

**Quality Assurance Implementation Experience in the
Yucca Mountain Project Technical Activities at
Lawrence Livermore National Laboratory**

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for

Nuclear Waste Technical Review Board

Quality Assurance Panel

Arlington, VA



Presentation Outline



- **General Implementation Activities**
 - **Basic Approach**
 - **Background/Recent History**

- **Specific Implementation Experience**

- **Final Remarks**

LLNL Approach to Quality Assurance



- **The achievement of quality is the responsibility of line management and the individuals performing the work.**
- **The quality assurance group is responsible for defining and coordinating the quality assurance program, and for monitoring, auditing, and reporting the status to management.**
- **The quality assurance program includes the activities of the individuals performing work as well as those performing quality control and quality assurance functions.**

Implementation Experience: Key Elements for Success



- **Top management commitment to quality and its assurance -- highest priority given to QA program revision**
- **Implementation of quality clearly assigned to line management**
- **Sufficient resources (labor, dollars, time) assigned to assure success**
- **Technical managers assigned active oversight role in development of technical and administrative QA procedures**
- **Training, document control, and records assigned to experienced administrative staff**
- **Experienced QA professionals assigned to audits and surveillances**

Implementation Experience: Key Elements for Success



- **Procedure preparation assigned to experienced technical and management staff**
- **Document logging and control system improved and effectively used**
- **Simplified change notice process created to assure responsiveness to procedural deficiencies**
- **Training activities tailored to staff responsibilities**
- **Procedure writers reassigned to assist line management in implementation of new QA program requirements**
- **Readiness reviews emphasized to assure adequate planning and control before starting quality affecting work**

