WHC-SP-0081-18

Fast Flux Test Facility Performance Monitoring Management Information January 1989

Prepared for the U.S. Department of Energy
Assistant Secretary for Nuclear Energy

Westinghouse
Hanford Company Richland, Washington

Hanford Operations and Engineering Contractor for the
U.S. Department of Energy under Contract DE-AC06-87RL10930

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D. J. Newland

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FOREWARD

The purpose of this report is to provide management with performance data on key performance indicators selected from the FFTF Early Warning System performance indicators. This report contains the results for key performance indicators divided into two categories of "overall" and "other". The "overall" performance indicators, when considered in the aggregate, provide one means of monitoring overall plant performance. Overall performance indicators are listed in Table 1. The "other" performance indicators, listed in Table 2, are considered useful management tools for assessing the specific areas they address.

The data should be used in conjunction with the results of other management assessment activities to focus improvement efforts. Use of these key performance indicators as a group is stressed, since focusing on a single indicator or a narrow set of indicators can be counterproductive both to safety and to long-term performance improvement.

Any concerns regarding the accuracy or analysis of the specific indicator should be addressed to the responsible manager identified on the figure. This report must be reviewed with the understanding that both the design and the mission are different for FFTF compared to commercial power reactors.

FFTF PLANT MANAGER'S ASSESSMENT

JANUARY 1989

The plant operated at full power for about half the month of January. Two test outages accounted for the remaining time, during which MOTA-1F, FSP-1, PO-4 and PO-5 were removed from the reactor. One automatic scram occurred while adjusting nuclear instruments at 15% power.

Most performance indicators reflect excellent FFTF operation in spite of staff shortages and high workloads. No lost work day injuries occurred in January, and none have occurred for twelve straight months.

Slight rises in maintenance backlog indicators reinforce the need for continued concentrated effort to keep backlogs within parameters that compare favorably with the best commercial nuclear plants.

Please route your copy of this report to your staff and direct any questions or comments to J. E. Truax (376-0758).

D J Newland

D. J. Newland
FFTF Plant Manager

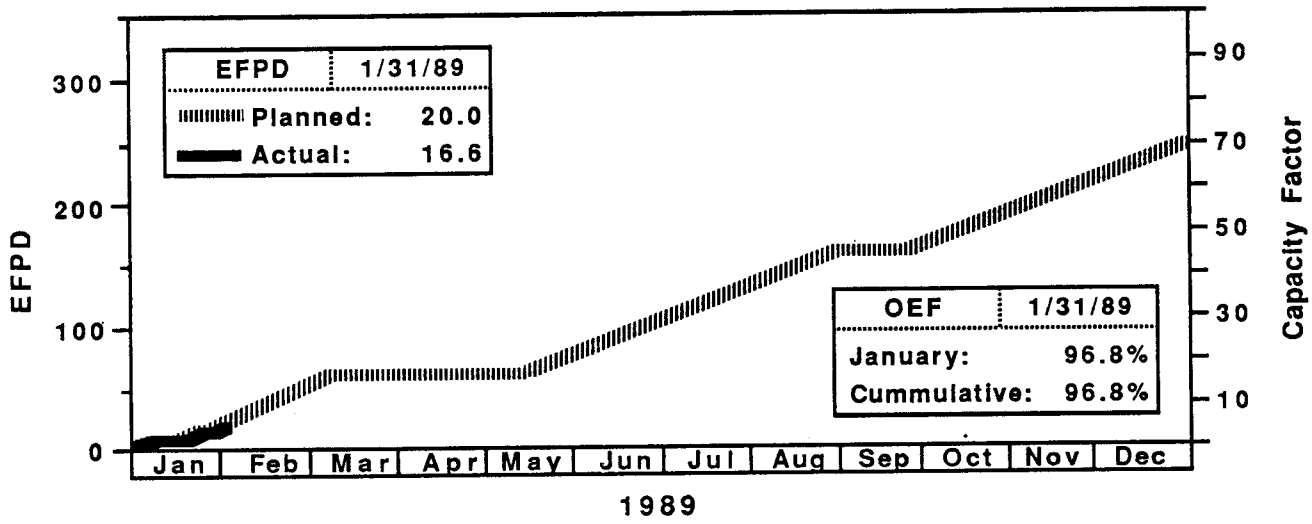
TABLE 1

OVERALL PERFORMANCE INDICATORS

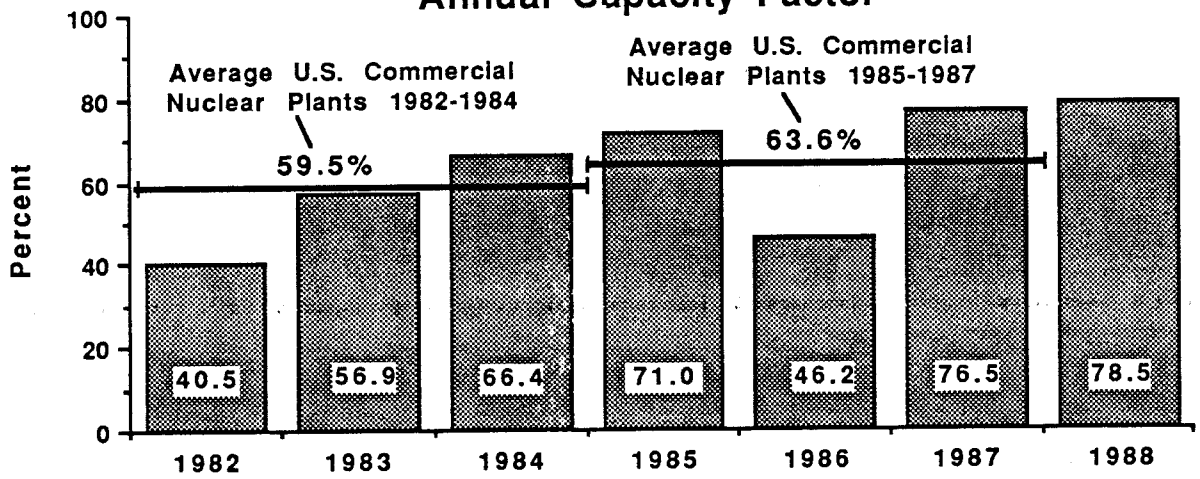
FIGURE	PERFORMANCE INDICATOR	AREA
1	Capacity Factor	OPS
2	Unplanned Automatic Scrams	OPS
3	Forced Outages	OPS
4	Unusual Occurrence Reports	OPS
5	Personnel Radiation Exposure	RADCON
6	Industrial Safety Statistics	INDSAF
7	Corrective Maintenance Workoff Rate	MAINT

Capacity Factor

Annual Capacity Factor



Annual Capacity Factor



Purpose

To monitor the plant's ability to perform at rated power. Capacity Factor is defined as the actual EFPD divided by the product of the calendar days in the reporting period times the Maximum Dependable Capacity (MDC) for the period. The MDC for CDE cycles is 1.0. For cycles prior to September 1986, the MDC was 0.973.

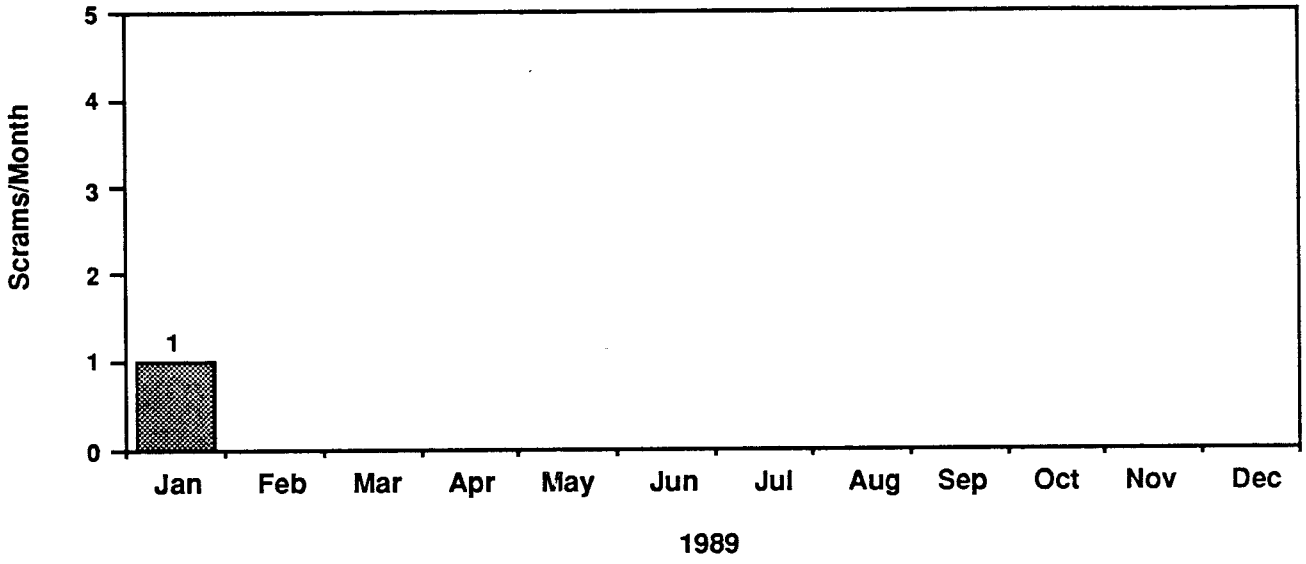
Assessment

The Capacity Factor for the month of January was 53.6%. The reactor was shutdown for seven days on January 8, 1989 for the scheduled removal of test assemblies MOTA and FSP-1. The reactor was shutdown again on January 20, 1989 for three and one half days for the removal of leaking test assembly PO-4. An additional day was lost during the two startups due to equipment design, procedure problems and operator error.

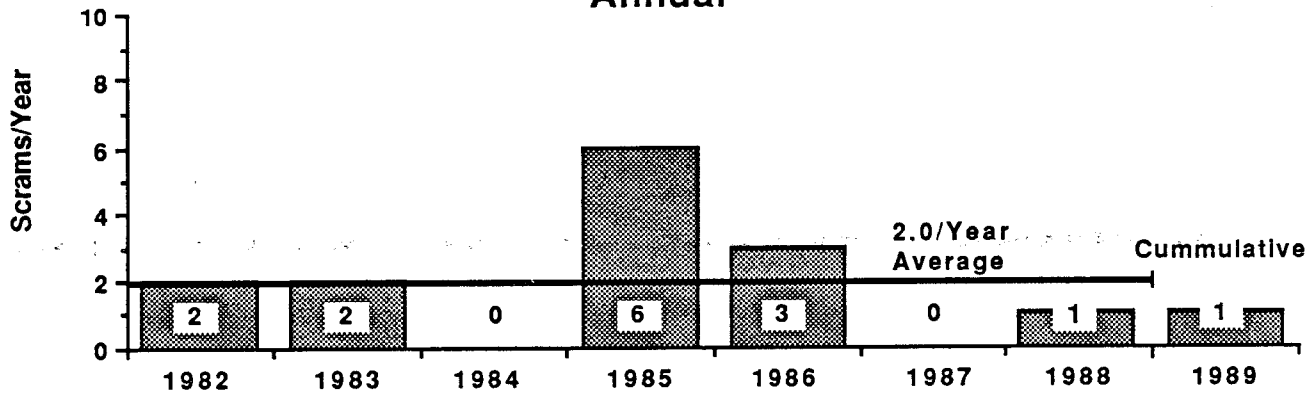
Jan 1989	D. J. Swaim	376-0604	Figure 1

Unplanned Automatic Scrams

Monthly



Annual



Purpose

To monitor the number of unplanned automatic scrams that occur while the reactor is critical. Unplanned means that the scram was not part of a planned operation or test. Unplanned automatic scrams include, for example, automatic scrams resulting from a transient, an equipment failure, a spurious signal, or human error.

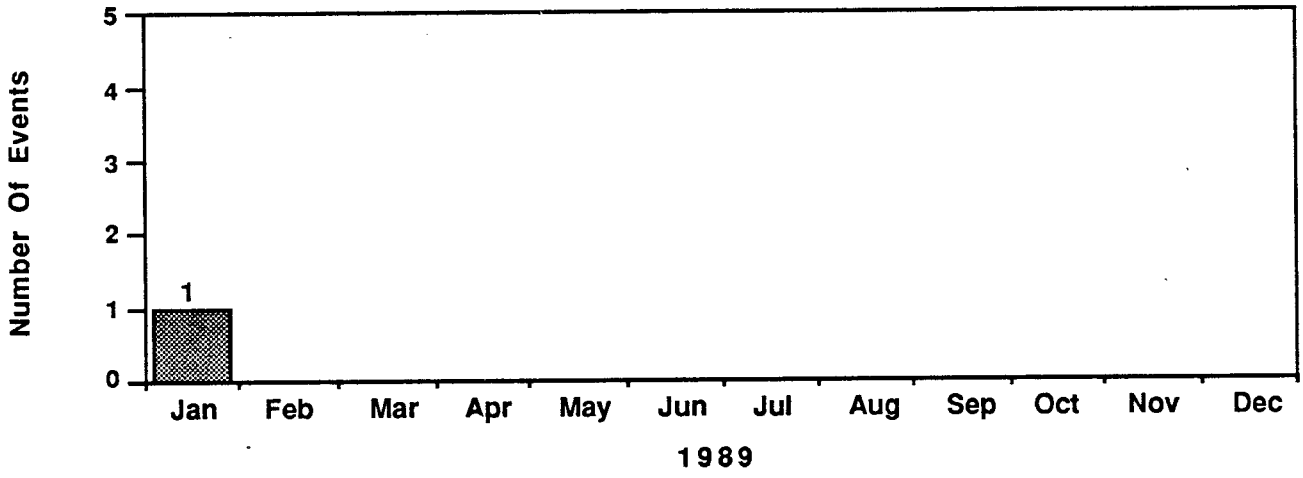
Assessment

There was one unplanned automatic scram during the month of January. The scram occurred when a PPS comparator was not reset during the performance of a compliance procedure.

