTROL

The following is a complete list of all documents that went through the controlled process during 1991:

THE FOLLOWING DOCUMENTS WERE ADDED:

QPs and DPs

LANL-INC-DP-85, R0	Determining UV-VIS Absorption and Diffuse Reflectance Spectra
LANL-EES15-DP-326, R0	Ion-Chromatographic Determination of Constituent Concentrations in Solution
LANL-INC-DP-86, R0	Sorption and Desorption Determinations by a Batch Sample Technique for the Dynamic Transport Task
LANL-INC-DP-87, R0	Identification, Storage, and Handling of Samples at HydroGeoChem
TWS-QAS-QP-02.8, R0	Indoctrination and Training Development and Review
LANL-YMP-QP-04.4, R0	Procurement of Commercial-Grade Items and Services
LANL-YMP-QP-04.5, R0	Procurement of Non Commercial-Grade Items and Services
LANL-YMP-QP-16.3, R0	Deficiency Reports

OTHER DOCUMENTS ADDED:

Software Quality Assurance Manual:

LANL-YMP-SQAP, R0	Software Quality Assurance Plan
TWS-QAS-QP-03.17, R0	Reviews of Software and Computational Data
TWS-QAS-QP-03.18, R0	Creation, Management, and Use of Computational Data
TWS-QAS-QP-03.19, R0	Documentation of Software and Computational Data
TWS-QAS-QP-03.20, R0	Software Configuration Management
TWS-QAS-QP-03.21, R0	Software Life Cycle
TWS-QAS-QP-03.22, R0	Verification and Validation of Software and Computational Data

Integrated Data System Functional Requirements Document, R2
SWO-LA-06
SWO-LA-07

THE FOLLOWING DOCUMENTS WERE REMOVED:

TWS-EES-DP-106, R1	Philips X-Ray Diffraction Procedure
TWS-INC-DP-84, R0	Cutting Collection Procedure
TWS-QAS-QP-04.1, R2	Procedure for Procurement
TWS-QAS-QP-04.2, R2	Procedure for Accepting the Performance of Procured Services
TWS-QAS-QP-04.3, R1	Qualification of Suppliers of Engineered Items and Services
TWS-QAS-QP-02.8, R0	Indoctrination and Training Development Review

THE FOLLOWING DOCUMENTS WERE REVISED:

TWS-INC-DP-78, R0 with LANL-INC-DP-78, R1	The Preparation of Solution of Pure Oxidation States of Neptunium, Plutonium, and Americium
TWS-EES-DP-124, R0 with LANL-EES-DP-124, R1	Use of Binocular Microscope in Fracture Mineralogy Studies
TWS-EES-DP-16, R4 with LANL-EES-DP-16, R5	Siemens X-Ray Diffraction Procedure
TWS-EES-DP-24, R2 with LANL-EES-DP-24, R3	Calibration and Alignment of the Siemens Diffractometers
TWS-EES-DP-25, R3 with LANL-EES-DP-25, R4	Clay Mineral Separation and Preparation for X-Ray Diffraction Analysis
TWS-EES-DP-56, R2 with LANL-EES-DP-56, R3	Brinkmann Automated Grinder Procedure
TWS-EES-DP-105, R1 with LANL-EES-DP-105, R2	Thermal Calibration Procedure
TWS-EES-DP-107, R1 with LANL-EES-DP-107, R2	Thermogravimetric and Differential Scanning Calorimetry Analyses
TWS-EES-DP-110, R1 with LANL-EES-DP-110, R2	Zeolite Purification/Separation Procedure
TWS-EES-DP-115, R1 with LANL-EES-DP-115, R2	Vaisala HMI-32 Humidity Probe Procedure
TWS-EES-DP-119, R0 with LANL-EES-DP-119, R1	Moisture Evolution Analyzer Procedure
TWS-EES-DP-121, R0 with LANL-EES-DP-121, R1	Long-Term Sample Heating Procedure
TWS-EES-DP-126, R0 with LANL-EES-DP-126, R1	Heavy-Liquid Mineral Separation Procedure
TWS-HSE12-DP-317, R1 with LANL-EES15-DP-317, R2	Calibration and Use of Analytical and Top-Loading Balances
TWS-INC-DP-63, R1 with LANL-INC-DP-63, R2	Preparation of NTS Core Samples for Crushed Rock Experiements
TWS-QAS-QP-17.3, R0 with LANL-YMP-QP-17.3, R1	Records Management
TWS-QAS-QP-18.1, R3 with LANL-YMP-QP-18.1, R4	Audits
TWS-QAS-QP-02.5, R0 with LANL-YMP-QP-02.5, R1	Selection of Personnel

