Department of Energy
Washington, DC 20585

September 5, 2003

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, DC 20004-2901

Dear Mr. Chairman:

Attached is the report, "Analysis and Trending of Suspect/Counterfeit Items at Department of Energy Facilities." This report fulfills a commitment to the Board to develop a semi-annual suspect/counterfeit items (SC/I) report documenting actions taken by the Department in response to potential S/CI issues.

If you have any questions, please contact me at 202-586-6151, or have your staff contact Frank Tooper at 202-586-1772.

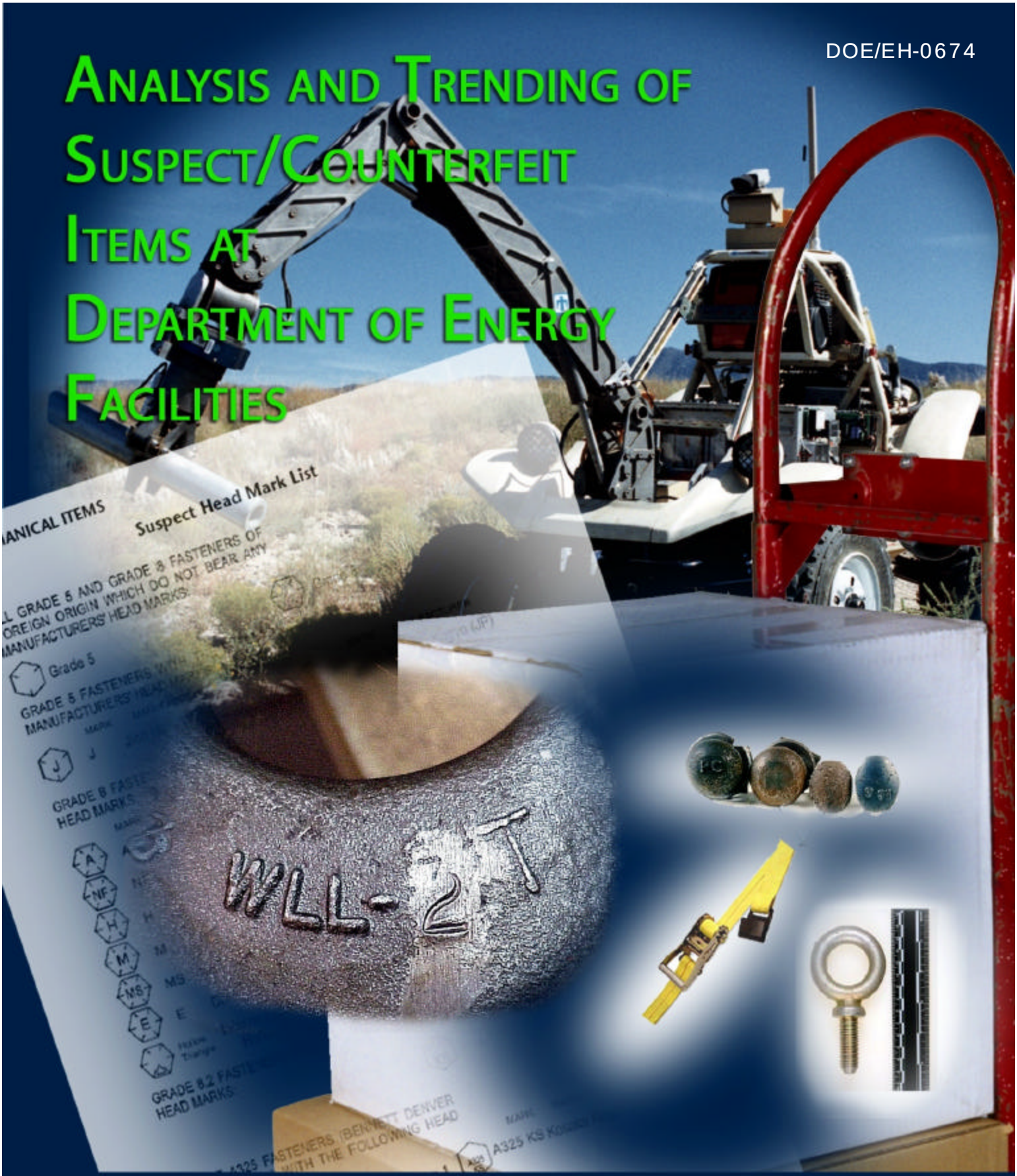
Beverly A. Cook
Assistant Secretary
Environment, Safety and Health

Attachment

cc:
M. Whitaker, DR-1

DOE/EH-0674

Analysis and Trending of Suspect/Counterfeit Items at Department of Energy Facilities



Office of Corporate Performance Assessment
Environment, Safety and Health
August 2003

DOE/EH-0674

ANALYSIS AND TRENDING OF SUSPECT/COUNTERFEIT ITEMS AT DEPARTMENT OF ENERGY FACILITIES

August 2003

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REVISIONS TO THE REPORT

The changes made to this report since the last report was issued in April 2003 (covering the period January 1 through December 31, 2002) are as follows:

1. The ORPS report events and analyses have been added from January 1, 2003, through June 30, 2003.

2. New defective items from January 1, 2003, through June 30, 2003 have been added to the report.

3. Appendix B – Suspect Components List, last revised for the July 1997 semiannual report has been removed. The list has been archived to the Office of Environment, Safety and Health (EH) web site (http://www.eh.doe.gov/portal/home.htm) for S/CI.