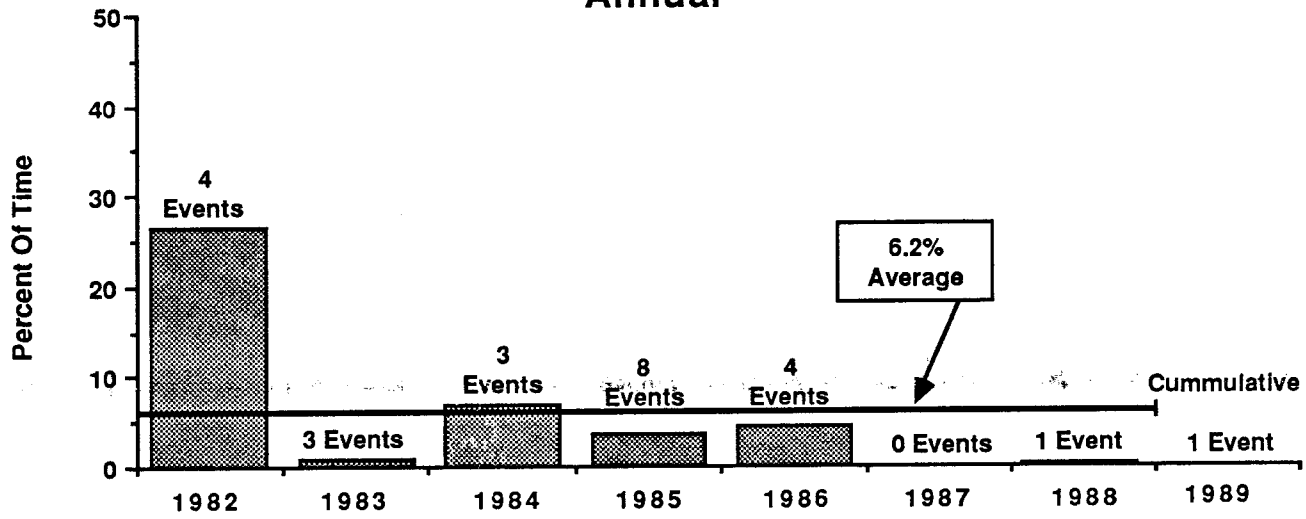
Jan 1989	D. J. Swaim	376-0604	Figure 2

Forced Outages

Monthly



Annual



Purpose

To monitor the percentage of time that the reactor was not available for irradiation testing due to a forced shutdown. A forced shutdown is one that would not have been completed in the absence of the condition for which corrective action was taken. Test outages are not considered forced shutdowns.

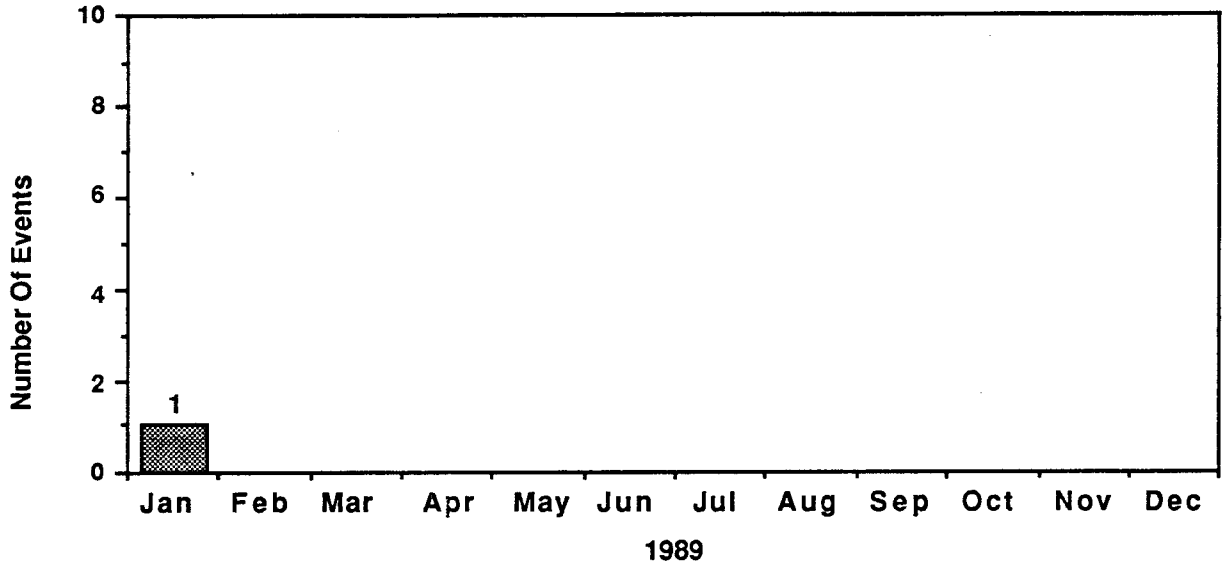
Assessment

There was one forced outage during the month of January. This was caused by an automatic scram during the performance of a compliance procedure, resulting in 16 hours of outage time.

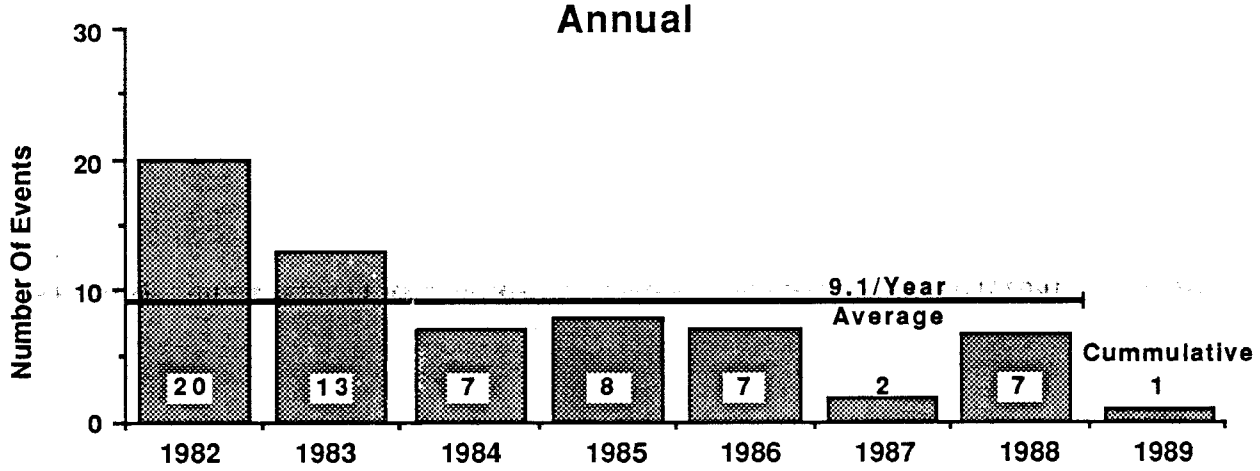
Jan 1989	D. J. Swaim	376-0604	Figure 3

Unusual Occurrence Reports

Monthly



Annual



Purpose

To monitor the number of Unusual Occurrence Reports (UOR). A UOR is an event outside normal operations that causes or risks serious injury to personnel, serious threat to the environment, or has significant effect upon safety, reliability or cost of FFTF or FFTF programs.

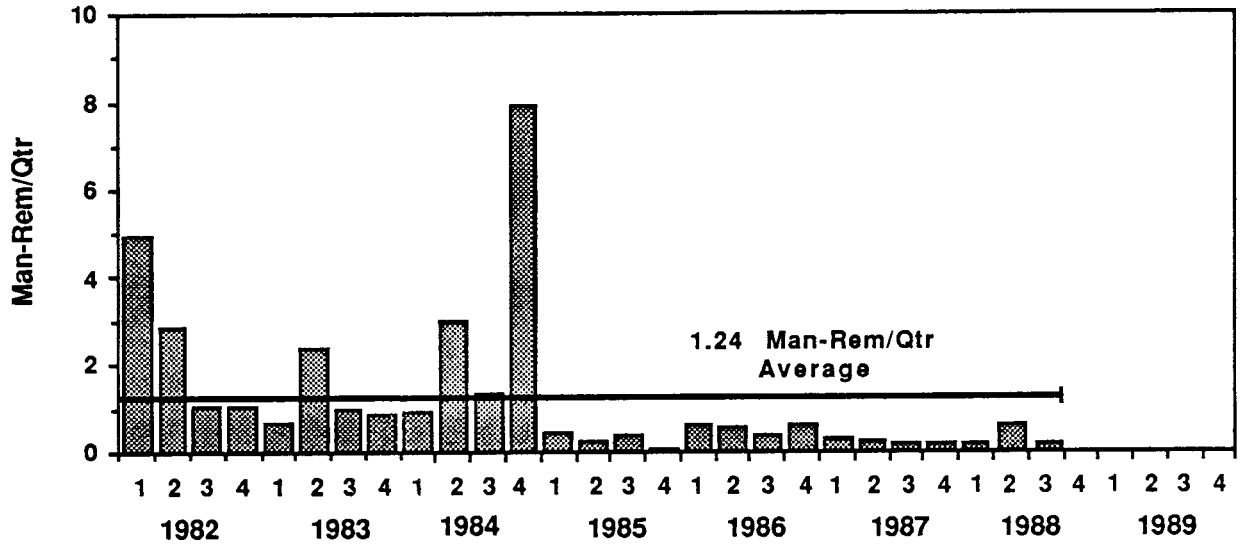
Assessment

There was one Unusual Occurrence Report during the month of January. It documented an automatic reactor shutdown from 15% power during a reactor startup. An error during calorimetric adjustment of the flux instruments resulted in the trip.

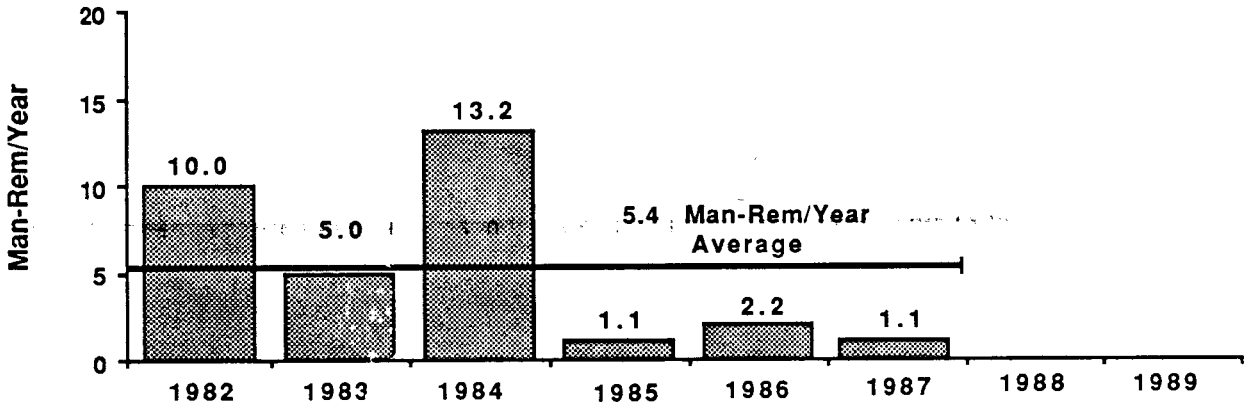
Jan 1989	D. J. Swaim	376-0604	Figure 4

Personnel Radiation Exposure

Quarterly Man-Rem Exposure



Annual Man-Rem Exposure



Purpose

To monitor the quarterly radiation exposure to the FFTF radiation workers. Due to the very low exposures, data is collected and reported quarterly.

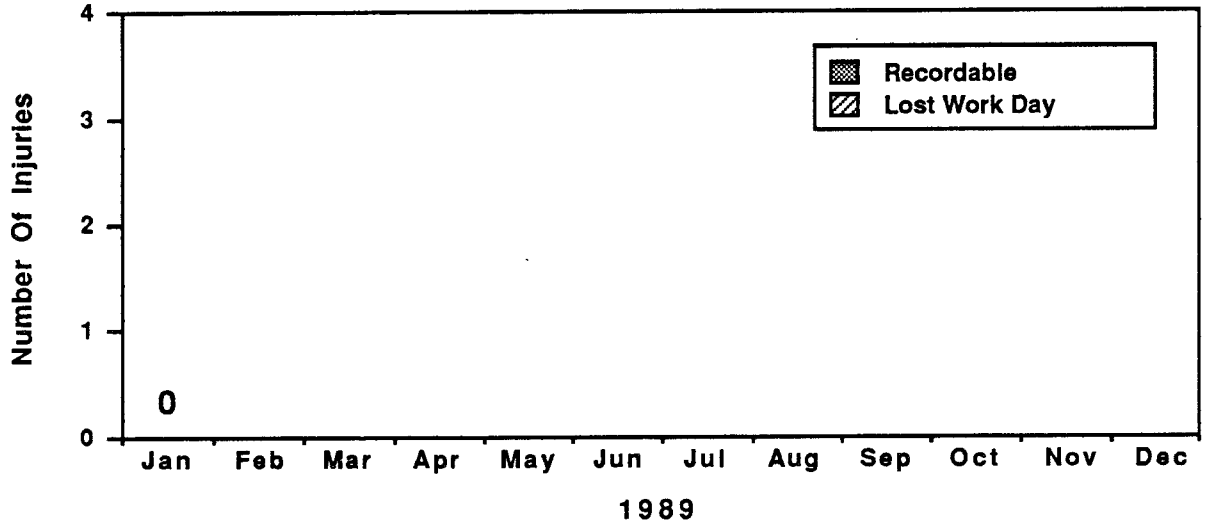
Assessment

Plant personnel radiation exposure during the third quarter of 1988 remained low. The highest individual exposure was 40 mrem. With 201 radiation workers at FFTF, the average exposure was less than 4 mrems per worker per quarter. The statistics for the fourth quarter of calendar year 1988 will be available in February.