THE FOLLOWING DOCUMENTS WERE REVISED (continued):

LANL-YMP-QP-04.5, R0 with LANL-YMP-QP-04.5, R1	Procurement of Non Commercial-Grade Items and Services
LANL-YMP-QP-06.1, R2 with LANL-YMP-QP-06.1, R3	Document Control
LANL-YMP-QP-06.2, R0 with LANL-YMP-QP-06.2, R1	Preparation, Review and Approval of Quality Administrative Procedures
LANL-YMP-QAPP, R4.4 with LANL-YMP-QAPP, R5	Los Alamos National Laboratory Quality Assurance Program Plan for the Yucca Mountain Site Characterization Project
LANL-YMP-QP-04.4, R0 with LANL-YMP-QP-04.4, R1	Procurement of Commercial-Grade Items and Services
TWS-INC-DP-35, R1 with LANL-INC-DP-35, R2	pH Measurement
LANL-INC-DP-63, R2 (cover page only)	Preparation of NTS Core Samples for Crushed Rock Experiements
LANL-YMP-QP-04.5, R1 with LANL-YMP-QP-04.5, R2	Procurement of Noncommercial-Grade Items and Services
TWS-QAS-QP-16.2, R0 with LANL-YMP-QP-16.2, R1	Trending

APPENDIX B

List of Training Classes Provided in 1991

Formal Training Classes 1991

LANL-YMP-SQAP, QP's 03.17-03.22 - Software Quality Assurance	1-15-91
LANL-YMP-SQAP, QP's 03.17-03.22 - Software Quality Assurance	1-16-91
LANL-YMP-SQAP, QP's 03.17-03.22 - Software Quality Assurance	1-17-91
LANL-YMP-SQAP, QP's 03.17-03.22 - Software Quality Assurance	1-18-91
TWS-QAS-QP-03.5, R0-Documenting Scientific Investigations	1-24-91
Indoctrination	2-19-91
Indoctrination	2-26-91
LANL-YMP-QP-18.1, R4 - Audits	3-6-91
TWS-QAS-QP-08.2, R0 - Procedure for Control of Data	3-6-91
Indoctrination	3-7-91
LANL-YMP-QP-17.3, R1 - Records Management	3-8-91
LANL-YMP-QP-17.3, R1 - Records Management	3-11-91
Indoctrination	3-20-91
YMP Environmental Requirements Training Program	3-22-91
TWS-QAS-QP-08.2, R0 - Procedure for Control of Data	4-2-91
TWS-QAS-QP-08.1, R1 - Identification and Control of Samples	4-2-91
TWS-QAS-QP-03.5, R0 - Documenting Scientific Investigations	4-2-91
Indoctrination	4-2-91
LANL-YMP-QP-17.3, R1 - Records Management	4-16-91
LANL-YMP-QP-18.1, R4 - Audits	5-14-91
Indoctrination	5-14-91
Indoctrination	5-21-91
TWS-QAS-QP-08.1, R1 - Identification and Control of Samples	5-22-91
Indoctrination	5-24-91
Indoctrination	6-11-91