DEFINITIONS

Counterfeit (Part or Item): A counterfeit item is a suspect item that is a copy or substitute without legal right or authority to do so or one whose material, performance, or characteristics are knowingly misrepresented by the vendor, supplier, distributor, or manufacturer. An item that does not conform to established requirements is not normally considered an S/CI if the nonconformity results from one or more of the following conditions, which should be controlled by site procedures as nonconforming items: defects resulting from inadequate design or production quality control; damage during shipping, handling, or storage; improper installation; deterioration during service; degradation during removal; failure resulting from aging or misapplication; or other controllable causes. (Reference: DOE G 440.1-6, *Implementation Guide for use with Suspect/Counterfeit Items Requirements of DOE O 440.1*, Worker Protection Management; 10 CFR 830.120; and DOE O 414.1A, *Quality Assurance*, July 2001).

Defective: A defective item or material is any item or material that does not meet the commercial standard or procurement requirements as defined by catalogues, proposals, procurement specifications, design specifications, testing requirements, contracts, or the like. It does not include parts or services that fail or are otherwise found to be inadequate because of random failures or errors within the accepted reliability level (Reference: DOE M 231.1-2, *Occurrence Reporting and Processing of Operations Information*, August 2003).

Suspect (Part or Item): A suspect item is one in which there is an indication by visual inspection, testing, or other information that it may not conform to established Government- or industry-accepted specifications or national consensus standards (Reference: DOE G 440.1-6, *Implementation Guide for use with Suspect/Counterfeit Items Requirements of DOE O 440.1*, Worker Protection Management; 10 CFR 830.120; and DOE 414.1A.6C, *Quality Assurance*, July 2001).

ACRONYMS

ALO	Albuquerque Operations Office
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
BXA	Bureau of Export Administration
CFR	Code of Federal Regulations
CH	Chicago Operations Office
CM/UP	Counterfeit Material/Unauthorized Product
D&D	Decontamination and Decommissioning
DISC	Defense Industrial Supply Center
DMSMS	Diminishing Manufacturing Sources and Material Shortage
DNFSB	Defense Nuclear Facilities Safety Board
DOE	Department of Energy
DP	Office of Defense Programs (now NNSA)
EM	Office of Environmental Management
EPRI	Electric Power Research Institute
FE	Office of Fossil Energy
FI	Office of Field Integration
FRAM	Functions, Responsibilities, and Authorities Manual
FQA	Fastener Quality Act
GIDEP	Government-Industry Data Exchange Program
HQ	Headquarters
IACC	International Anti-Counterfeiting Coalition
ID	Idaho Operations Office
IFI	Industrial Fasteners Institute
LANL	Los Alamos National Laboratory
NAVSUP	Naval Supply Systems Command
NE	Office of Nuclear Energy, Science and Technology
NIST	National Institute of Standards and Technology
NNSA	National Nuclear Security Administration
NRC	Nuclear Regulatory Commission
OAK	Oakland Operations Office
OH	Ohio Field Office
ORBITT	Occurrence Reporting Binned Information Trending Tool
ORO	Oak Ridge Operations Office
ORPS	Occurrence Reporting and Processing System
PSO	Program Secretarial Officer
QA	Quality Assurance
QAWG	Quality Assurance Working Group
QTRC	Quality Training Resource Center
RFO	Rocky Flats Field Office
RL	Richland Operations Office
RP	Hanford Office of River Protection
RW	Office of Civilian Radioactive Waste Management

SC	Office of Science
S/C	Suspect/Counterfeit
S/CI	Suspect/Counterfeit Item
SMTG	Senior Managers Task Group
SQIG	Supplier Quality Information Group
SR	Savannah River Operations Office
SSCs	Systems, Structures, and Components
YMP	Yucca Mountain Project Office

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EXECUTIVE SUMMARY

This report was prepared by the Office of Environment, Safety and Health (EH), to disseminate information regarding Department of Energy (DOE) suspect/counterfeit items (S/CI) and defective items. As part of a new Departmental process, the Office of Corporate Performance Assessment (EH-3) now routinely collects, screens, and disseminates information on S/CI and defective items that could potentially impact operations at DOE facilities.

This semiannual report includes data on S/CI events reported in the Occurrence Reporting and Processing System (ORPS) between January 1, 1991, and June 30, 2003. The report provides the DOE complex with general information, trends and analyses about S/CI and defective items and related quality assurance/procurement issues. The following is a summary of recent S/CI and defective item information:

? S/CI events reported during the first six months of 2003 (26) continue to be reported at a rate similar to 2002 (54).

? There were no injuries or near misses resulting from S/CI within the DOE complex.

? While the number of S/CI reports has decreased since the peak of 144 in 1994, the number of S/CI events reported has remained relatively constant (approximately 55 per year) since 2000.

? During the previous reporting period from January 1991 through December 2002, ORPS reports indicated that 92% of S/CI pertained to fasteners. During the current reporting period, 81% of the reported S/CI events pertain to fasteners.

? During the previous reporting period from January 1991 through December 2002, approximately 74% of all S/CI were found subsequent to installation. During the current reporting period, this improved to 65% for the reported S/CI events pertaining to installed items.