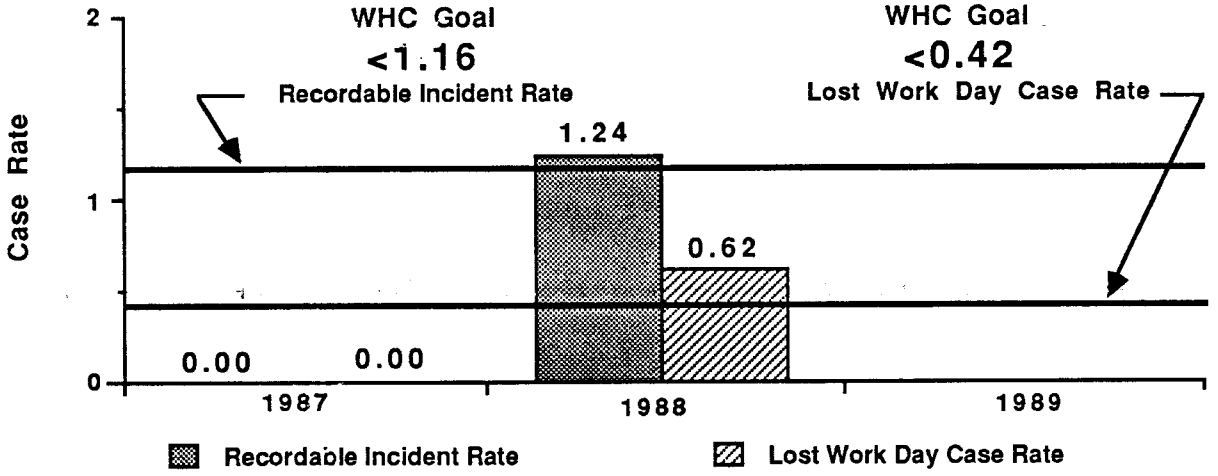
Jan 1989	P. R. Prevo	376-5667	Figure 5

Industrial Safety Statistics

Monthly Injuries



Annual Case Rates



Purpose

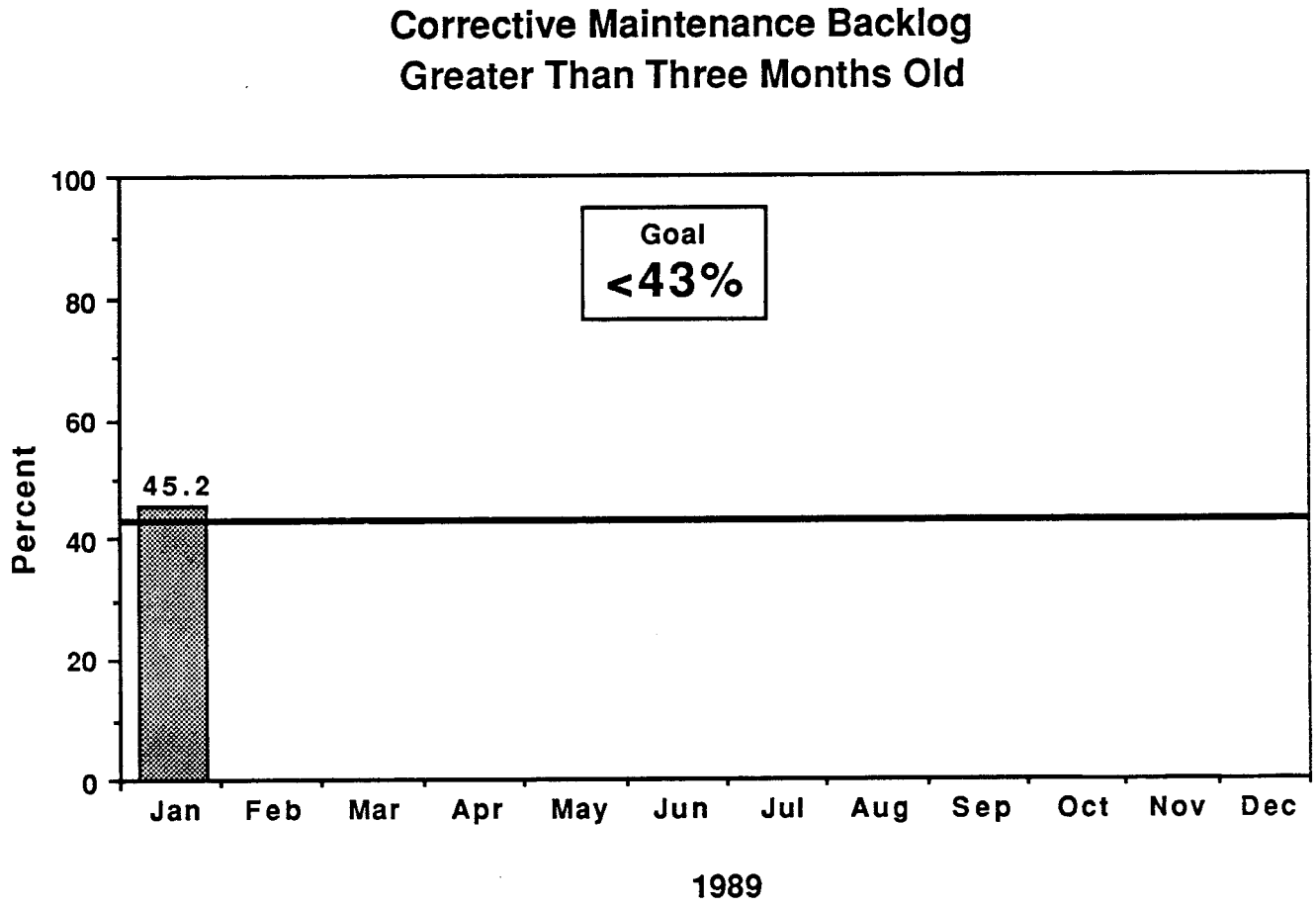
To monitor the number of recordable and lost work day injuries. The lost work day injury incident rate (the number of lost time injuries per 200,000 employee-hours) and the recordable injury incident rate (the number of OSHA recordable injuries per 200,000 employee-hours) are also monitored for permanent site personnel.

Assessment

There were no OSHA recordable injuries at FFTF during the month of January.

Jan 1989	H. N. Bowers	376-3070	Figure 6

Corrective Maintenance Workoff Rate



Purpose

To monitor the rate of completion of corrective maintenance items. This chart indicates the efficiency of the FFTF work control process and the staff's ability to follow through on the disposition, scheduling, field work, and close out of corrective maintenance.

Assessment

The backlog greater than three months made a slight increase to 45.2% during the month of January. Focusing on other goals (MASF upgrades, Fusion MOTA, ILRT, etc.) has diverted some attention from this goal. Increased focus on the planning and scheduling of older corrective maintenance items is needed to reduce this parameter.

Jan 1988	R. D. Redekopp	376-9668	Figure 7

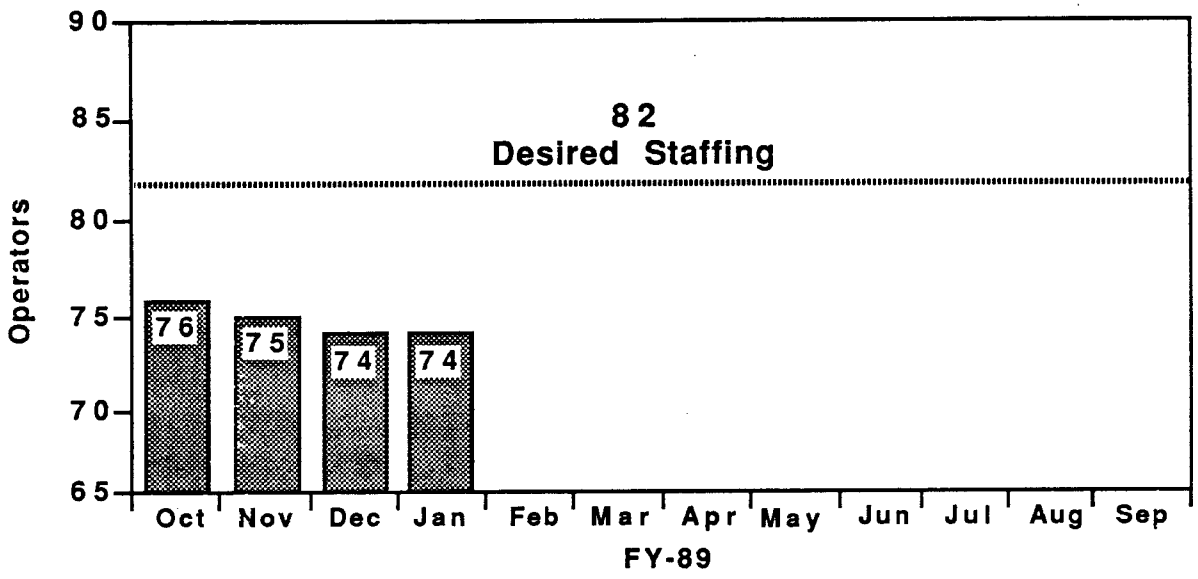
TABLE 2

OTHER PERFORMANCE INDICATORS

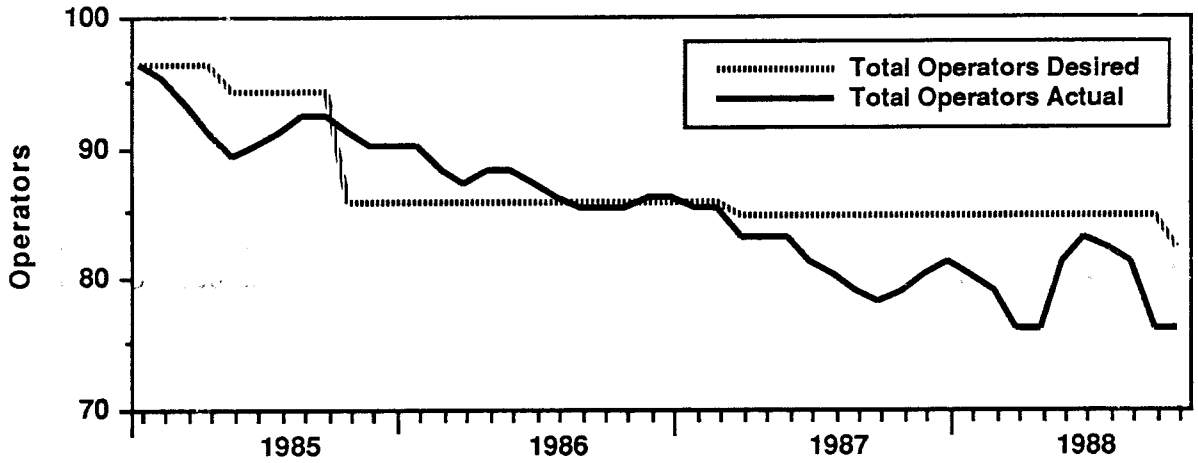
FIGURE	PERFORMANCE INDICATOR	AREA
8	Total Operations Staffing	OPS
9	Qualified Plant Operators	OPS
10	Qualified Control Room Operators	OPS
11	Reportable Events	OPS
12	Outage Planning Performance	MAINT
13	Corrective Maintenance Backlog	MAINT
14	Protective Maintenance Performance	MAINT
15	Modification Status (In Review)	ENG
16	Temporary Modification Status	ENG
17	Essential Drawing Status	ENG
18	Tagouts	OPS
19	Staffing Status	PERS
20	(TBD)	
21	Solid Radioactive Waste	RADCON
22	Liquid Radioactive Waste	RADCON
23	Skin Contaminations	RADCON
24	Safety/Quality Commitments	QA
25	FFTF Operating Histogram	OPS
26	Annual Operational Performance	OPS

Total Operations Staffing

Crew Staffing



Crew Staffing



Purpose

To monitor the operating crew staffing by tracking the total number of people assigned to operating crews. This is an indicator of the ability of Operations to support current and future plant activities. Some of the assigned operators may be in training or awaiting clearances prior to being assigned operating duties.

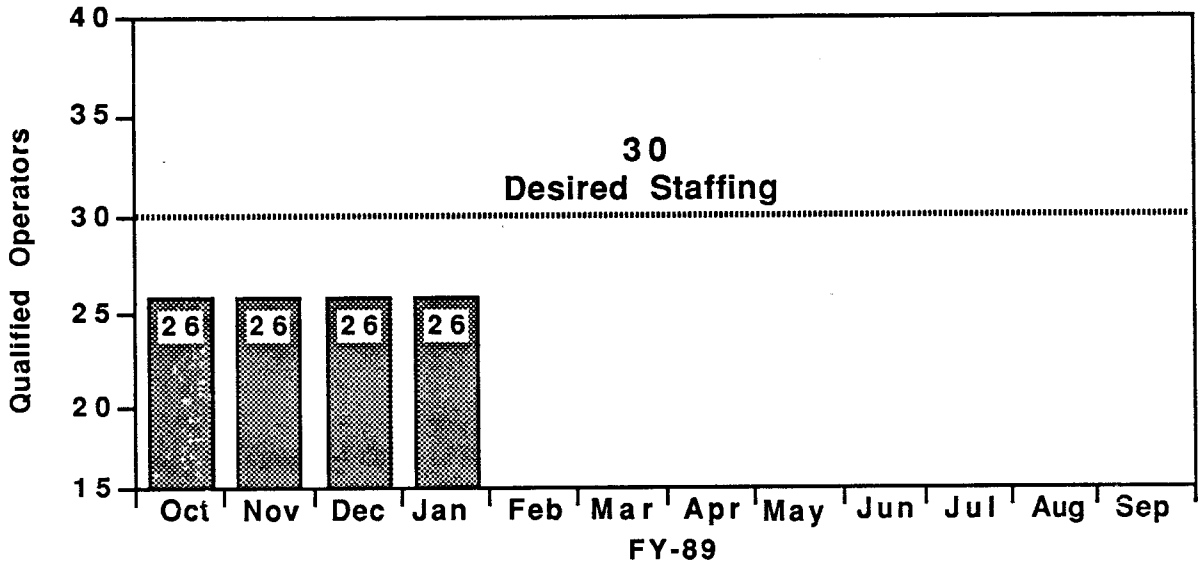
Assessment

The total number of operators for the month of January was 74, well below the desired level of staffing. An action plan is in place to address the short fall. While this short fall does not affect the safety of plant operations, the ability of Operations to support extra work loads imposed by plant outages and non-routine tasks requires higher usage of overtime.

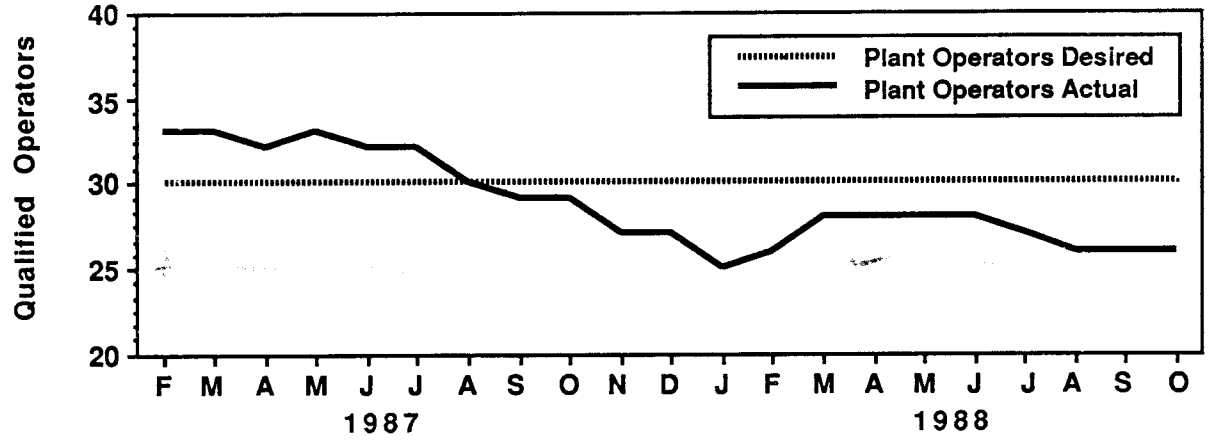
Jan 1989	D. J. Swaim	376-0604	Figure 8

Qualified Plant Operators

Crew Plant Staffing



Crew Plant Staffing



Purpose

To monitor the number of key personnel who are qualified outside the control room. This is an indicator of the number of field operators available to support plant activities and operate the plant safely and efficiently.

