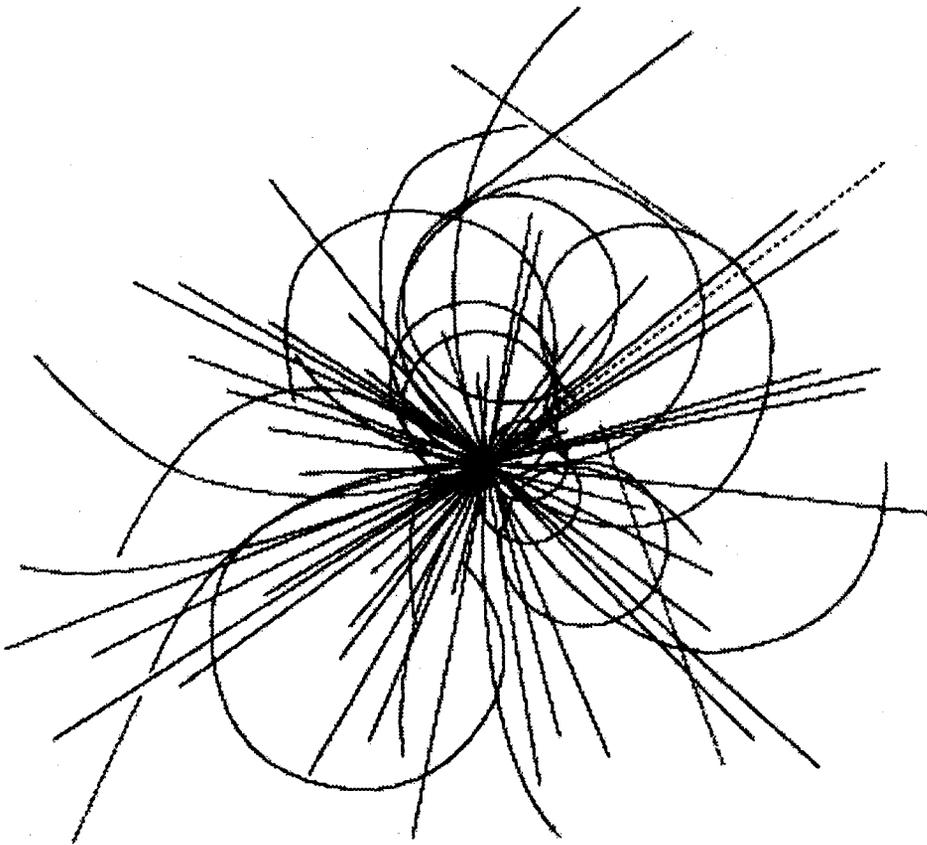


Supplier Performance Evaluation and Rating System (SPEARS)



**Superconducting Super Collider
Laboratory**

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and Rating System (SPEARS)***

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SUPPLIER PERFORMANCE EVALUATION AND RATING SYSTEM (SPEARS)

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INTRODUCTION

The SSCL Magnet Quality Assurance Department has implemented a Supplier Performance Evaluation and Rating System (SPEARS) to assess supplier performance throughout the development and production stages of the SSCL program. The main objectives of SPEARS are to promote teamwork and recognize performance. This paper examines the current implementation of SPEARS.

MSD QA supports the development and production of SSC superconducting magnets while implementing the requirements of DOE Order 5700.6C. The MSD QA program is based on the concept of continuous improvement in quality and productivity. The QA program requires that procurement of items and services be controlled to assure conformance to specification. SPEARS has been implemented to meet DOE requirements and to enhance overall confidence in supplier performance. Key elements of SPEARS include supplier evaluation and selection as well as evaluation of furnished quality through source inspection, audit, and receipt inspection. These elements are described in this paper.

THE SELECTION AND EVALUATION PROCESS

Supplier selection and evaluation are accomplished initially by a "pre-award survey" and later through periodic evaluation of performance. The purpose of the pre-award survey is to determine a supplier's ability to: 1) produce items that will meet SSCL specifications, 2) maintain a Quality Assurance program which ensures finished quality, and 3) minimize cost by reducing losses. The pre-award survey is based on MIL-STD-45208 quality assurance requirements for suppliers of magnet and tooling component parts, or MIL-Q-9858 quality assurance requirements for major magnet suppliers. An "Approved Suppliers List" (ASL) is maintained by MSD QA. Only suppliers on the ASL are used for procurement of magnet and tooling items.

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PERIODIC EVALUATION

Supplier quality is periodically evaluated by MSD QA. Supplier "Approved" status may be removed as a result of poor performance. Under SPEARS, each approved supplier is evaluated quarterly. Performance is measured by incoming Quality (defined as the percent of conforming lots received). A three level Quality Rating is assigned depending on the percent of acceptable lots received as described in Table 1. Quality Rating Parameters. The supplier rating becomes part of the ASL. In the future, we plan to expand the evaluation criteria to include "Schedule" as well as frequency of "Waiver/Deviations."