The Office of Independent Oversight and Performance Assurance (OA) conducted a special study of the Department's management of S/CI, including a recent issue regarding improperly heat-treated aluminum. The OA report indicates that some S/CI processes were effective at some DOE sites. However, there were weaknesses in the S/CI processes at DOE Headquarters and most sites in a number of important areas including timeliness and thoroughness in acting on S/CI information.

This report is also accessible on the EH web site at http://tis.eh.doe.gov/portal/home.htm.

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1.0 INTRODUCTION

1.1 Background

The problem of suspect/counterfeit items (S/CI) delivered in place of quality parts is a continuing one. A key element in the characterization of S/CI is the intent of the manufacturer or distributor to misrepresent the item and consciously furnish false or altered documentation and/or hardware. The objective of the S/CI process is to avoid the introduction of S/CI into the Department of Energy (DOE)/National Nuclear Security Administration (NNSA) complex and, therefore, to alert buyers, inspectors, and end users to the S/CI problem and associated safety performance vulnerability.

DOE and other government agencies have been reporting S/CI since the early 1980s. For the most part, S/CI occurrences involve threaded fasteners; however, suspect/counterfeit circuit breakers and breaker test sets, motors, valves, electrical components, semiconductors, piping components, ventilation filters, eye-type sling hooks, and stainless steel wire rope, among others, have also been reported.

The cost and time associated with identifying S/CI within DOE facilities can vary dramatically. If S/CI are discovered in the procurement process, prior to or during actual delivery, the associated cost could be relatively moderate. At the opposite end of the spectrum, failure of a S/CI in a safety system application could generate unrecoverable losses and require huge expenditures of money and time for such items as repair, cleanup, medical and legal expenses, problem correction, and tracing the S/CI back through the installation/procurement process to its source.

With regard to new equipment, procurement specificity and design specifications are the first defense against S/CI. The second is vendor past performance and reputation. The third, inspection, can include examination of the documentation, partial visual inspection, complete visual inspection (including partial or complete disassembly), nondestructive testing, destructive testing of samples or replaceable parts, and various combinations of these investigative techniques.

The S/CI issue within the DOE complex cannot be ignored simply because no incidents have yet resulted in a serious consequence. To date, prior and ongoing actions by DOE have been sufficient to preclude vital equipment failures or injuries.

In a DOE memorandum dated January 2, 1996[1], the Inspector General's Office described its concerns that DOE had not yet assigned overall responsibility for addressing S/CI, and that DOE had not demonstrated a coordinated effort in this area. In June 1996, the Senior Managers' Task

[1] U.S. DOE Memorandum from J. Layton to the Deputy Secretary, *Assignment of Responsibility for Addressing Suspect/Counterfeit Products Issues*, January 1996.

Group (SMTG) on S/CI forwarded their final report[2], which provided recommendations to address the concerns expressed in the 1996 IG report and the January 2, 1996, memorandum.

The Defense Nuclear Facilities Safety Board (DNFSB) has also raised concerns over the Department's failure to implement an effective Quality Assurance Program, including S/CI. In the Deputy Secretary's March 18, 2003, letter[3] to the DNFSB, the Assistant Secretary for the Office of Environment, Safety and Health (EH) was assigned responsibility for identifying, evaluating, monitoring, managing, and resolving crosscutting safety issues. As part of this effort, EH has assumed responsibility for activities associated with S/CI or defective items from the DOE Quality Assurance Working Group (QAWG). The Office of Corporate Performance Assessment (EH-3) now routinely collects, screens, dispositions, and communicates information on S/CI or defective items that could potentially impact operations at DOE facilities.

At the direction of the Deputy Secretary of Energy, the Office of Independent Oversight and Performance Assurance (OA) conducted a special study[4] of the Department's management of S/CI. The OA report indicates that some S/CI processes were effective at some DOE sites. However, there were weaknesses in the S/CI processes at DOE Headquarters and most sites in a number of important areas including timeliness and thoroughness in acting on S/CI.

1.2 Purpose

The purpose of this report is to update S/CI summary information and associated trends for newly identified S/CI at DOE facilities. Trends reported include the distribution of S/CI related to fasteners and non-fasteners, safety and non-safety systems (installed and uninstalled), and immediate and programmatic action. For the purpose of this report, "safety system" and "critical application" are considered equivalent terms.

1.3 Scope, Approach, and Data Collection

This report provides historical data and trend information regarding discovery and disposition of S/CI across the DOE complex. The Occurrence Reporting and Processing System (ORPS) database was used to search for reported events involving S/CI. The information from the search results has been used for trending and analysis of S/CI for the period from January 1994 through June 2003. Section 2 documents the current status of S/CI in DOE facilities.

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[2] U. S. Department of Energy, *Resolution of Outstanding Issues Identified from Inspector General Report DOE/IG-0304: Concerns with the Effectiveness of the Department' s Quality Assurance Program Regarding Production Substitution Issues, November 1991*, June 21, 1996.

[3] Letter, K. McSlarrow to Chairman of DNFSB, *Responsibilities for Increased Monitoring of Progress on Meeting Department of Energy (DOE) Commitments to the Defense Nuclear Facilities Safety Board*, March 18, 2003.

[4] *Independent Oversight Special Study of the Department of Energy's Management of Suspect/Counterfeit Items*, August 2003.