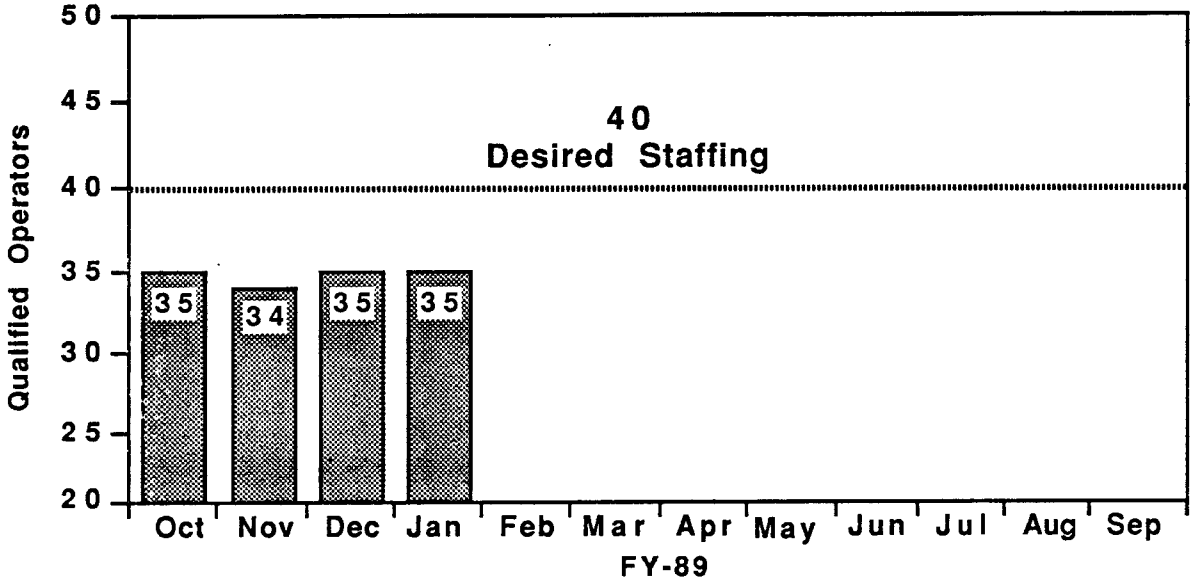
Assessment

The number of qualified plant operators for the month of January was 26. The short fall of plant operators requires higher usage of overtime to support non-routine plant evolutions and, in particular, refueling outages.

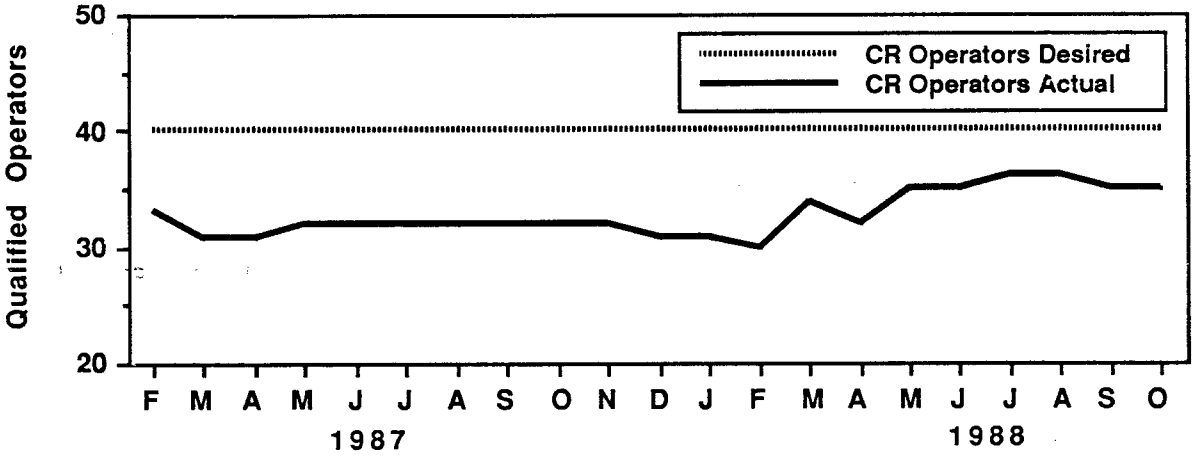
Jan 1989	D. J. Swaim	376-0604	Figure 9

Qualified Control Room Operators

Crew Control Room Staffing



Crew Control Room Staffing



Purpose

To monitor the number of key non-supervisory personnel qualified to stand watch in the control room. It is an indication of the knowledge and experience level of Operations personnel and reflects the ability of the organization to safely and efficiently operate the plant.

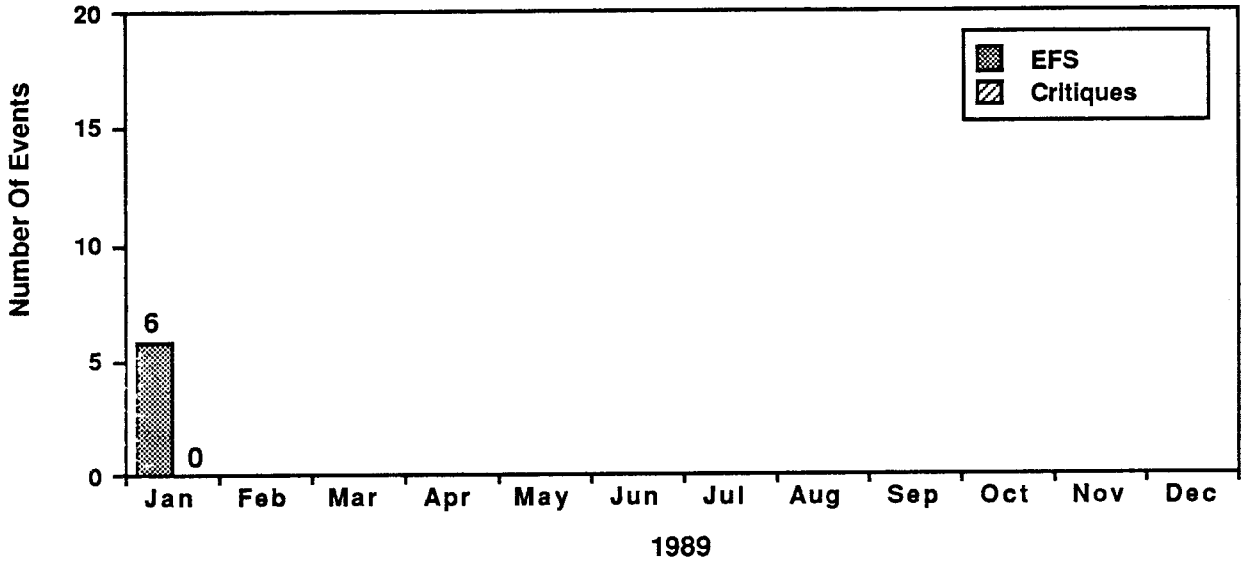
Assessment

The total number of qualified control room operators for the month of January was 35. While the safety of operations is not affected, use of overtime is required to support non-routine evolutions.

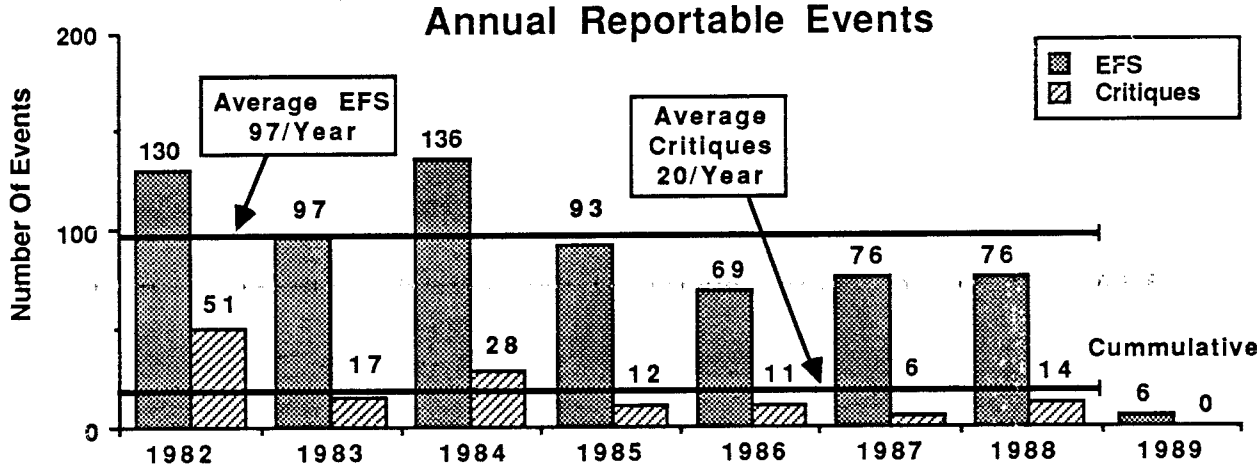
Jan 1989	D. J. Swaim	376-0604	Figure 10

Reportable Events

Monthly Reportable Events



Annual Reportable Events



Purpose

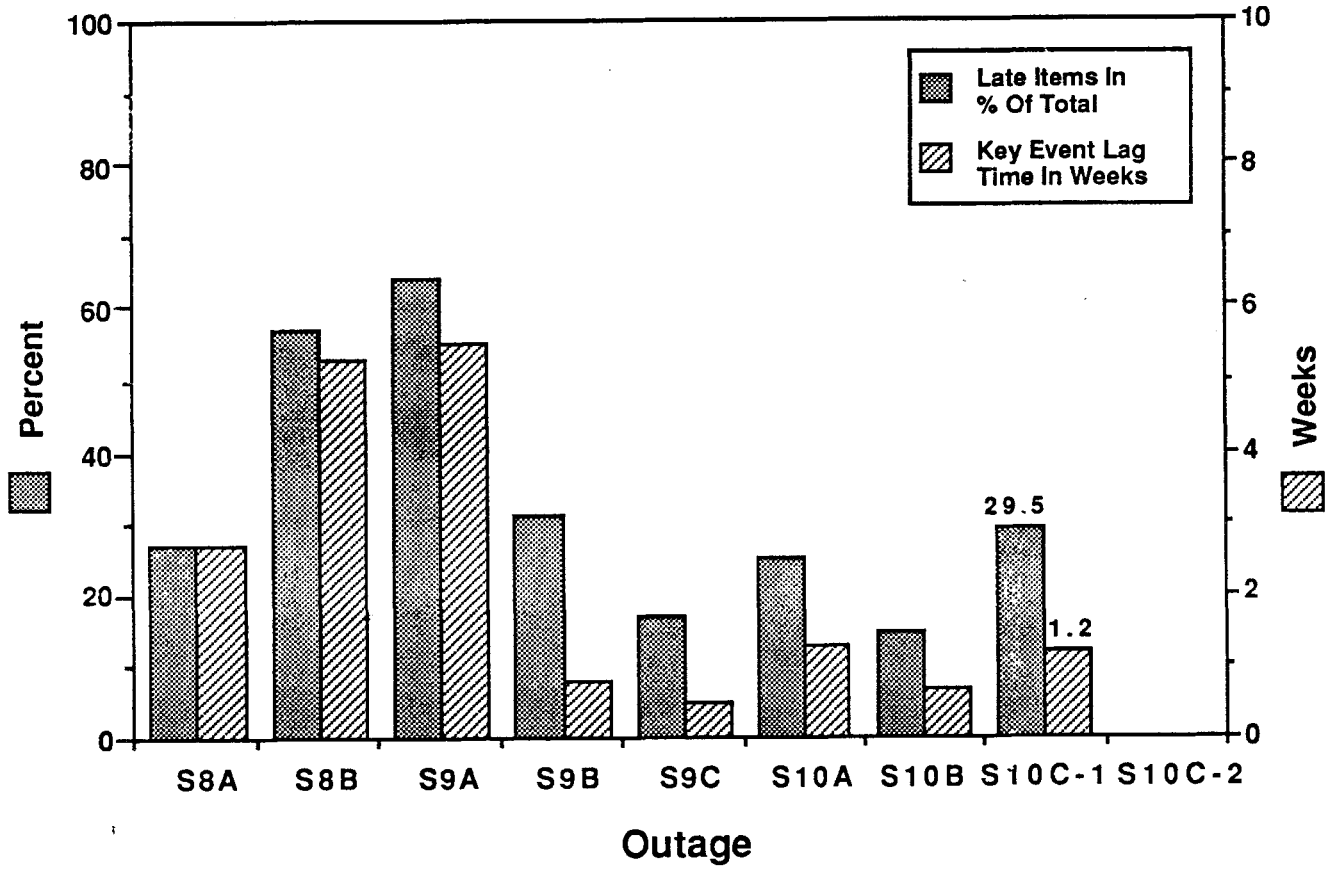
To monitor the number of Event Fact Sheets (EFS) and Critiques. An Event Fact Sheet records any significant unplanned event that may or may not be reportable as a Critique or Unusual Occurrence Report (UOR). A Critique is an evaluation of those events that do not meet the criteria for a UOR, but require investigation beyond that identified in an EFS.

Assessment

There were six Event Fact Sheets and no Critiques written this month.

Jan 1988	D. J. Swaim	376-0604	Figure 11

Outage Planning Performance



Purpose

To monitor the plant staff's ability to meet outage planning action item due dates. Both percentage of items that are late and key event lag time are plotted. These parameters have a direct impact on minimizing the length of planned outages.