Formal Training Classes 1991

TWS-QAS-QP-03.5, R0 - Documenting Scientific Investigations	6-12-91
TWS-QAS-QP-08.1, R1 - Identification and Control of Samples	6-19-91
TWS-QAS-QP-03.5, R0 - Documenting Scientific Investigations	6-19-91
TWS-QAS-QP-08.2, R0 - Procedure for Control of Data	6-19-91
Root Cause Determination	6-21-91
TWS-QAS-QP-03.5, R0 - Procedure for Control of Data	6-24-91
Indoctrination	6-27-91
TWS-QAS-QP-08.1, R1 - Identification and Control of Samples	6-28-91
TWS-QAS-QP-03.5, R0 - Documenting Scientific Investigations	6-28-91
YMP Environmental Requirements Training Program	7-12-91
Root Cause Determination	7-24-91
Indoctrination	7-25-91
YMP Environmental Requirements Training Program	7-26-91
Root Cause Determination	7-26-91
Root Cause Determination	7-29-91
TWS-QAS-QP-03.5, R0 - Documenting Scientific Investigations	8-7-91
Orientation YMP Site Characterization Project	9-5-91
TWS-QAS-QP-08.1, R1 - Identification and Control of Samples	9-3-91
TWS-QAS-QP-03.5, R0 - Documenting Scientific Investigations	9-30-91
TWS-QAS-QP-08.1, R1 - Identification and Control of Samples	10-9-91
Indoctrination	10-9-91
TWS-QAS-QP-03.5, R0 - Documenting Scientific Investigations	10-9-91
Indoctrination	10-18-91
LANL-YMP-QP-18.1, R4 - Audits	11-5-91
Indoctrination	11-15-91

Formal Training Classes 1991

TWS-QAS-QP-03.5, R0 - Documenting Scientific Investigations	11-18-91
TWS-QAS-QP-03.5, R0 - Documenting Scientific Investigations	12-10-91

APPENDIX C

Los Alamos Internal Deficiencies

(Identified by Procedure)

Introduction

In the following pages, deficiencies are categorized by procedure or plan, which is listed at the top of each page. Deficiency's are also grouped by year. Deficiencies can be identified by referring to the abbreviations listed below.

Deficiencies are complied from Project Office and internal audit and survey reports, stop work order and conflict resolution logs, and the Los Alamos deficiency report data base. Deficiencies fixed during audits and surveys are included (identified in the 'FIXED' column).

Abbreviations

• SDR-562	Standard Deficiency Report 562, issued by Project Office
• CAR-92-001	Corrective Action Report 001, issued by Project Office 92 is the year (1992) deficiency was written.
• DR 135 R5, 18.2.7	Los Alamos Internal Deficiency Report #135. R5 is version of procedure; 18.2.7 is section of procedure violated.
• 91-008-1	Los Alamos internal deficiency number 1, fixed during Audit 91-008.
• YA-90-01-7	Project Office deficiency number 7, fixed during audit 90-01.
• SR-91-014	Project Office deficiency number 014, fixed during Survey SR-91.
• SWO-LA-07	Los Alamos stop work order #07.
• CR-001	Los Alamos conflict resolution #01.

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 011 v4.3		DR 135 v5	
DR 012 v4.3		DR 137 v5	
DR 013 v4.3		DR 143 v5	
DR 017 v4.3, 2.1.1		DR 151 v5, 18.2.7	
DR 024 v4.4, 3.1.9		CAR-91-041 v5	
SDR 511 Sec. 1 & 2		DR 174 R5	
SDR 513 v4.3, 2.1.1			
DR 053 v4.4			
DR 077 v4.4, 3.1.3			
DR 115 v4.4			
Totals 11	0	6	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 026 R2, 6.2			91-003-3 R0, 6.2
DR 028 R2, 1.1			91-008-1 R2
DR 91 R2, 6.1-.2			
Totals 3	0	0	2