2.0 CURRENT STATUS OF S/CI IN DOE FACILITIES

2.1 Annual Distribution of S/CI

Since the requirement to report S/CI events, a total of 728 events have been reported. This section addresses S/CI data reported in ORPS from January 1994 through June 2003. Twenty-six S/CI ORPS reports were issued during this reporting period.

Annual Distribution of S/CI by DOE Program Office and Field/Operations Office

The distribution by Program Office (Figure 1) illustrates a peak in reported occurrences in 1994 following the 1992 Quality Alert Bulletin. There was a steady decrease in reported occurrences for 1995 through 1998. From 2000 to present, the S/CI rate has remained relatively consistent. The total number of events in the first half of 2003 (26) reflects a projected year-end total about the same as in 2002 (54). The higher current rate of S/CI events could be attributed to improved awareness of S/CI and continuing complex-wide S/CI training. Alternatively, this could illustrate continuing attempts by dishonest vendors to supply substandard parts and equipment to DOE.

Figure 1. Annual Distribution of S/CI Events by DOE Program Office

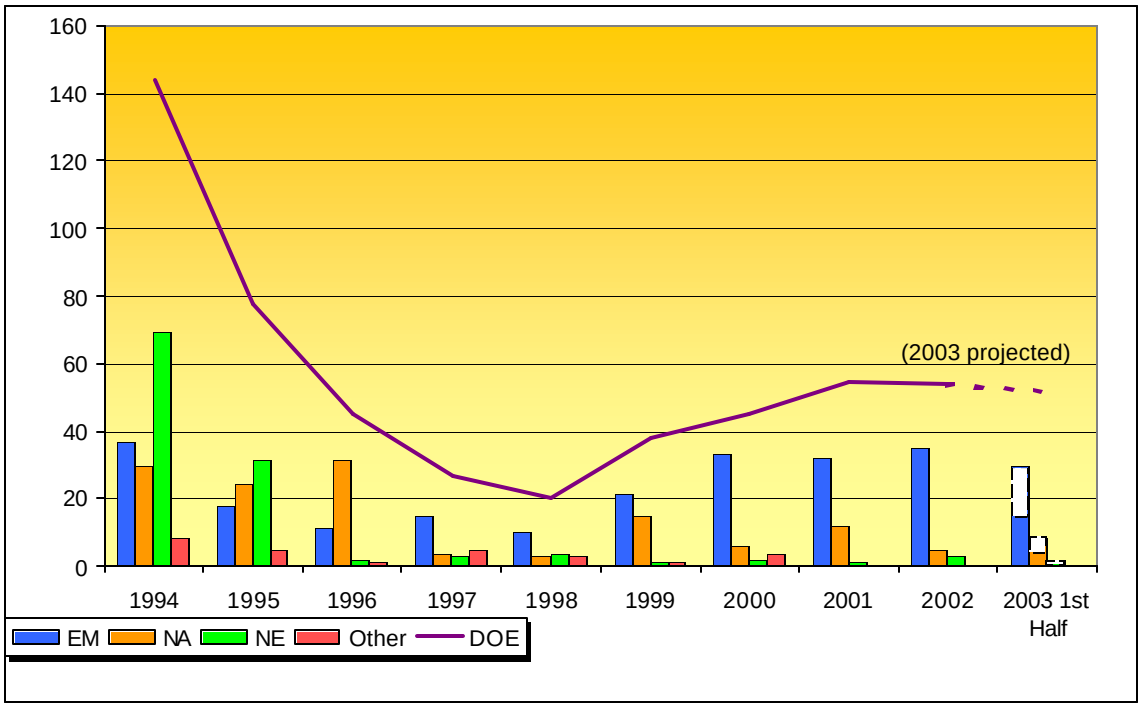
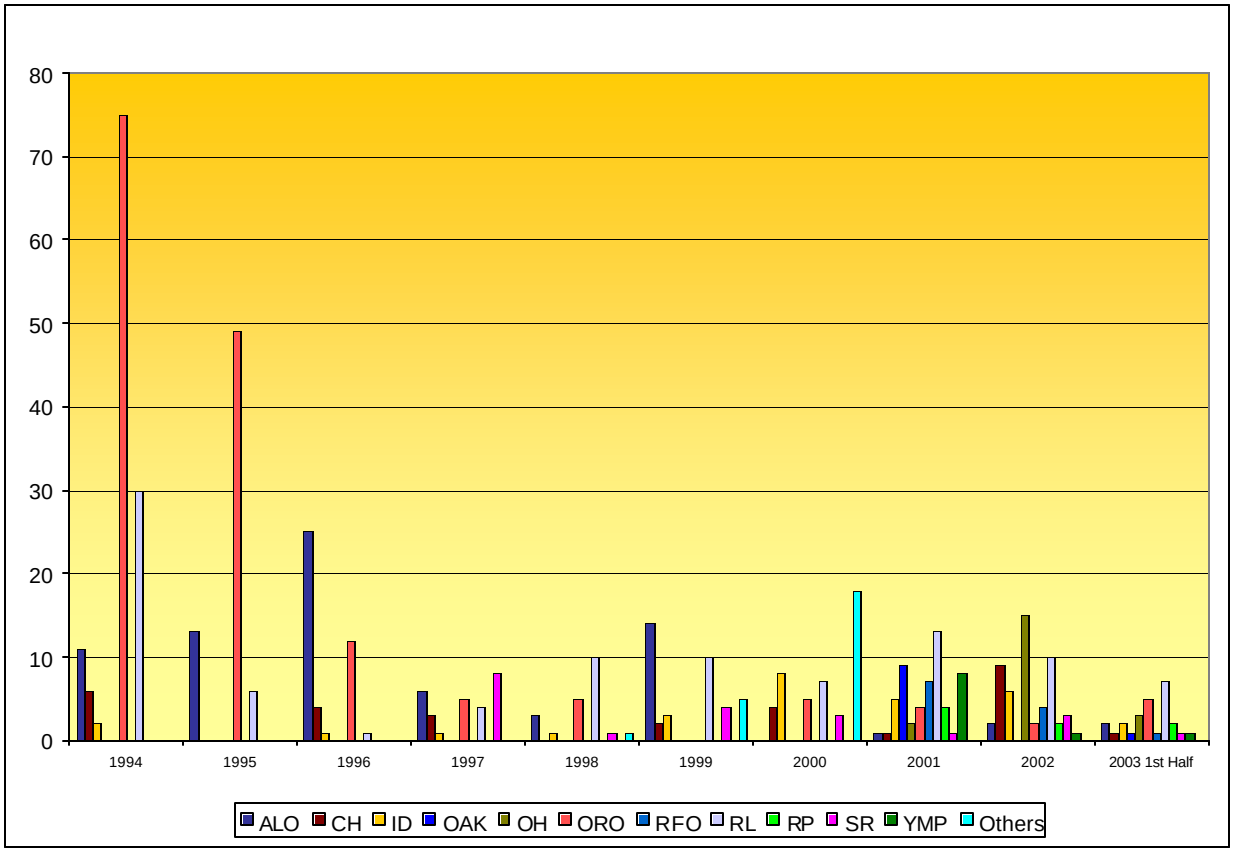