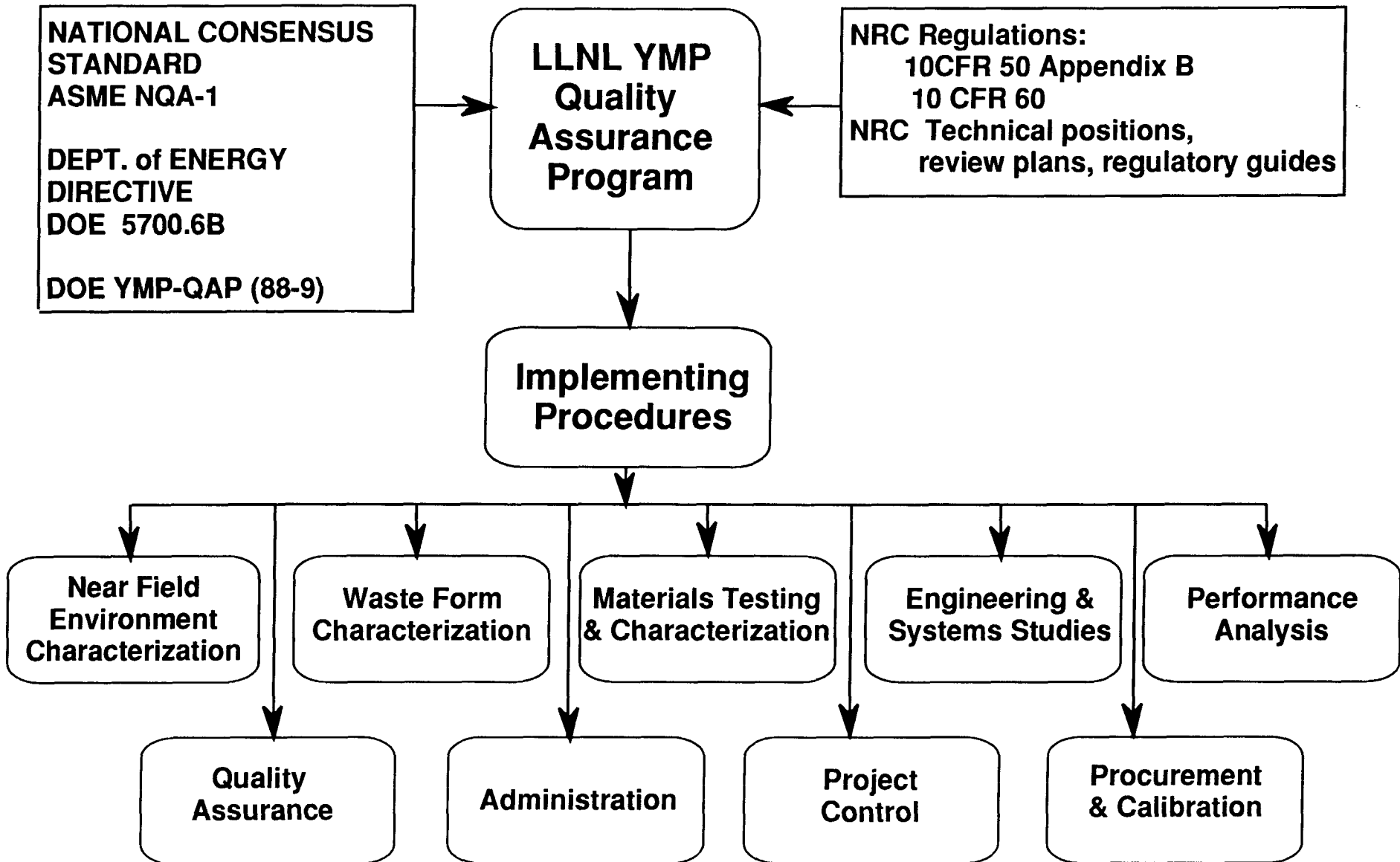
LLNL Implementation Approach



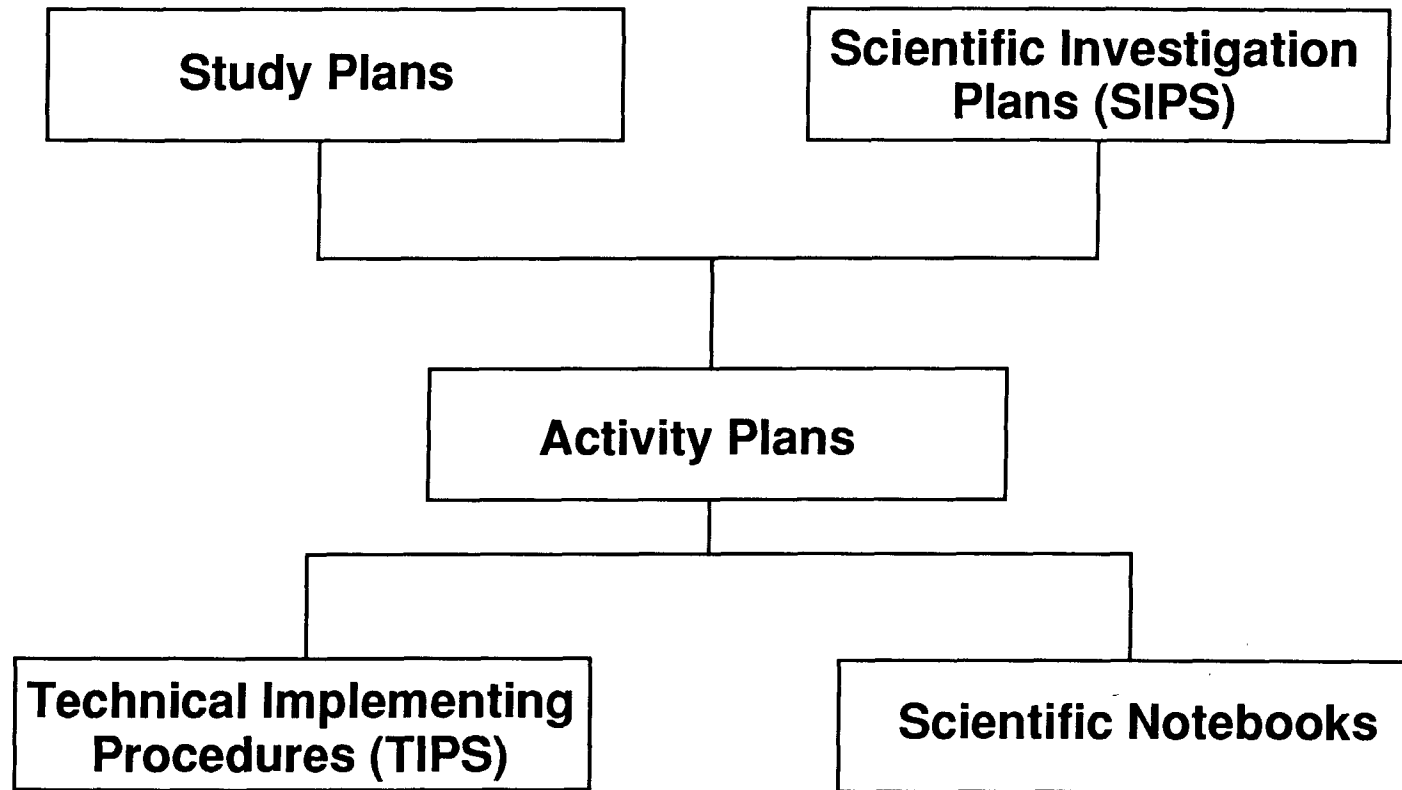
Project QA Staff Responsibilities

- **Prepare, issue and maintain the QA program plan**
- **Conduct QA indoctrination/assist in training**
- **Audit and monitor project activities**
- **Identify need for & assist in preparation of procedures**
- **Prepare QA assessment reports**
- **Review selected technical documents**
- **Identify need for corrective actions**
- **Advise management of quality concerns**