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 013 R0, 6.3	YA-90-01-7 R0		
DR 016 R0, 6.2			
DR 093 R0			
Totals 3	1	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
Totals 0	0	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
Totals 0	0	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 115 R0, 5.1		DR 132 R0, 5.1	
Totals 1	0	1	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 034 R0, 6.2-.5		DR 136 R0	91-001-1 R0, 6.2.1
DR 095 R0		DR 145 R0, 6.3	91-002-2 R0, 6.2
DR 096 R0		DR 163 R0, 6.1, 6.1.1	91-013-1 R0, 6.2.4
DR 103 R0		DR 169 R0, 6.2	YA-91-03-1 R0
SWO-LA02 R0		DR 177 R1, 6.1.2	91-11-1 R0,6.2.3
			91-12-1 R0, 6.2.3
			91-12-2 R0, 6.2.4
Totals 5	0	5	7

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 032 R0, 5.3.1		DR 173 R1, 6.1	91-11-2 R1, 6.5
DR 034 R0, 6.1.3-6.2			91-12-3 R1, 6.1.6, 6.5
DR 095 R0			
DR 096 R0			
DR 103 R0			
SWO-LA02 R0			
Totals 6	0	1	2

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 027 R0, 6.4.4.2		DR 145 R1, 6.2	91-006-1 R1, Attach 1
DR 033 R0, 5.5		DR 156 R1, 6.2	91-12-3 R1, 6.4.5
DR 051 R0, 6.2.1		DR 157 R1, 6.4.3	
DR 052 R0, 6.2.1			
DR 068 R0, 6.2			
DR 074 R0, 6.2			
DR 092 R0, 6.2			
DR 095 R0			
DR 096 R0			
DR 100 R0, 6.2.1			
DR 103 R0, 6.2			
DR 113 R0, 6.2			
SWO-LA02 R0			
Totals 13	0	3	2

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
Totals 0	0	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 095 R0			91-12-5 R0, 6.1.4
DR 096 R0			
DR 103 R0			
SWO-LA-02 R0			
Totals 4	0	0	1

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 024 R0,6.3.1	YA-90-01-2 R0	DR 146 R0, 6.1.1	91-001-02 R0, 6.2.1
DR 067 R0, 2.0	SDR 512 R0, 3.2.1	DR 152 R0, 6.3.1	91-002-2 R0, 6.2.1
DR 080 R0, 7.0		DR 162 R0, 7.0	SR-91-014 R0
DR 081 R0, 5.2		DR 184 R0, 6.3.1	91-12-6 R0, 6.2.2, 6.2.4
DR 082 R0, 7.0			
DR 105 R0, 6.3.1			
DR 120 R0, 2.0			
Totals 7	2	4	4

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 069 R0, 5.2	YA-90-01-1 R0	DR 147 R0, 6.0, 6.2.6	
DR 070 R0, 6.5.1		DR 153 R0, 3.2.3, 3.1.2	
DR 072 R0		DR 162 R0, 6.2.4	
DR 073 R0, 5.2		DR 172 R0	
DR 074 R0			
DR 075 R0			
DR 077 R0			
Totals 7	1	4	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 005 R0		DR 191 R0	91-003-4 R0, 6.1
DR 015 R0, 6.5		DR 185 R0, 6.5.2	91-004-1,2,3 R0 6.5.2, 6.8
DR 058 R0, 6.1-.3		DR 187 R0, 6.6.3	91-008-2 R0, 6.3, 6.8
DR 059 R0, 6.1		DR 188 R0, 6.5, 6.8	91-013-2,3 R0,6.6.5,6.6.3
DR 064 R0, 6.2		DR 190 R0, 6.9.1	YA-91-03-2 R0
DR 071 R0, 6.5.1		DR 180 R0, 6.6.3	91-014-1 R0
DR 076 R0, 6.9.1		DR 179 R0, 6.5.2, 6.3, 6.8	91-015-1 R0, 6.1
DR 090 R0, 6.5		DR 173 R0	91-10-1 R0, 6.8
DR 140 R0, 6.8		DR 178 R0, 6.5.1, 6.6.1	91-11-3 R0, 6.5.2
DR 106 R0, 6.3		DR 142 R0, 6.0	91-12-7 R0, 6.3, 6.8
DR 107 R0, 6.1		DR 148 R0, 6.5, 6.8	
DR 117 R0, 6.5.1		DR 159 R0, 6.5.2	
DR 119 RD, 6.6.5		DR 160 R0, 6.6.3	
DR 123 R0		SWO-LA06 R0, 6.8	
SDR 512 R0			
Totals 15	0	14	10