Figure 2. Annual Distribution of S/CI by DOE Field/Operations Office



2.2 Results from ORPS Database

The ORPS database was used to obtain information that could be used to draw conclusions on the current status of S/CI in DOE facilities, determine discovery methodologies and significant trends, and to perform event-specific analyses. The ORPS database contains over 50,000 reports that have been issued since January 1, 1991. Occurrence reports are issued according to three categories: Emergency, Unusual, and Off-Normal, as required by DOE Order 231.1A[5]. The ORPS database allows retrieval of detailed information for each occurrence report.

Following a review of the ORPS database and other relevant supplemental information relative to DOE S/CI and procurement/quality assurance issues, the following highlights were noted.

? S/CI events for the first half of 2003 (26) continue to be reported at a similar rate as in 2002 (54).

? There were no injuries or near misses resulting from S/CI within the DOE complex.

[5] DOE Order 231.1A, *Environment, Safety and Health Reporting*, August 19, 2003.

? While the number of S/CI reports has decreased since the peak of 144 in 1994, the number of S/CI reports has remained relatively constant (approximately 55 per year) since 2000.

? During the previous reporting period from January 1991 through December 2002, ORPS reports indicated that 92% of S/CI pertained to fasteners. During the current reporting period, 81% of the reported S/CI events pertain to fasteners.

? During the previous reporting period from January 1991 through December 2002, approximately 74% of all S/CI were found subsequent to installation. During the current reporting period, this improved to 65% for the reported S/CI events pertaining to installed items. This improvement is due, in part, to increased inspections at DOE facilities.

2.2.1 Trending and Analysis of S/CI Data

The following figures illustrate the results of ORPS database reviews for the three selection criteria (Program Office, Operations/Field Office, and Activity). These figures reflect data for the period from January 1, 2003 through June 30, 2003, and for 2002 for comparison.

Distribution of Recent S/CI by Program Office

When sorted by Program Office, Environmental Management (EM) accounted for 58% of the reported occurrences, Science (SC) accounted for 19% of the reported occurrences, National Nuclear Security Administration (NA) accounted for 15% of the reported occurrences, and Civilian Radioactive Waste Management (RW) and Nuclear Energy (NE) each accounted for 4% of the reported occurrences. None of the other Program Offices reported any S/CI events. Figure 3 shows this breakdown by Program Office for 2003. The results are similar to the S/CI events reported by Program Office in 2002 as shown in Figure 4.

Figure 3. S/CIs by Program Office – 2003 First Half (ORPS only)

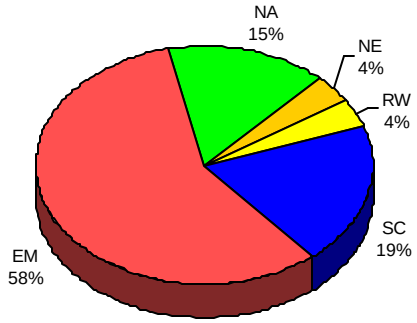
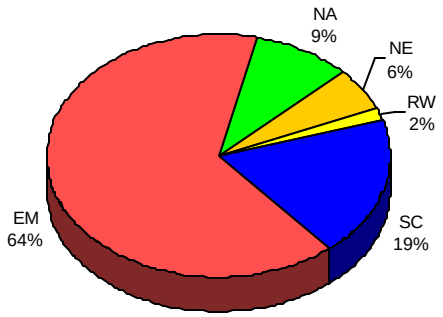


Figure 4. S/CIs by Program Office – 2002 (ORPS only)



Distribution of Recent S/CI by Operations/Field Office

The distribution of S/CI for the first six months of 2003 by Operations/Field Offices was as follows: Richland Operations Office (RL) 26%; Oak Ridge Operations Office 18%; Ohio Field Office (OH) 12%; Idaho Operations Office (ID) 8%; River Protection Office (RP) 8%, Albuquerque Operations Office (ALO) 8%; and other remaining Offices combined 20%. Figure 5 displays these results. Figure 6 illustrates the S/CIs by Operations/Field Office for 2002.