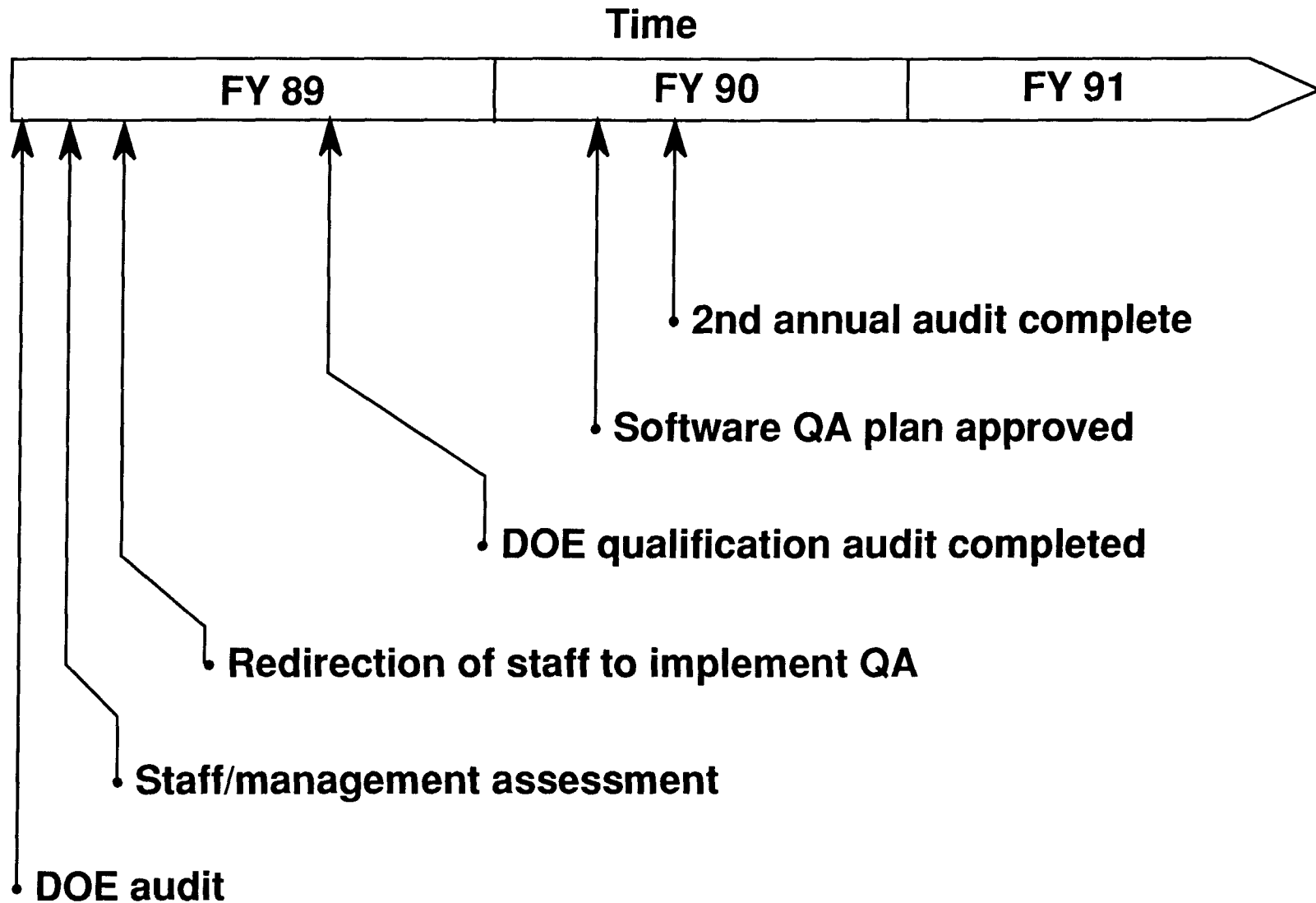
LLNL YMP Quality Assurance Program



Technical Planning Document Hierarchy at LLNL



Background / Recent LLNL Implementation History



Presentation Outline



- **General Implementation Activities**

- **Specific Implementation Experience**

- **General**
- **Surveillances and Audits**
- **Technical Planning Documents**
- **Management Assessments**
- **Training**
- **Software**
- **Costs**