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
Totals 0	0	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
Totals 0	0	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 029 R1, 4.0			
Totals 1	0	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
Totals 0	0	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
(SWO-LA01 *note: issued in 1989)		DR 155 R0, 7.2.7	
Totals 0	0	1	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
Totals 0	0	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
Totals 0	0	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
Totals 0	0	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
Totals 0	0	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
	YA-91-03-3 R0		
Totals 0	1	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
Totals 0	0	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 004 R2	YA-90-01-4 R2, 6.4	DR 150 R2, 6.6	
DR 006 R1			
DR 018 R2			
DR 019 R2			
DR 021 R0			
DR 022 R2, 1.0			
DR 023 R2, 2.0			
DR 035 R2, 6.3			
DR 036 R2, 7.1			
DR 037 R2, 7.1.7			
DR 061 R0, 6.3.2			
DR 062 R2, 7.1.7			
DR 063 R2, 6.1.1.2			
DR 065 R2, 7.1.7			

	1990		1991	
	DEFICIENCY	FIXED	DEFICIENCY	FIXED
	DR 066 R2, 7.1.5			
	DR 078 R2, 6.3			
	DR 085 R2, 6.2			
	DR 108 R2, 6.3			
	DR 113 R2			
	SDR 491 R2			
	SDR 515 R2, 6.4			
Totals	21	0	1	0

NOTE: Superceded by QPs 4.4 & 4.5

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 083 R2, 5.0			
DR 084 R2, 5.0			
Totals 2	0	0	0

NOTE: Superceded by QPs 4.4 & 4.5

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 003 R1	YA-90-01-3 R1	CR-001 R1	
DR 020 R1	YA-90-01-6 R1	DR 166 R1, 6.1, 6.3	
Totals 2	2	2	0

NOTE: Superceded by QPs 4.4, 4.5

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
		DR 139 R0, 6.7	YA-92-01-1 R0
		CAR-92-002 R0	
		DR 175 R0, 6.5, 6.2, 6.1	
		DR 182 R0, 2.0	
Totals N/A	N/A	4	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
		DR 149 R0, 6.1.1	
		SWO-LA05 R0	
		CAR-92-002 R0	
		DR 182 R0, 4.2	
Totals N/A	N/A	4	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 002 R3			
DR 009 R3, 6.4			
DR 010 R3, 6.4			
DR 041 R3, 7.2			
DR 047 R3, 6.2, 6.3			
Totals 5	0	N/A	N/A

NOTE: Superceded by QP6.2

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 007 R2, 5.2			
DR 118 R2, 7.0			
DR 144 R2			
Totals 3	0	N/A	N/A

NOTE: Superceded by QP6.3

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 001 R1, 5.2		DR 161 R2	91-001-03 R2, 6.3.3
DR 030 R1, 5.2		DR 168 R2, 6.3.3.2	91-003-05 R2, 5.4
DR 039 R1, 5.2		DR 174 R3, 5.7	
DR 045 R1, 6.5		DR 189 R2, 4.2	
DR 046 R1, 6.5			
DR 116 R1, 6.3			
DR 124 R2, 6.3.2			
DR 122 R0, 6.2.12.1			
Totals 7	0	4	2