Figure 5. S/CI by Operations/Field Office – First Half 2003 (ORPS only)

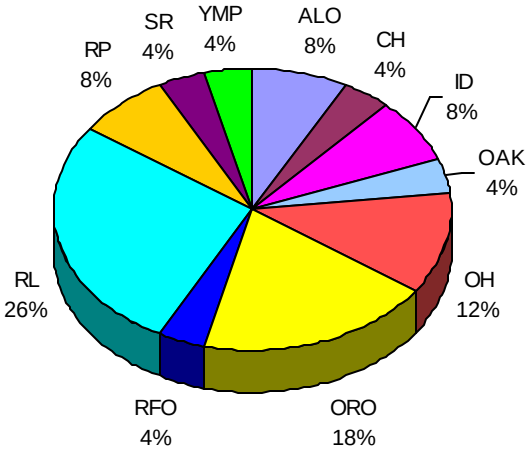
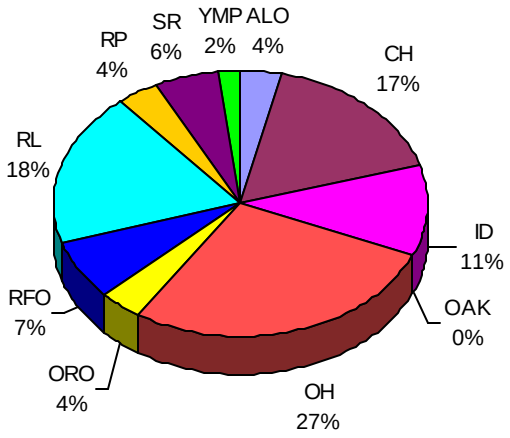


Figure 6. S/CI by Operations/Field Office – 2002 (ORPS only)



Distribution of Recent S/CI by Activity Category

S/CI occurrences identified during different activities included: Inspection/Monitoring 77% (this is obviously the preferred method of S/CI identification); Maintenance 8%; and Other 15%. Figure 7 displays these results. Figure 8 shows S/CI by activity for 2002. The most notable difference between the two years is a sharp increase in the percentage of events that were identified during the inspection process. Most of these S/CI events are related to an increase in the identification of various fasteners, especially bolts in ratchet straps, throughout the DOE complex.

Figure 7. S/CI by Activity, First Half 2003 (ORPS only)

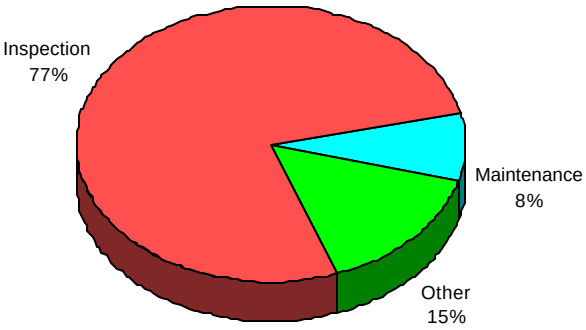
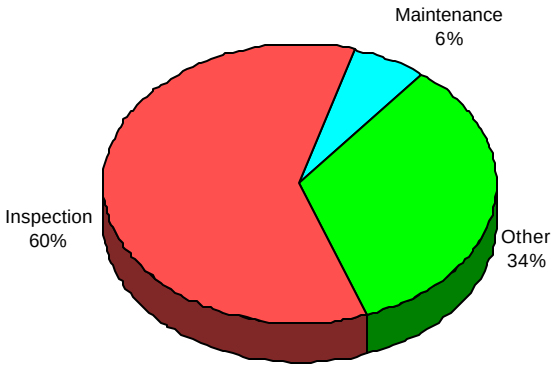


Figure 8. S/CI by Activity, 2002 (ORPS only)



2.2.2 Sample Study Using ORPS Reports Only

ORPS reports identified between January 1991 and June 2003 were reviewed for the following parameters and illustrated in Figures 9 through 12.

? Usage: Used as fastener or non-fastener.

? Application: Used in safety or non-safety system equipment.