- **Final Remarks**

Implementation Experience FY 89 Major Accomplishments: QA Program



- QA Program Plan approved by DOE, 38 quality procedures and an administrative system completed
- Trained scientific and engineering staff to QA Program
- Developed/approved major subcontractor QA programs: ANL, PNL, B&W
- No deficiencies found during DOE qualification audit (June '89)
- Started first technical work in full compliance with QA Program (July '89)
- LLNL conducted QA surveillances and audits:

(internal) (external)

Surveillances:	11	7
Audits:	8	1

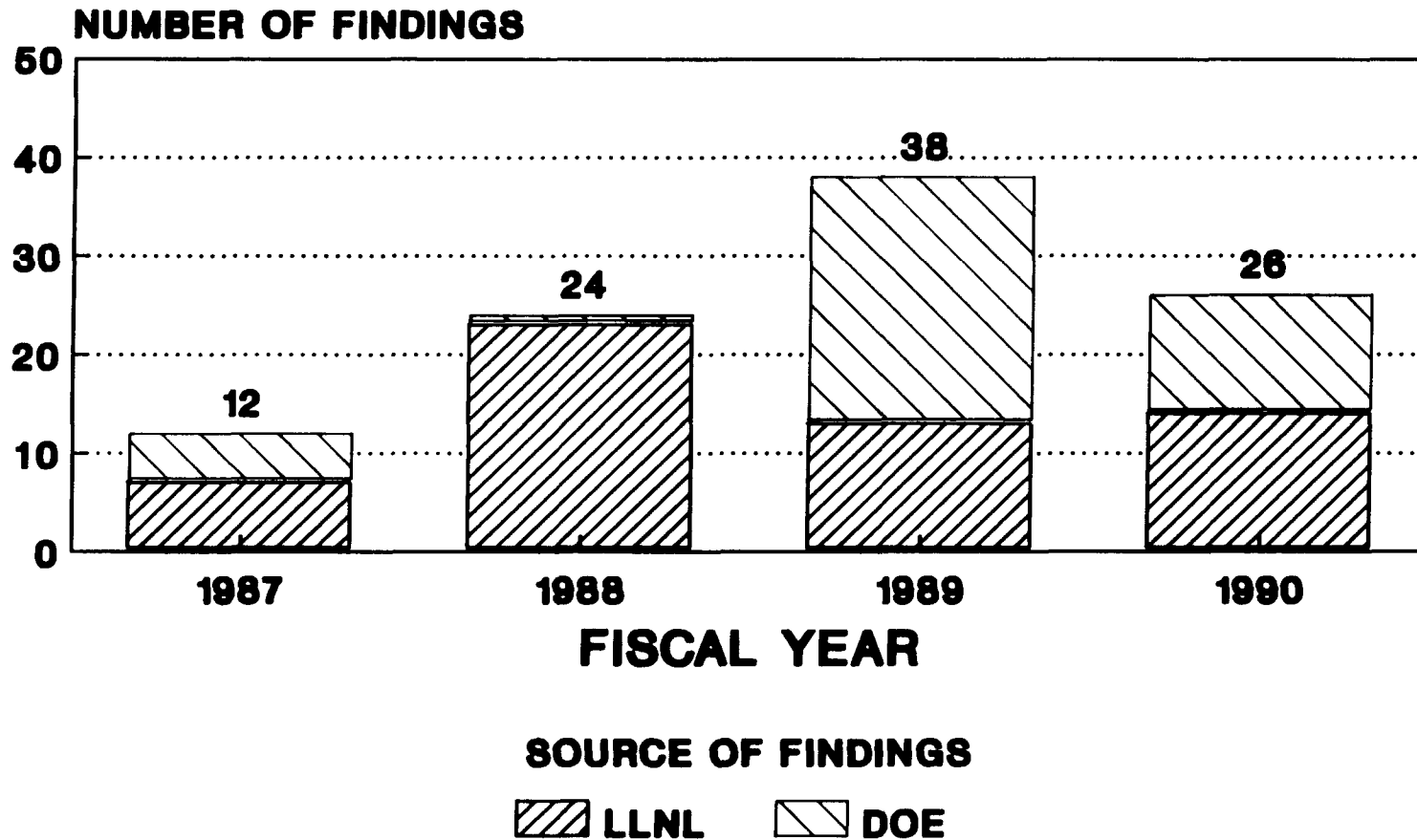
Implementation Experience: FY90 Major QA Program Accomplishments