Assessment

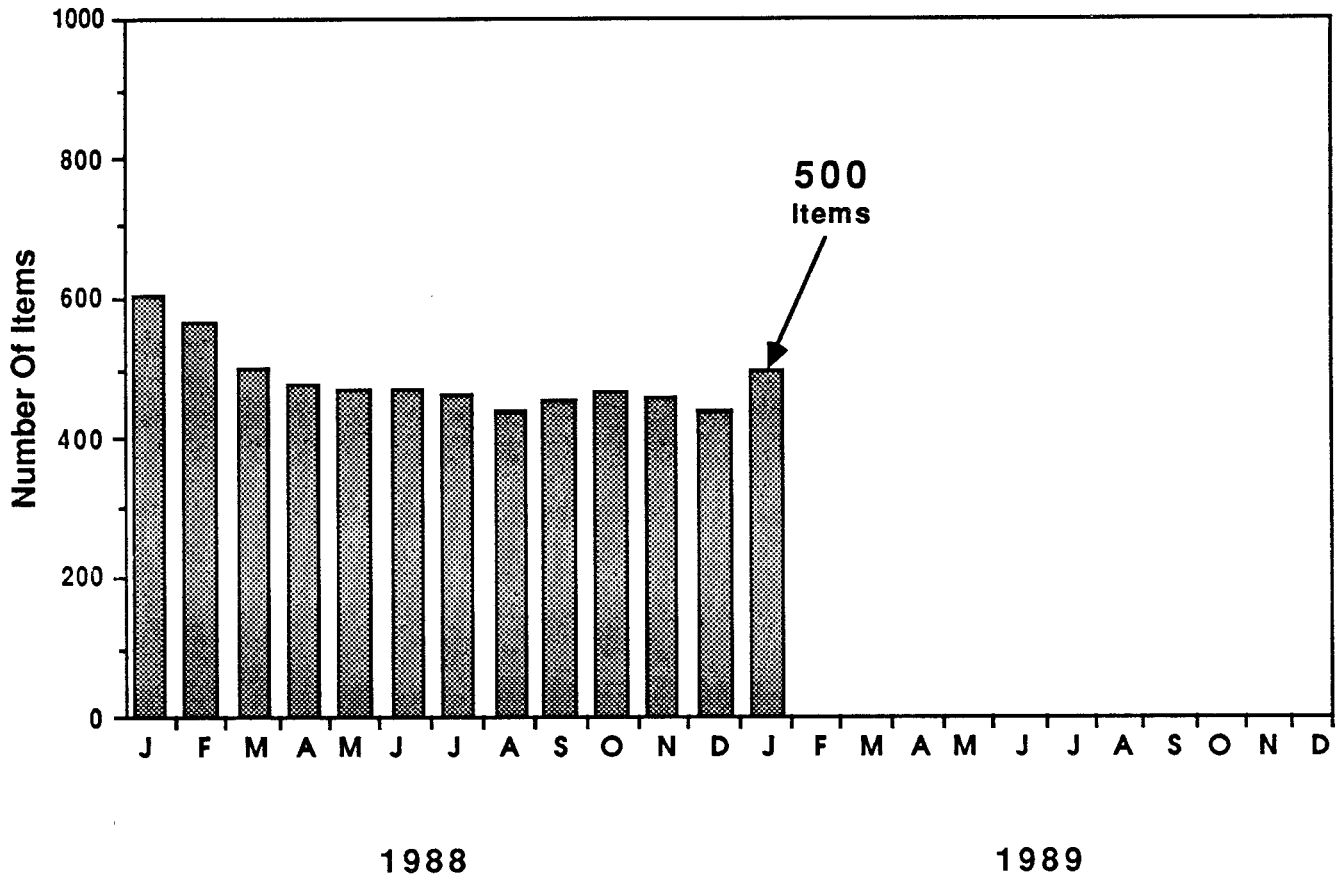
Planning for the S10C-1 Outage was in par with past outages. Planning efforts were aided by the thirty-day extension to P10B Operation.

This indicator is under review for revision.

Jan 1989	R. D. Redekopp	376-9668	Figure 12

Corrective Maintenance Backlog

Total Corrective Maintenance Backlog



Purpose

To monitor the overall material condition of the FFTF. Corrective maintenance is defined as activity that repairs, restores, or modifies plant equipment to restore it to the intended design condition or function.

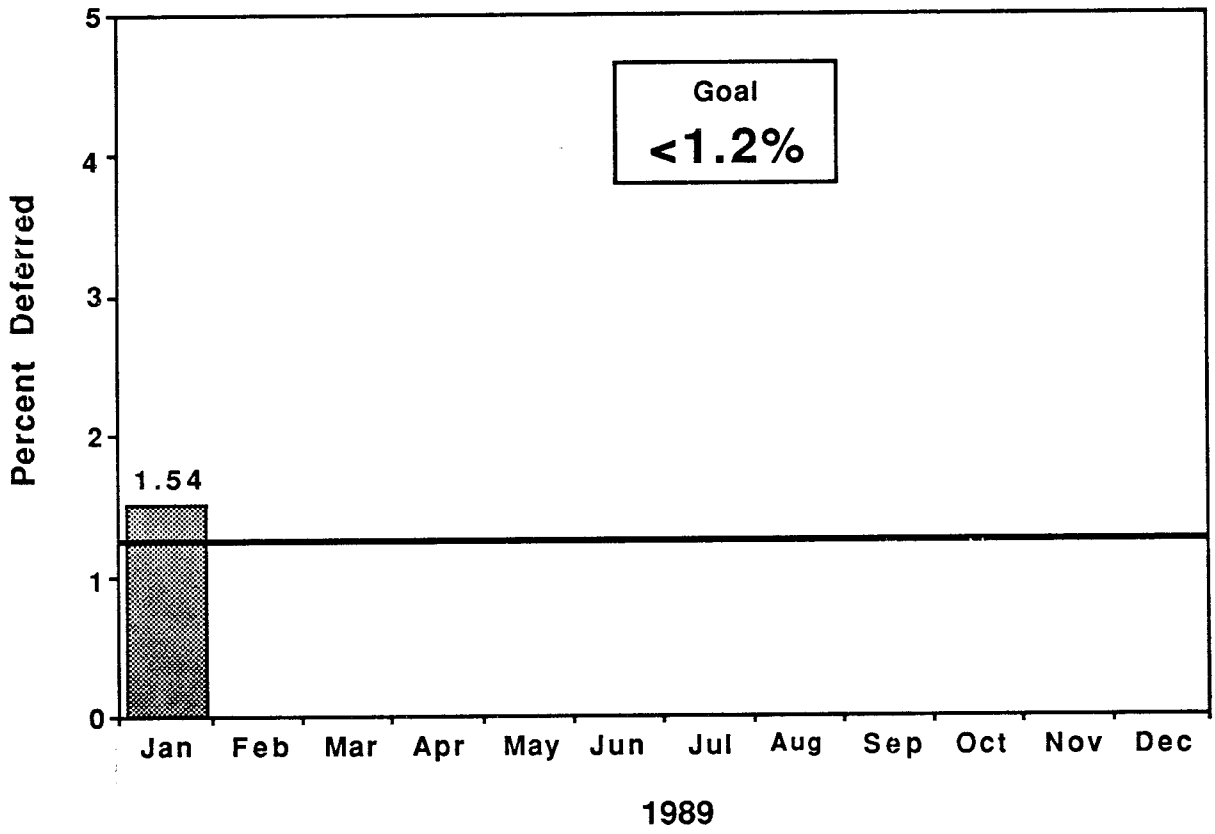
Assessment

The total corrective maintenance backlog increased to 500 items during the month of January. While this increase presently helps to reduce our percentage greater than three months old, it also means that from now on we will have a larger backlog to deal with.

Jan 1989	R. D. Redekopp	376-9668	Figure 13

Protective Maintenance Performance

Protective Maintenance Items Deferred



Purpose

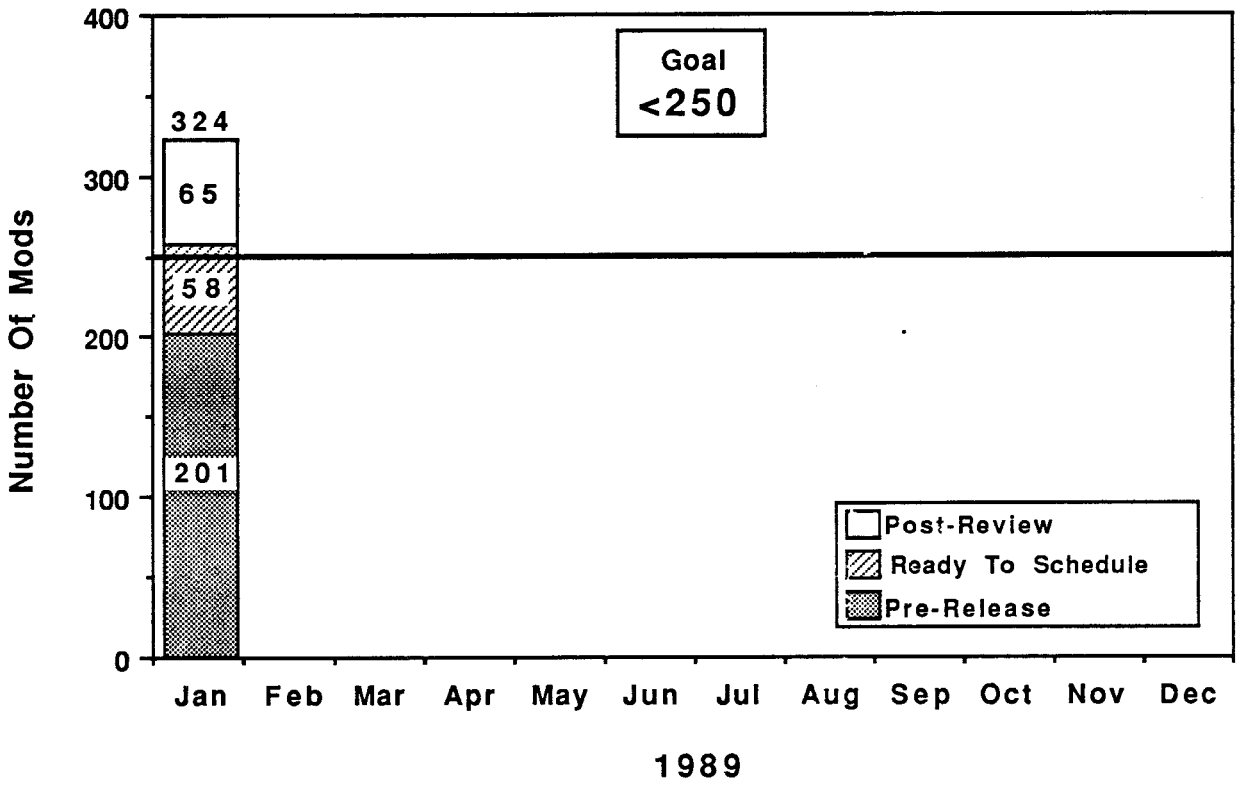
To monitor the number of protective maintenance (PMP and ICR) items that have been deferred. It illustrates the organization's ability to schedule and complete routine maintenance.

Assessment

The protective maintenance backlog has risen to 1.54%. This is down from 1.95% measured earlier in the month. Continued competition for craft and engineering resources with major FFTF projects, such as ILRT preparations and Fusion MOTA work, are the prime contributors in this upswing. An increased effort by FFTF Work Control is currently in progress to reduce engineering involvement.

Jan 1989	R. D. Redekopp	376-9668	Figure 14

Modification Status



Purpose

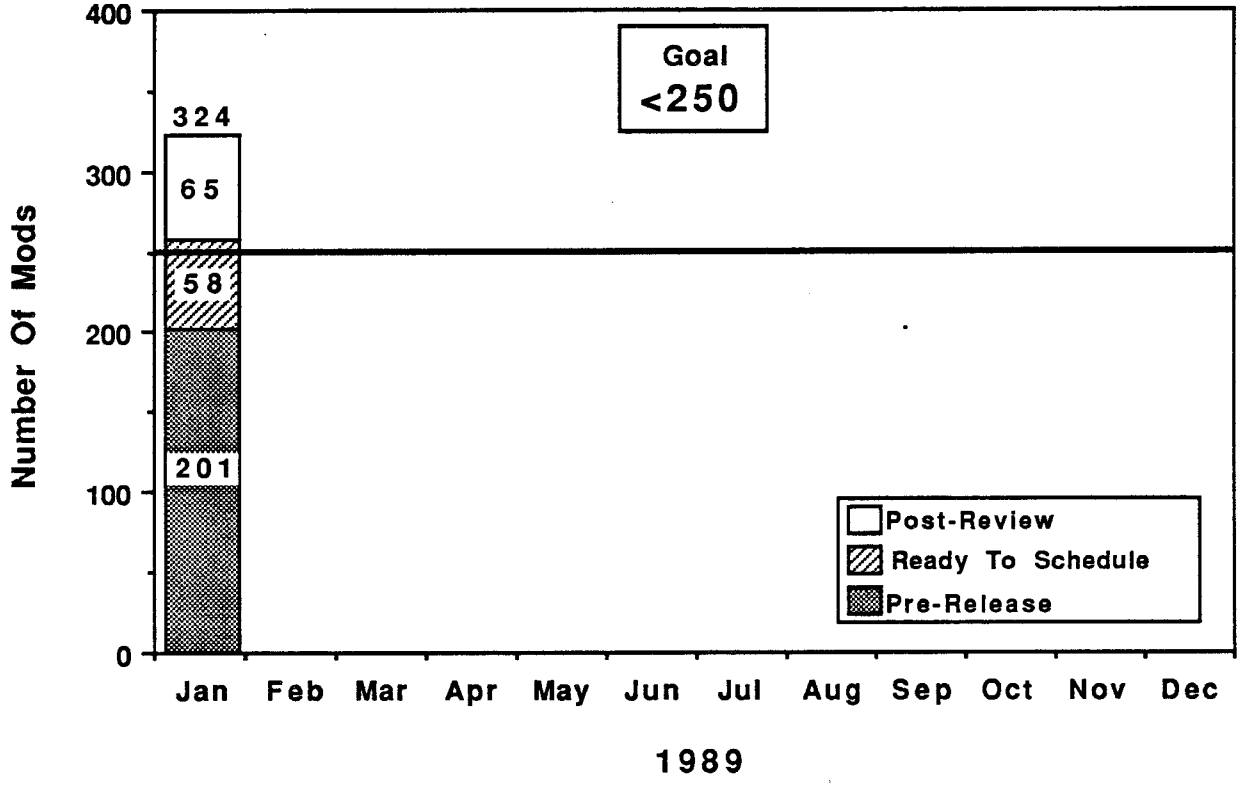
To monitor the number of plant modifications that are active in the Plant Tracking System (PTS). It illustrates the organization's ability to design, implement and closeout changes in the plant.

Assessment

The total number of outstanding modifications increased during January. A new goal has been set at <250 modification packages outstanding. This area needs attention in order to accomplish this goal.