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
Totals N/A	N/A	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
		DR 144 R0	
		DR 161 R0, 6.2.10.2	
		DR 189 R0, 6.2.10.2	
Totals N/A	N/A	3	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 038 R0, 7.1		CAR-92-001 R1, 6.4	
DR 094 R1, 6.2.1			
DR 125 R1, 6.2.1			
Totals 3	0	1	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
		DR 154 R0, 6.1	
		DR 167 R0, 6.1	
Totals 0	0	2	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 025 R4, 6.7	YA-90-01-10 R4, 4.6	DR 137 R4, 6.7	91-003-2 R4, 6.6
DR 051 R4, CR140		DR 141 R4, 2.0	91-008-3 R4, 6.1.1, 6.4
DR 053 R4, 6.7		DR 160 R4, 5.5	YA-91-03-4 R4
DR 054 R4, 6.7		CAR-92-003 R4, 6.3	
DR 055 R4, 6.7		DR 171 R4, 6.7	
DR 057 R4, 6.7		DR 176 R4, 6.7	
DR 099 R4, 5.2, 6.1.1		DR 187 R4, 5.5	
DR 101 R4, 6.3.2		DR 192 R4, 6.3	
DR 100 R4		DR 193 R4, 6.3, 6.4	
DR 102 R4, 6.7			
DR 109 R4, 4.9, 6.1.1			
DR 110 R4, 7.1			
DR 112 R4, 4.5, 4.9, 6.4			
DR 126 R4, 7.1			

	1990		1991	
	DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 128 R4, 6.7				
SDR 490 R3, 4.8				
Totals	16	1	9	3

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
Totals 0	0	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 114 R1, 6.7.5	YA-90-01-8 R1	DR 158 R1, 7.0	YA-91-03-5 R1
DR 121 R1, 6.3.1		DR 186 R1, 6.7.4.3	YA-91-03-6 R1
DR 127 R1, 6.7.3			
Totals 3	1	2	2

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 056 R0, 6.1.1, CR 123			
SDR 597 R0,			
Totals 2	0	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
Totals N/A	N/A	0	0

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 165 R1, 6.10.3		DR 164 R1, 6.2.3	
		DR 170 R1, 6.7.3.5	
		DR 183 R1, 6.4.1	
Totals 1	0	3	0

NOTE: Superceded by QP17.3

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 031 R0, 6.2	91-001-04 R1, 6.2.1	DR 129 R0, 6.5.4	91-12-8 R1, 6.2.2
DR 040 R0, 6.2	91-002-1 R1, 6.2.1	DR 130 R0, 6.4.6	91-001-04 R1, 6.2.1
DR 042 R0, 6.4.1	91-003-1 R1, 6.6.3	DR 133 R1, 6.3.5.1, .6, 6.6.3	91-002-1 R1, 6.2.1
DR 043 R0, 6.4.1		DR 138 R1	91-003-1 R1, 6.6.3
DR 044 R0, 6.4.1		DR 147 R0, 6.0	
DR 048 R0, 6.1		SWO-LA07 R0, 6.10	
DR 049 R0, 6.3.3		DR 164 R1, 6.2.3	
DR 050 R0, 6.3.2		DR 170 R1, 6.7.3.5	
DR 060 R0, 6.3.3		DR 183 R1, 6.4.1	
DR 075 R0, 6.2			
DR 079 R0, 6.4.2			
DR 086 R0, 4.5.4			
DR 087 R0, 6.4.2			
DR 089 R0, 6.4.5			

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
DR 095 R0			
DR 096 R0			
DR 111 R0, 6.4.5			
DR 088 R0, 6.4.3			
Totals 17	8	9	4

NOTE: Superceded by QPs 17.4,17.5

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
	YA-90-01-5 R4	DR 143 R4, 6.5	
		DR 151 R4, 6.5	
Totals 0	1	2	1

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
	YA-90-01-9 R0	DR 138 R0, 7.1	YA-91-03-8 R2
			YA-91-03-9 R2
Totals 0	1	1	2

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
	YA-90-01-11 R0		YA-91-03-7 R2
Totals 0	1	0	1

1990		1991	
DEFICIENCY	FIXED	DEFICIENCY	FIXED
	YA-90-01-12 DP 07, R3	DR 140 DP 06	91-002-3 DP 606, R1, 703
		DR 160 DP 35	91-008-4 DP 15
		DR 174 DP 607, R0	91-10-2 DP 607, R0,6.6
		DR 178 DP 401, R0	
Totals 0	1	4	3

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