- QA Program Plan accepted by US NRC (10/24/89)
- Software Quality Assurance Plan approved (12/20/89)
- QA Program initially accepted by DOE (3/1/90)
- QA Program acceptability confirmed by DOE (8/15/90)
- LLNL conducted QA surveillances and audits:

	internal	external
Surveillances:	3	4
Audits:	5	6

Implementation experience: QA Audits and Surveillances



NOTE: DOES NOT INCLUDE CONTRACTORS
10/29/90

Implementation Experience: Technical Planning and Other Accomplishments



	Completed/In Use	Under Development*
Study Plans	0	3
Scientific Investigation Plans	12	4
– Activity Plans	9	9
Tech. Implementing Procedures	28	9
Scientific Notebooks	118	N/A
Software Quality Documents	6	5
Technical Reports/Papers (FY90)	32	18

* in preparation, being revised, in approval cycle

Implementation Experience: Management Assessment Recommendations



- **MA 89-01**
 - **Perform MA after implementing QA program in technical areas**
 - **Continue dollar trend analysis of QA program costs**
 - **Close standard deficiency reports (findings) quickly**

- **MA 90-01**
 - **Press DOE for timely turn around of project documents**
 - **Work with DOE to ensure QA requirements are workable, appropriate to R & D, and stabilized**
 - **Close standard deficiency reports (findings) quickly**

Implementation Experience: Training



	<u>Number</u>	
	<u>FY89</u>	<u>FY90</u>
- Class room sessions	51	13
Number staff in sessions	855	299
- Read and sign issues	3	20
- Total staff trained	147*	160
- New staff trained	147*	40
- Staff terminated/reassigned	17*	39