Jan 1989	R. D. Redekopp	376-9668	Figure 15

Modification Status



Purpose

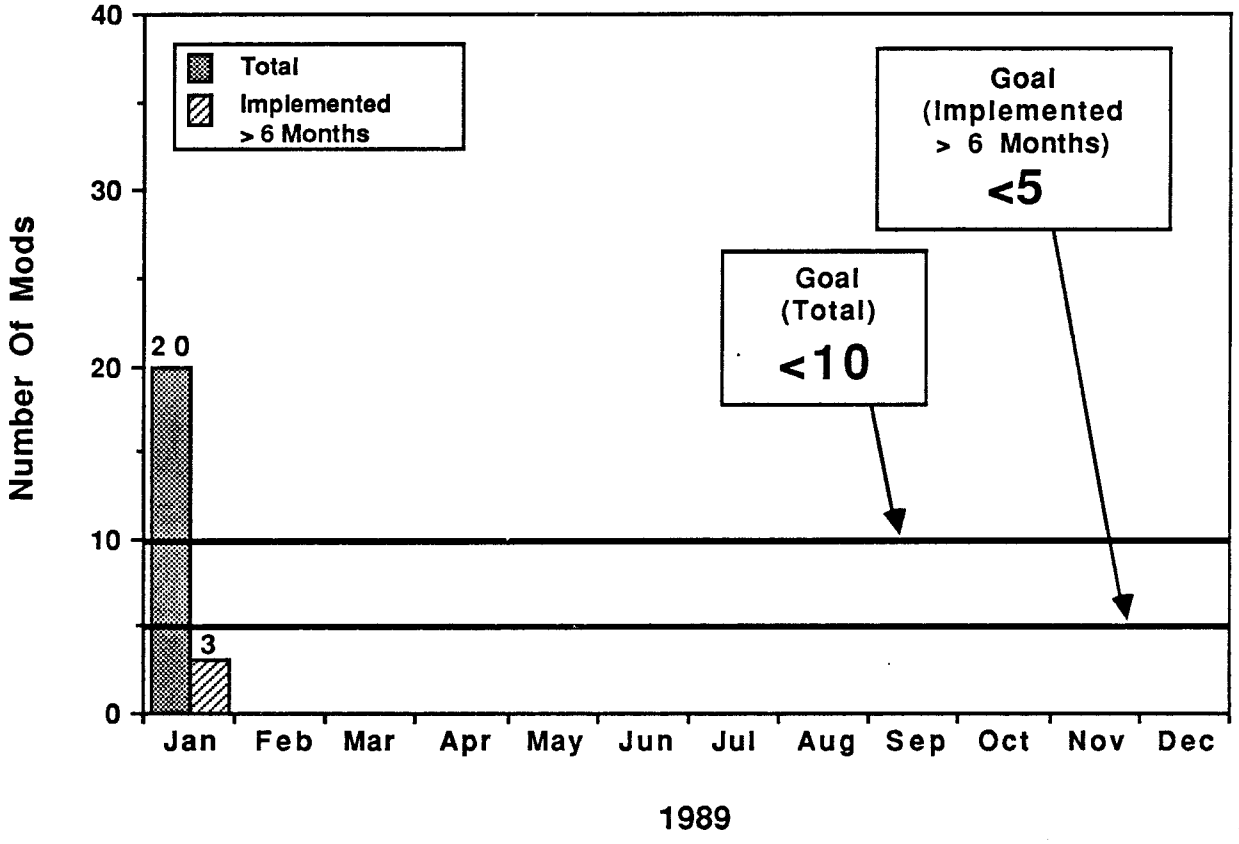
To monitor the number of plant modifications that are active in the Plant Tracking System (PTS). It illustrates the organization's ability to design, implement and closeout changes in the plant.

Assessment

The total number of outstanding modifications increased during January. A new goal has been set at <250 modification packages outstanding. This area needs attention in order to accomplish this goal.

Jan 1989	R. D. Redekopp	376-9668	Figure 15

Temporary Modification Status



Purpose

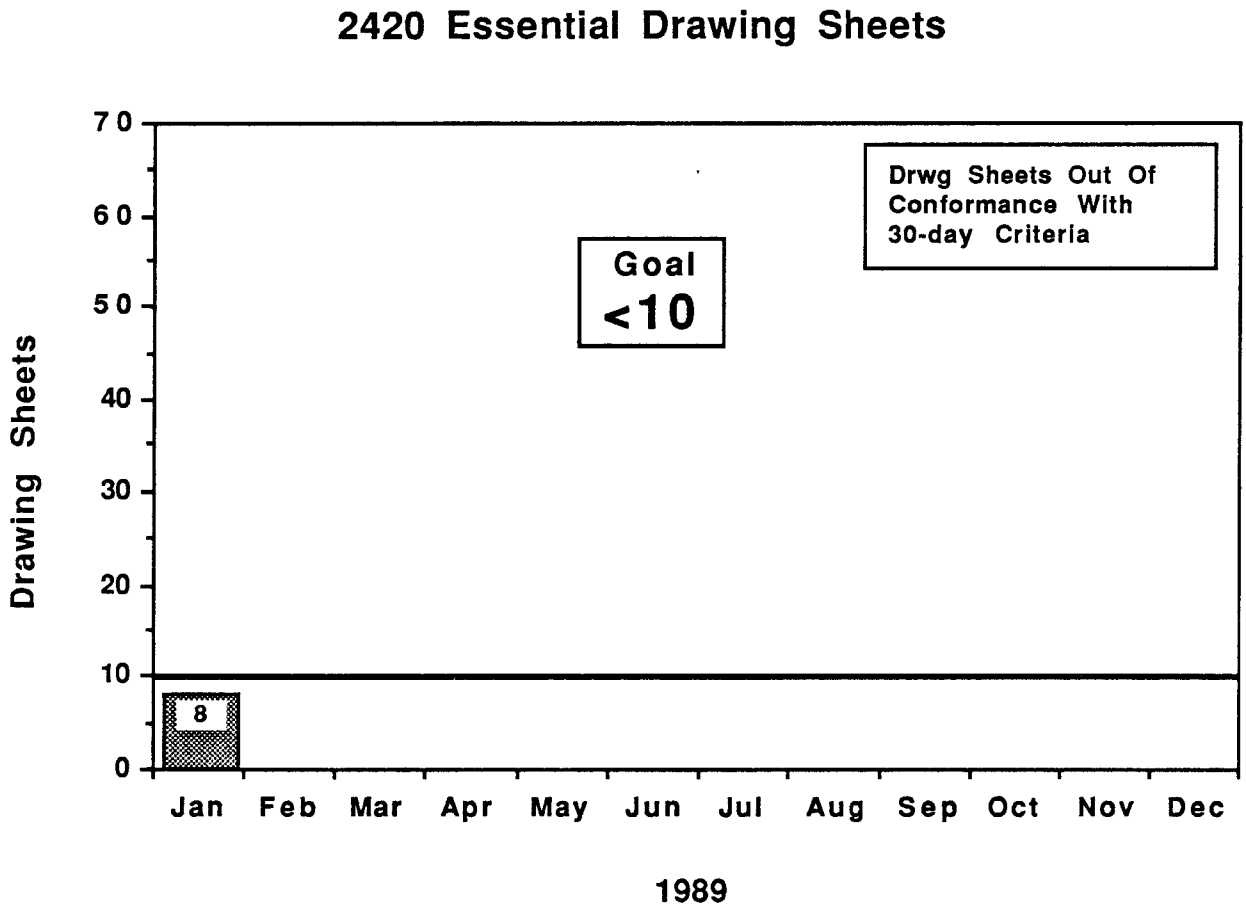
To monitor the number of modifications that are not permanent. It also monitors the organization's ability to complete the documentation and provide permanent changes to the FFTF.

Assessment

The total number of temporary modifications has continued to climb. The increase is due to eleven temporary modifications being readied for ILRT in S11A.

Jan 1989	R. D. Redekopp	376-9668	Figure 16

Essential Drawing Status



Purpose

To monitor the number of essential drawing sheets on which changes have not been incorporated within thirty working days after completion of the field work package.

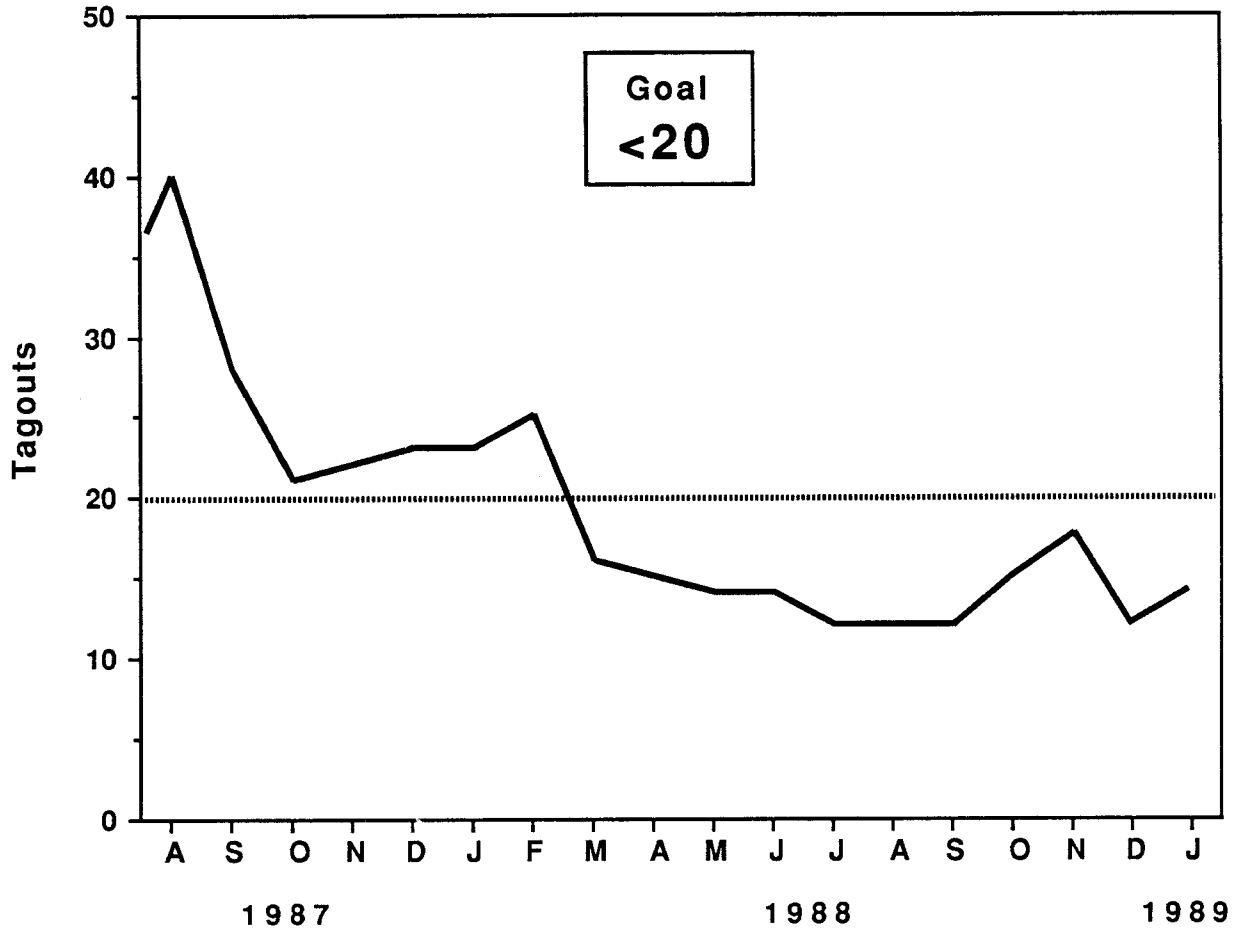
Assessment

It appears that a working level of 5 sheets is a normal backlog. A target to maintain the month to month level less than 10 sheets is reasonable.

Jan 1989	J. B. Waldo	376-0400	Figure 17

Tagouts

Tagouts Greater Than Six Months Old



Purpose

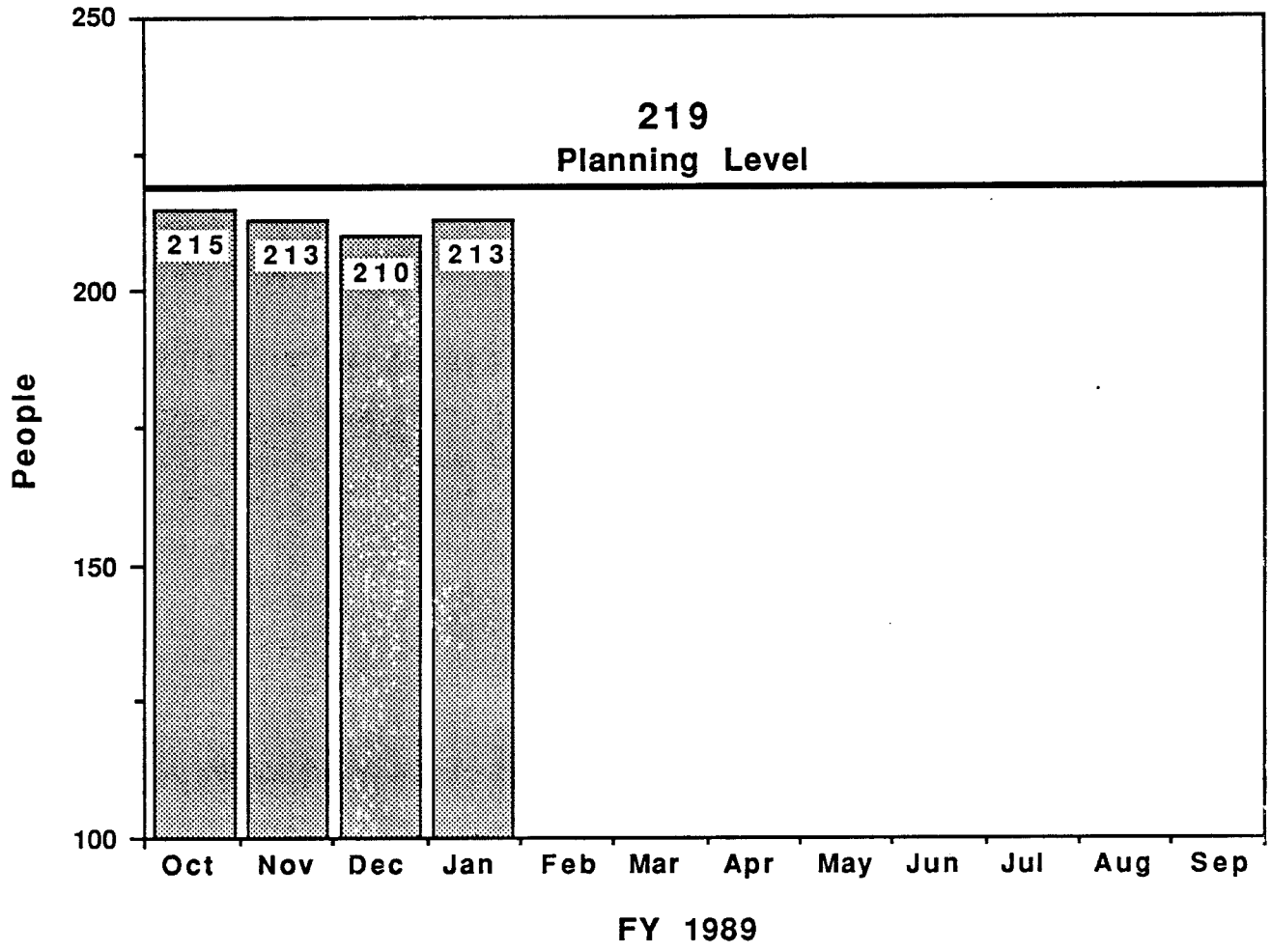
To monitor tagouts which have been in place for six months or longer. This is an indicator of the plant equipment which has been available or in reduced status for at least six months.