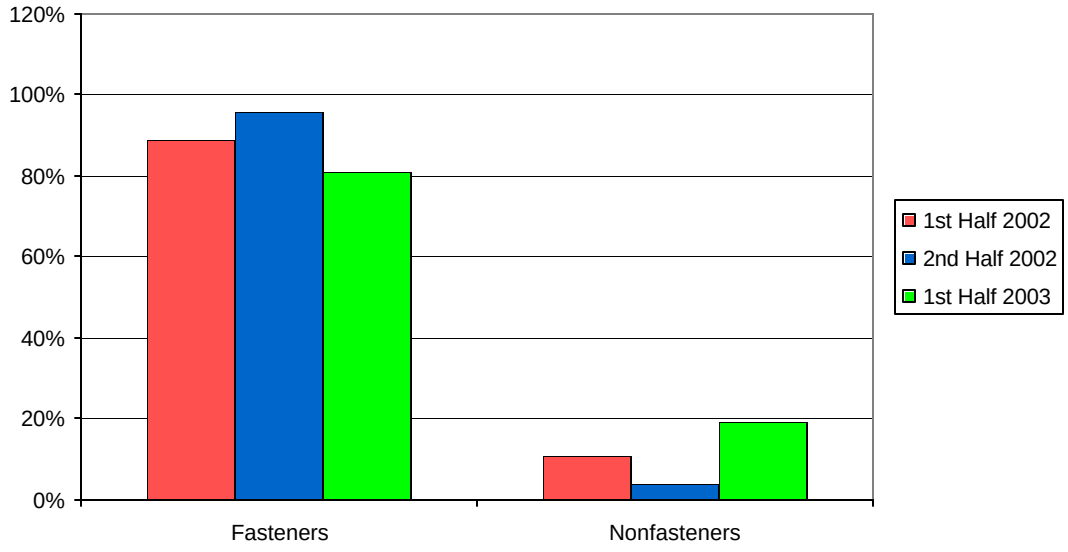
? Installed vs. Uninstalled: Found in an installed condition; or uninstalled, (e.g., found in storage or during receipt inspection).

? Corrective Action: The programmatic or immediate actions taken.

S/CI Reports – Fasteners vs. Non-fasteners

During the period from January 1991 through December 2002, 92% of the reports submitted refer to fasteners; thus, the emphasis on suspect/counterfeit (S/C) fasteners was justified. . During the most current period (January 1 through June 30, 2003), 81% of the reports involved fasteners. However, items such as valves, circuit breakers, test equipment, or memory modules, for example, could be as important as, or more important than, fasteners in terms of potential adverse impact to safety systems

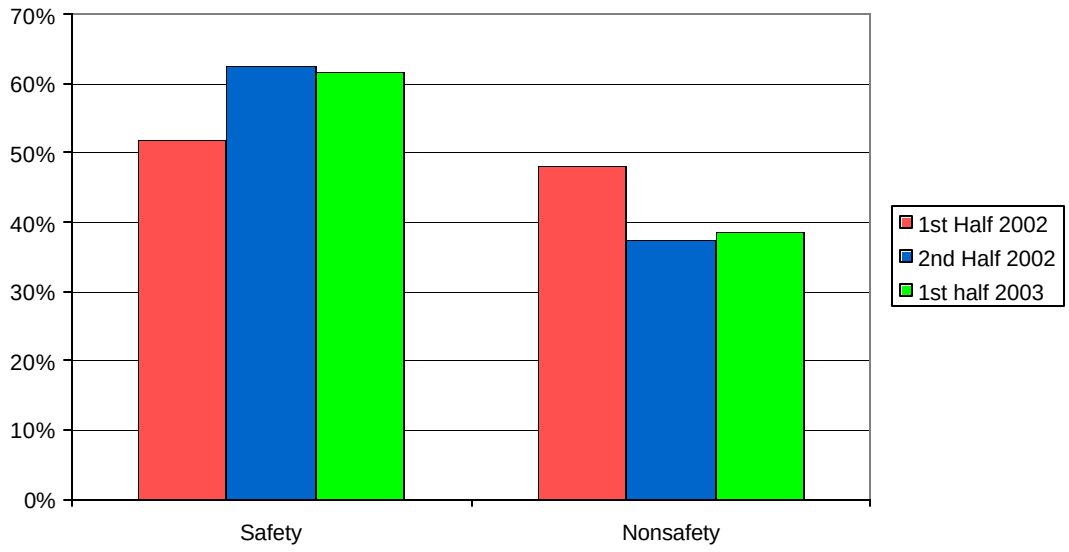
Figure 9. Fasteners vs. Non-fasteners, 2002-2003 (ORPS only)



S/CI Reports – Safety vs. Non-safety Applications

Components discovered in site stores or during receipt inspection are categorized as a non-safety application if they were never used to perform a safety function. During the period (January 1 through June 30, 2003), 38% of the reports involved non-safety system applications.

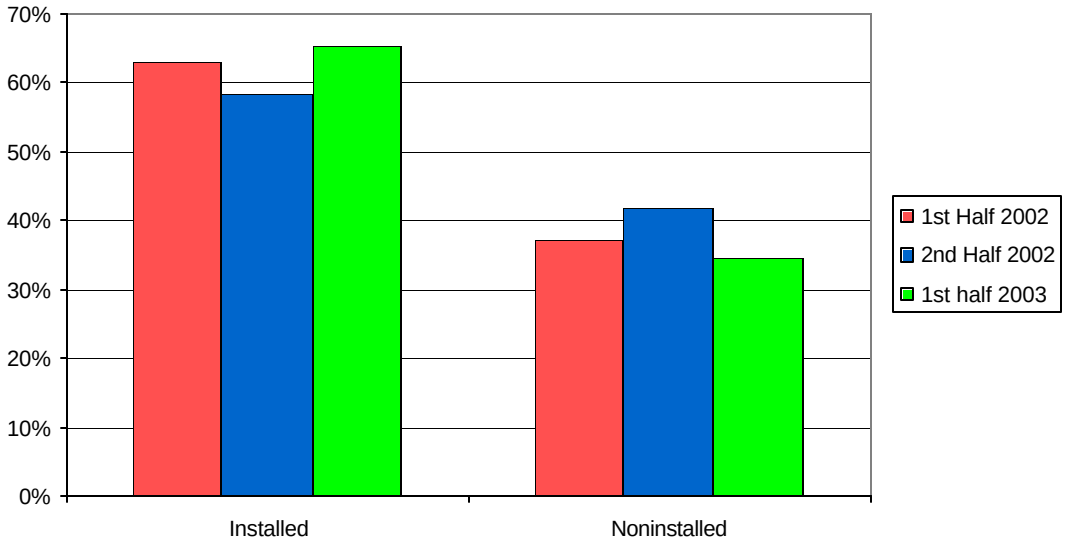
Figure 10. Safety vs. Nonsafety Applications, 2002-2003 (ORPS only)