* partial year only

LLNL-YMP Software QA Implementation Experience

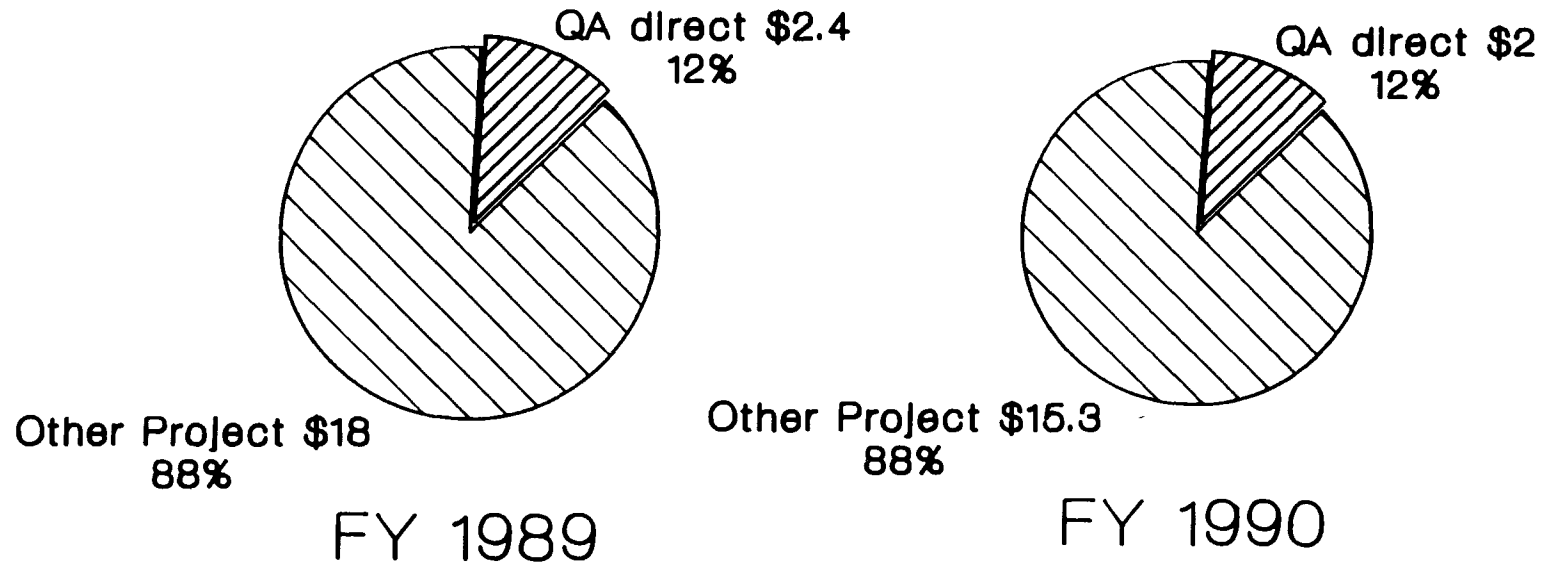


- **Wrote software quality assurance plan (SQAP) using YMP-QAP (88/9)**
- **Developing Implementing Procedures**
 - **Issue Guidelines (80% issued)**
 - **Evaluate Guidelines Effectiveness (10% evaluated)**
 - **Revise & Issue as Procedures**
- **Conduct Staff Training**
 - **Develop training modules (70% developed)**
 - **Conduct training (30% conducted)**
 - **Evaluate effectiveness**
- **Revise SQAP using QARD (future)**

Implementation experience: LLNL costs



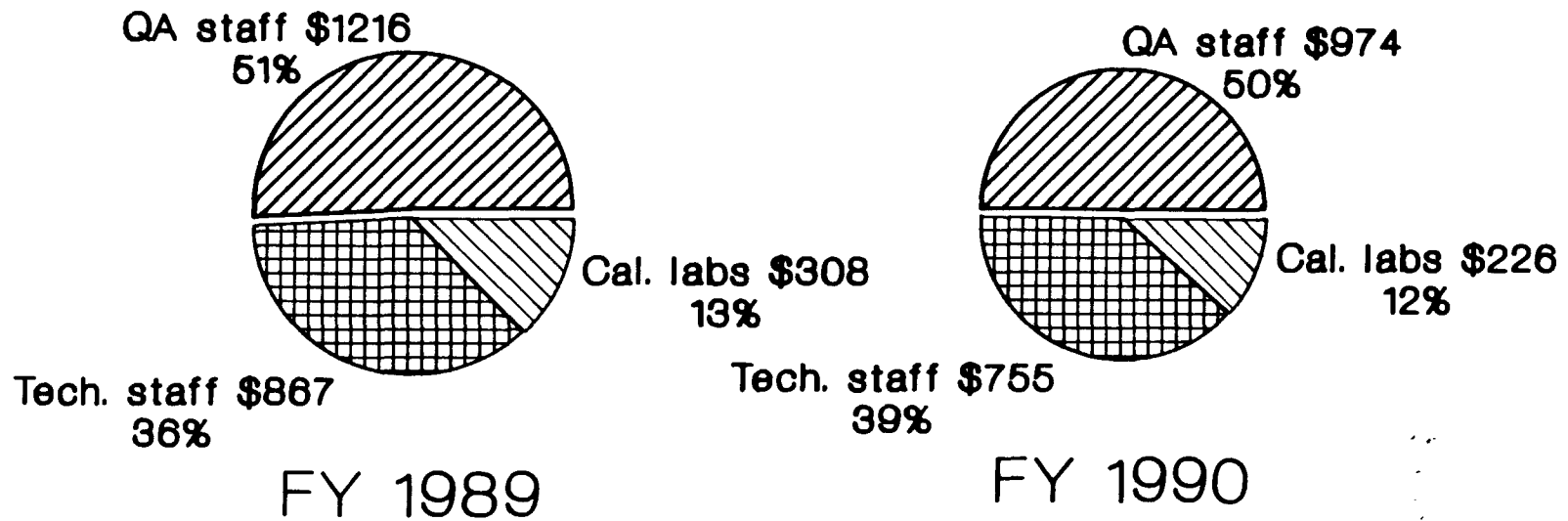
\$(millions)



Implementation experience: QA direct cost experience



\$(thousands)



Presentation Outline



- **General Implementation Activities**
- **Specific Implementation Experience**

- **Final Remarks**
 - **Difficulties**
 - **Future Emphasis**

Implementation Difficulties



- **Identifying a workable and effective approach for software implementation for R&D activities**
- **Identifying, sorting out and communicating to DOE the mixtures of regulatory quality assurance and management (project unique) requirements in upper-tier documents**
- **Dealing with frequent changes in upper-tier requirements**
- **Developing transition methods for tests and analyses in progress prior to effective QA program implementation**
- **Changing budget levels requiring major revisions of technical planning documents**