Table 1. Quality Rating Parameters

Rating	Category	Quality (% acceptance Rate)
1	Outstanding	95-100%
2	Good	90-94%
3	Unsatisfactory	Below 90%

Suppliers having a Quality Rating of 3 receive increased MSD surveillance and may be recommended for restricted use or removal from the ASL. If supplier quality remains less than 90% for one calendar quarter, Procurement Quality Assurance (PQA) will inform the supplier by means of a performance status letter requesting corrective action. If supplier quality remains at less than 90% for a second quarter within one year of the first quarter, the supplier is down graded to "conditional status" with restricted procurement action until corrective actions are complete. If supplier quality remains at less than 90% for a third quarter within one year, the supplier becomes "disapproved" and is removed from the ASL.

Exceptions to or deviations from these guidelines may be accomplished by direction of the MSD Associate Director. Re-qualification is accomplished through a "pre-award survey" as described earlier and by demonstrated evidence of supplier improvements. Consideration is given to product deficiencies not within supplier control. Deviations/Waivers submitted and approved prior to SSCL inspection are not counted against the supplier.

Summary data of supplier performance for four consecutive quarters (January through December, 1992) is provided in Table 2. Supplier Performance Summary (calendar 1992). See Figure 1. SPEARS Summary (Status) and Figure 2. SPEARS Summary (Active Status) for an additional description of recent supplier performance.

Table 2. Supplier Performance Summary (calendar 1992)

	ACTIVITY PERIOD			
	JAN-MAR	APL-JUN	JUL-SEP	OCT-DEC
	(Q1)	(Q2)	(Q3)	(Q4)
Approved Suppliers	122	132	132	148
Inactive	81	100	110	124
Active*	41	32	22	24
Unsatisfactory	11	9	3	9
% Unsatisfactory	27	28	14	38

* Active Suppliers: Suppliers that had receipt or source inspection performed by MSD on products in each quarter.

Analysis of the data for 1992 shows that out of a total of 148 suppliers, only 61 remained active in all four quarters while 19 remained unsatisfactory through four consecutive quarters. A large percentage of our suppliers appear to be inactive. We are investigating options to improve usefulness of the ASL by maintaining both an "Active" and an "Inactive" Approved Supplier List. Any reduction of our ASL will be accomplished in strict accordance with SSCL MSD QA standards.

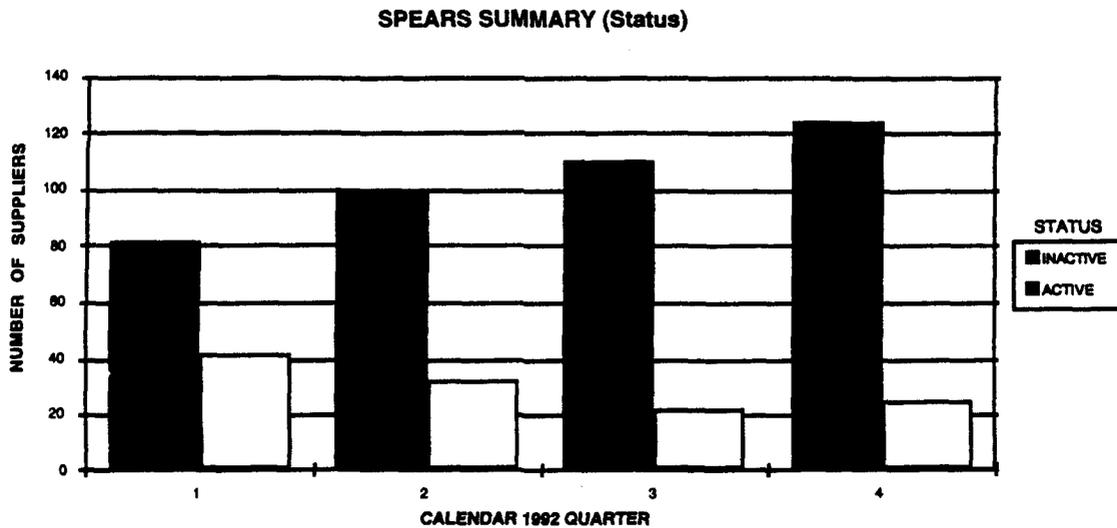


Figure 1. SPEARS Summary (Status) of the Active or Inactive status of MSD suppliers by calendar quarter in 1992.