Assessment

The number of tagouts in place for six months or longer during January was 14.

Jan 1989	D. J. Swaim	376-0604	Figure 18

Direct Staffing



Purpose

To monitor the number of direct staff. The number of direct staff is obtained from monthly manpower reports.

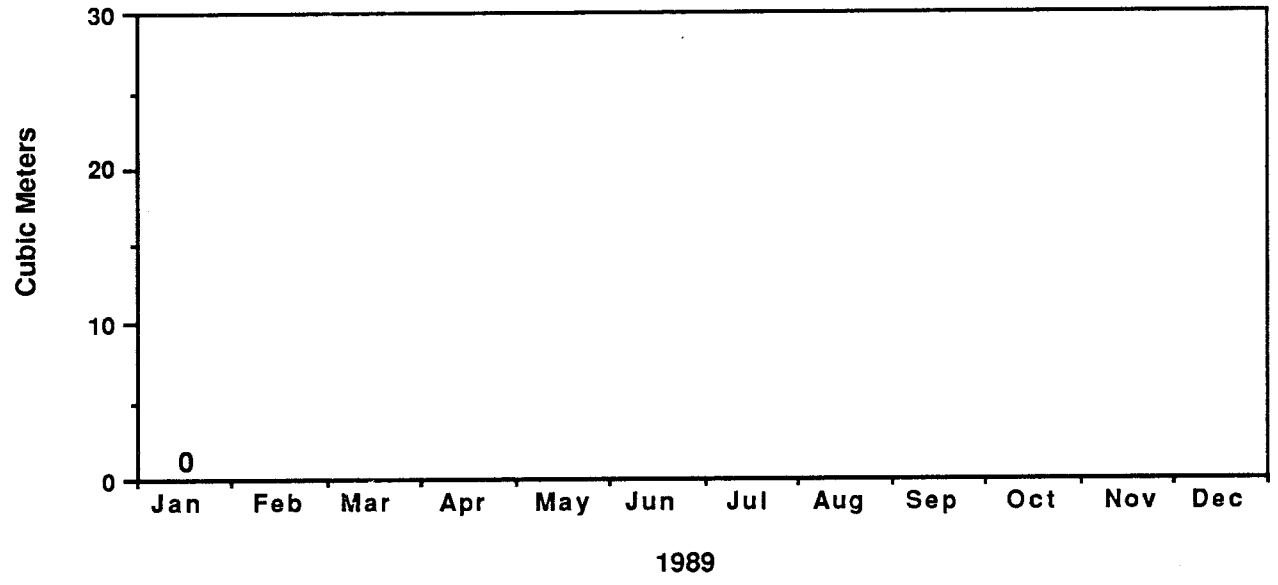
Assessment

The number of FFTF direct staff remained essentially the same through January, slightly below the planning level.

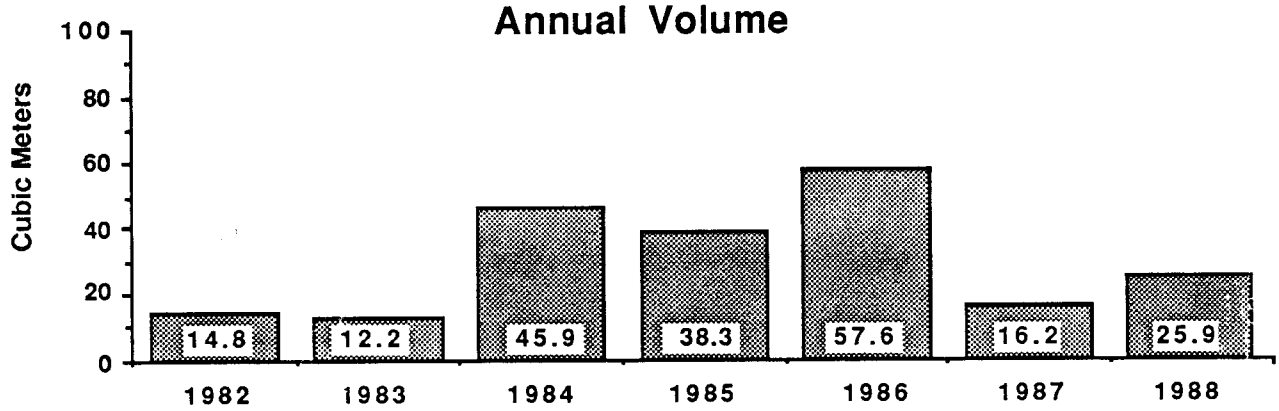
Jan 1989	J. E. Truax	376-0758	Figure 19

Solid Radioactive Waste

Monthly Volume



Annual Volume



Purpose

To monitor the volume of solid radioactive waste that is shipped off the FFTF site. Solid radioactive waste generated from the FFTF, IEM cell, and MASF are included in the totals.

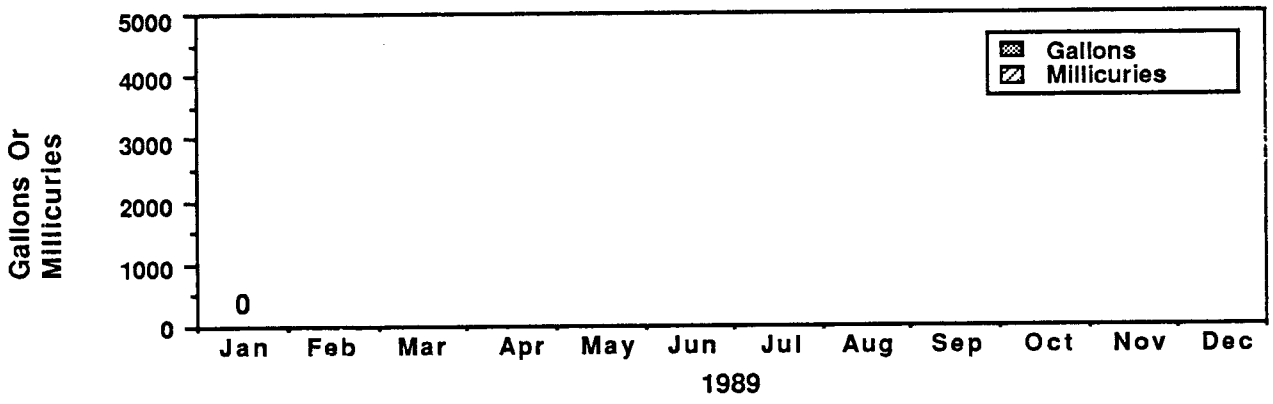
Assessment

There were no shipments of solid radioactive waste during the month of January.

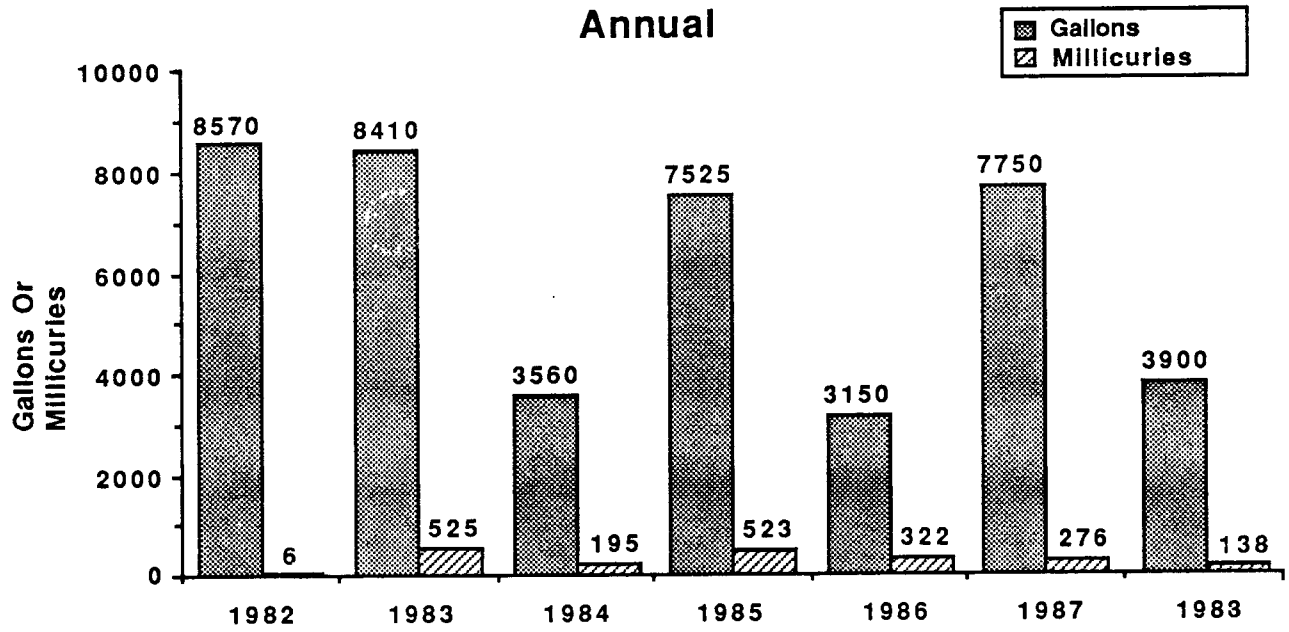
Jan 1989	D. J. Swaim	376-0604	Figure 21

Liquid Radioactive Waste

Monthly



Annual



Purpose

To monitor the volume of liquid radioactive waste shipped from storage tank T-103 to the railroad tank car for shipment off the FFTF site.

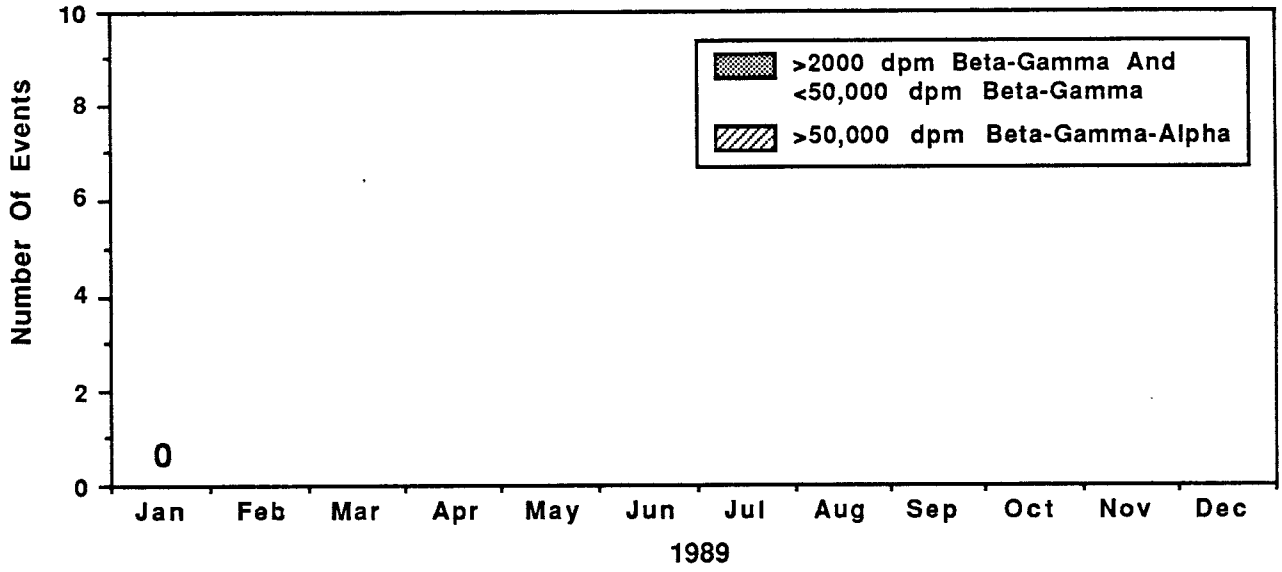
Assessment

There were no shipments of liquid radioactive waste during the month of January.

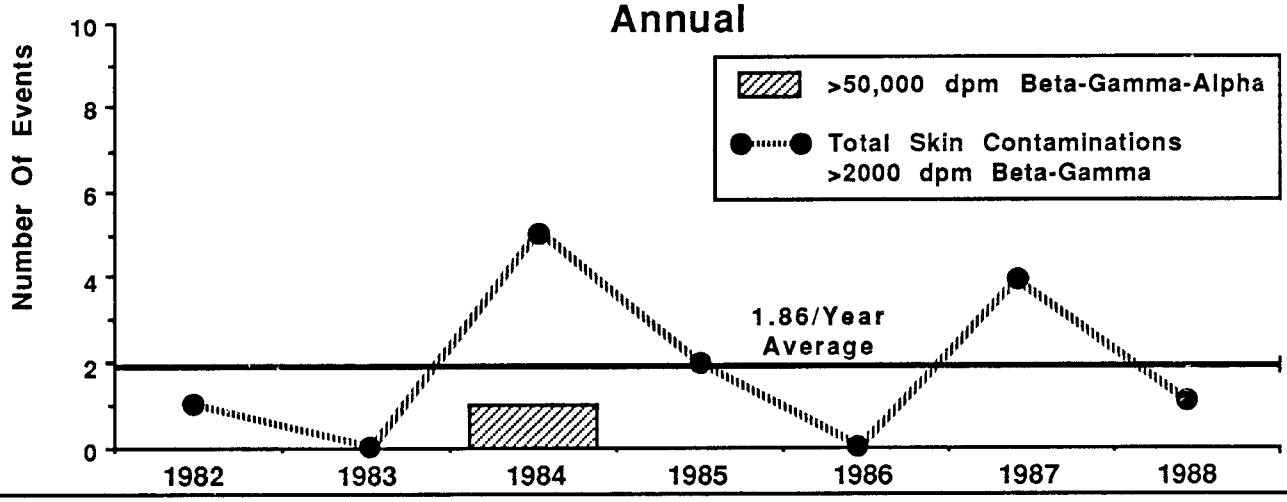
Jan 1989	D. J. Swaim	376-0604	Figure 22

Skin Contaminations

Monthly



Annual



Purpose

To monitor the number of recordable and significant (reportable) skin contamination events. A recordable skin contamination event is any event with detectable contamination levels above 2000 dpm/ probe area beta-gamma and/or 500 dpm/probe area alpha (not to include radon/thoron isotopes). A significant (reportable) skin contamination event is any event with detectable contamination levels above 50,000 dpm/probe area beta-gamma-alpha.