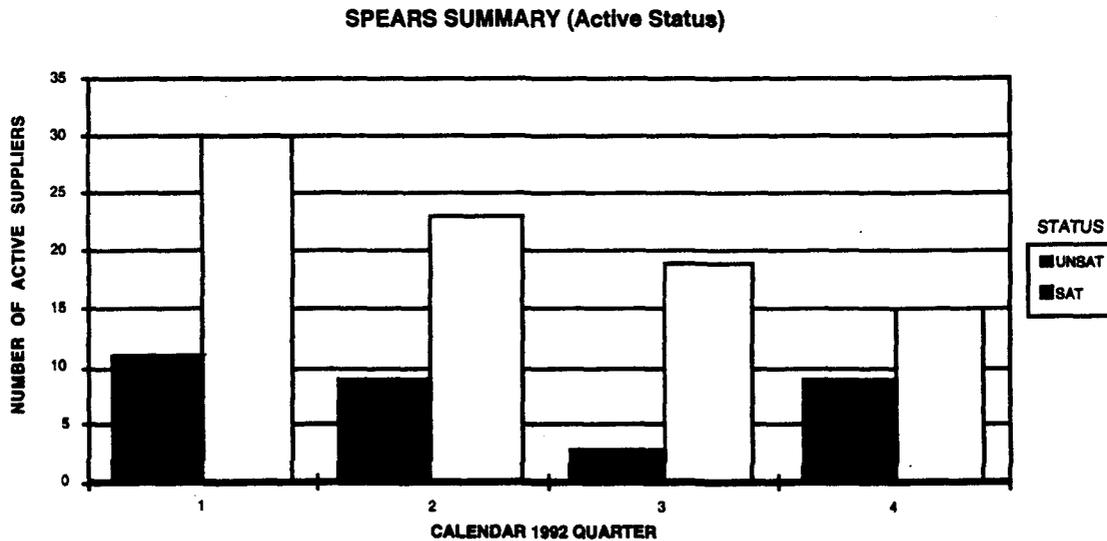


Figure 2. SPEARS Summary (Active Status) of the quality rating as satisfactory or unsatisfactory for active suppliers by calendar quarter in 1992.

SUPPLIER EVALUATIONS

During the evaluation of supplier performance, we attempt to identify discrepancies that contribute to a reduction of quality. These discrepancies are analyzed and their root causes documented. We have found that the majority of discrepancies are caused by inadequate communication of requirements, errors in drawing interpretation, late supplier submittal of Waiver/Deviations, and tolerances on dimensions that are accepted for use-as-is.

CONTINUOUS IMPROVEMENT

In our effort to reduce procurement cost by reducing losses, MSD PQA has implemented the following strategies during 1992:

(1) *Geometric Dimensioning and Tolerancing (GDT)*. A GDT course has been offered to SSCL and supplier personnel (at no cost to suppliers). The GDT course was given to help suppliers better understand SSCL drawing requirements. Approximately forty suppliers attended the course.

(2) *Procurement Team (PT)*. A PT has been created to work with our critical suppliers to improve procurement quality. The PT includes representatives from MSD QA, Magnet Development (Engineering) and Procurement. The main objective of the PT is to establish and communicate requirements for SSCL procured material. Quality improvements include but are not limited to: adding MSD QA criteria to Purchase Orders, identifying pertinent engineering specifications and drawings, communicating MSD QA inspection plans and/or supplier inspection plans, and the use of SPEARS. These improvements are being developed with supplier input. We are working to establish long term relationships with suppliers of critical parts.

(3) A *Quality Satisfaction Questionnaire* has been implemented to give each MSD engineer the opportunity to communicate parts problems on individual orders.

(4) *Communication*. Suppliers have been encouraged to honestly and fairly inform the SSCL of the quality status of delivered items. We have also made them aware of the impact of delivering non-conforming products. Unintentional discrepancies that could jeopardize a supplier's program are clearly communicated to responsible individuals to assure maintenance of the supplier's quality and ethical reputation.

(5) *Performance Recognition*. Good performance by our suppliers is now recognized with a certificate of commendation. The award provides recognition of achievement and encourages suppliers to improve performance. A supplier with four consecutive quarters of satisfactory quality, 90% or above, receives the certificate from the MSD Associate Director. In addition, we encourage MSD buyers to use the most qualified suppliers. In this way we reward suppliers who consistently produce quality products. This in turn helps minimize total cost to the division.

CONCLUSION

The SPEARS goal is to improve the working relationships between the SSCL and our suppliers; it enables us to identify and resolve quality issues in a timely manner. The SPEARS program can also serve other purposes such as tracking the timeliness of incoming materials and ensuring continuous quality improvement. In addition, the SPEARS program can be used effectively to minimize purchased material cost by reducing quality related losses.

In the future, MSD PQA plans to strengthen communications with our suppliers to provide essential information, performance feed-back, and to identify problem areas as they arise. We want to stimulate corrective action, and will work closely with our suppliers. In this way, we feel that we will continually improve quality and performance while reducing total costs.