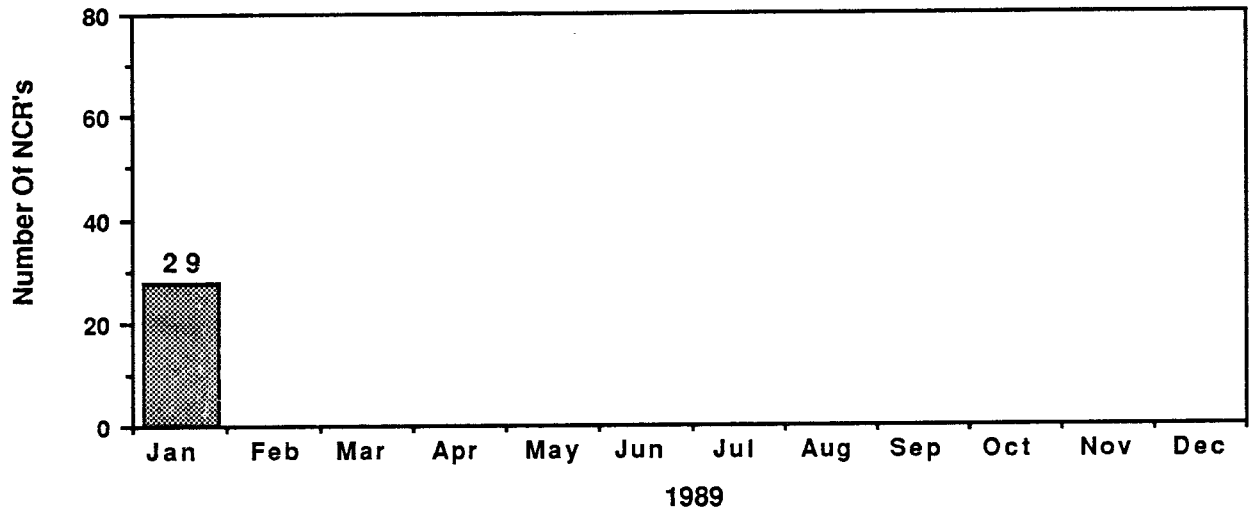
Assessment

There were no skin contamination events in the 400 area during the month of January.

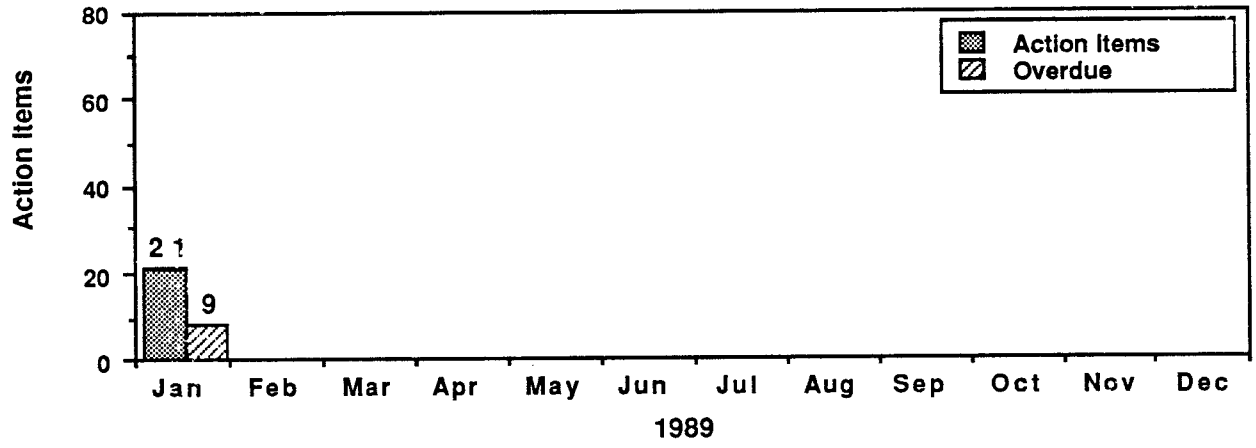
Jan 1989	R. L. Watts	376-3111	Figure 23

Safety/Quality Commitments

Nonconformance Reports



Action Items



Purpose

To monitor the number of NonConformance Reports (NCR) and action items resulting from reportable events, critiques, and UOR's. The number of overdue action items is also monitored to measure responsiveness to completing identified action items.

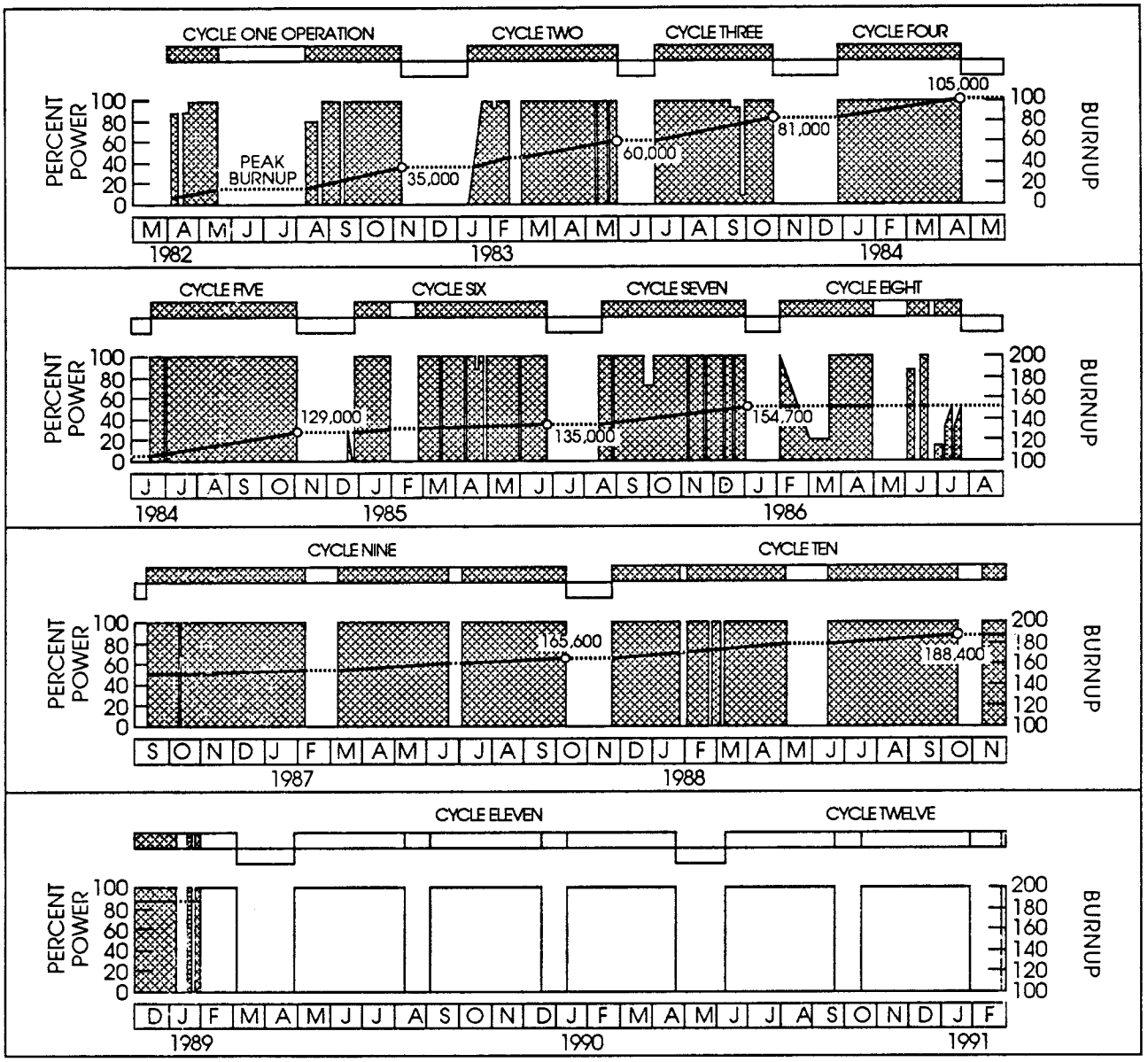
Assessment

The number of open NCR's increased from 26 in December to 29 in January. 1988's average number of open NCR's was 26. The high was 35 with a low of 22.

The total number of action items in January decreased to 21. 1988's average was 33 with a high of 48 and a low of 26. The number of overdue action items decreased to nine in January. 1988's average of overdue action items numbered 13 with a high of 29 and a low of three.

Jan 1989	J. E. Truax	376-1805	Figure 24

FFTF Operating Histogram

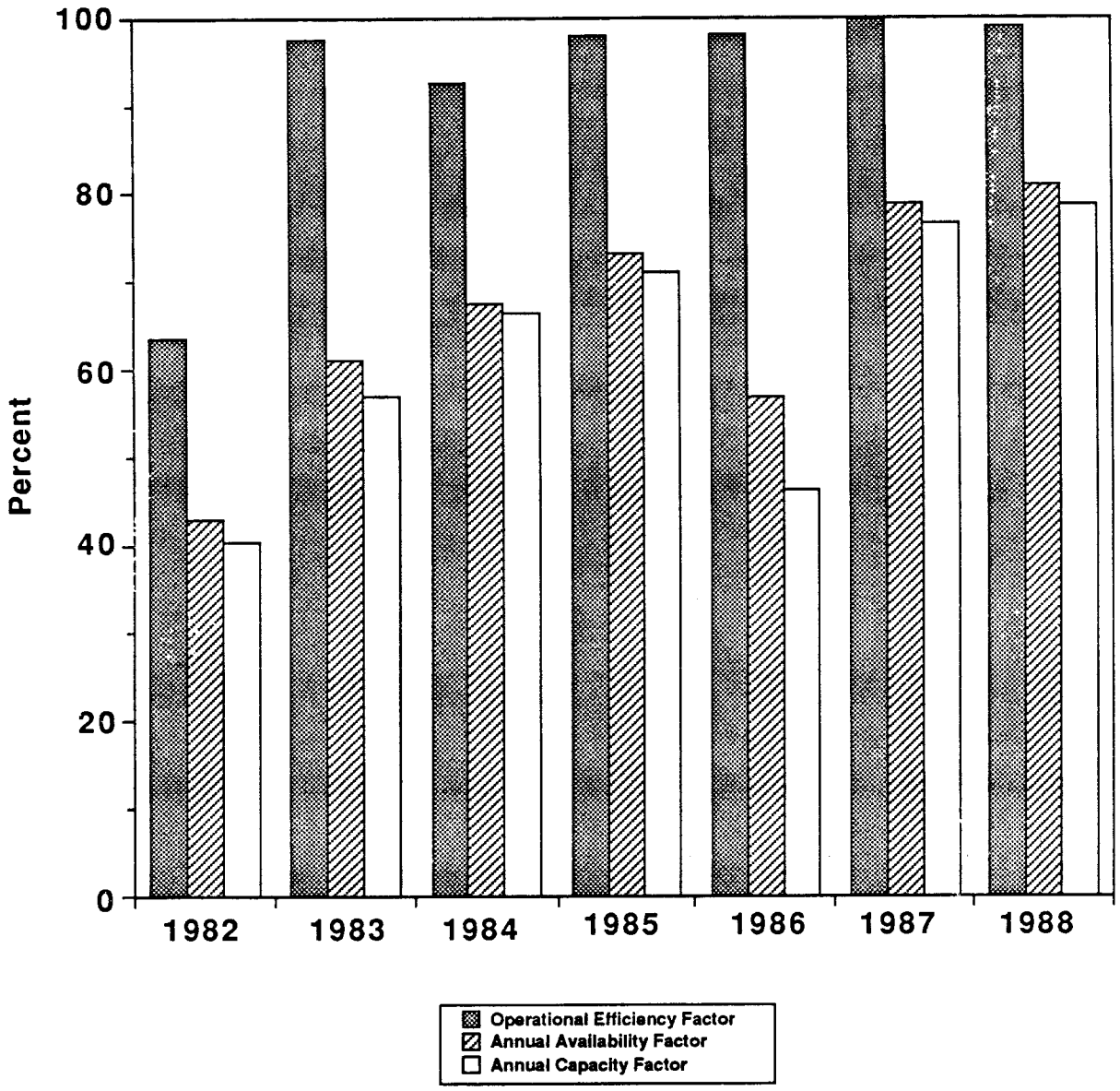


Operating Statistics

	CYCLE 1	CYCLE 2	CYCLE 3	CYCLE 4	CYCLE 5	CYCLE 6	CYCLE 7	CYCLE 8	CYCLE 9	CYCLE 10 (1/31/89)
EFPD FOR CYCLE:	101.5	100.5	101.5	109.5	122.7	134.0	122.8	63.0	341.8	344.7
TOTAL PLANT EFPD AT END OF CYCLE:	134.3	234.8	336.3	445.8	568.5	702.5	825.3	888.3	1230.1	1574.8
CYCLE CAPACITY FACTOR (%):	50.3	83.1	93.5	99.5	93.5	74.9	90.3	38.9	86.6	78.3
AVAILABILITY FACTOR (%):	53.0	90.6	99.0	100.0	94.6	78.5	94.6	57.9	89.6	81.9
NUMBER OF EXPERIMENTS:	61	64	57	51	51	41	31	19	44	34
MAXIMUM FUEL BURNUP AT END OF CYCLE (MWd/MT):	35,000	60,000	81,000	105,000	129,000	135,000	154,700	154,700	165,600	188,400

Jan 1989	J. E. Truax	376-0758	Figure 25

Annual Operational Performance



	1982*	1983	1984	1985	1986	1987	1988
CAPACITY FACTOR (%):	40.5	56.9	66.4	71.0	46.2	76.5	78.5
AVAILABILITY FACTOR (%):	42.8	61.1	67.6	73.0	56.8	78.7	81.2
OPERATIONAL EFFICIENCY FACTOR (%):	63.5	97.6	92.6	98.0	98.1	100.0	98.9

* Reporting began at start of Cycle 1 on April 16, 1982

Jan 1989	J. E. Truax	376-0758	Figure 26

DISTRIBUTION

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R. A. Bennett	N2-32	R. C. Nichols	B3-02
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January 1989