S/CI Reports – Installed vs. Non-installed

During the period from January 1991 through December 2002, 74% of the S/CI events were found installed, compared to 65% during the current period.

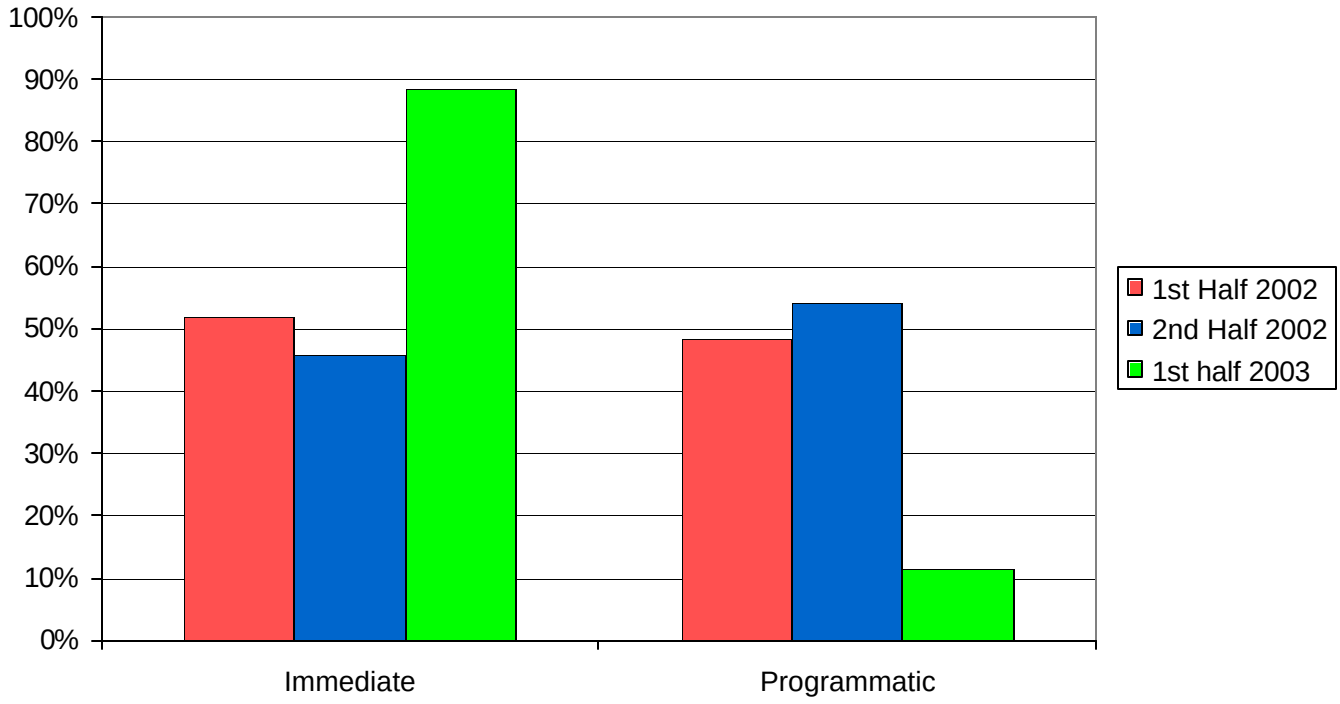
Figure 11. Installed vs. Noninstalled, 2002-2003 (ORPS only)



S/CI Reports – Immediate vs. Programmatic Actions

During the first half of 2003, 12% of corrective actions were classified as programmatic, meaning that the processes or procedure-related actions were taken after discovery to prevent recurrence. This is an improvement of over 39% over the programmatic rate for 2002. The typically appropriate response to the discovery of a S/CI is to remove and replace it. Programmatic modifications may not be warranted or cost-effective in all cases.

Figure 12. Immediate vs. Programmatic, 2002-2003 (ORPS only)



2.2.3 Updated S/CI Information (January 2003 through June 2003)

Twenty-nine new ORPS reports containing twenty-six S/CI events and three defective items were added to the database from January 1, 2003, through June 30, 2003. The ORPS report numbers are shown below.

	DCS# (Internal use only)	Suspect/Counterfeit Item ORPS ID#	Site	PSO
1	404	RL--BHI-REMACT-2003-0001	Hanford	EM
2	407	OAK--LLNL-LLNL-2003-0005	LLNL	DP
3	410	CH-PA-PPPL-PPPL-2003-0001	PPPL	SC
4	411	OH-WV-WVNS-HMT-2003-0001	West Valley	EM
5	457	RL--PHMC-GENERAL-2003-0002	Hanford	EM
6	459	RP--CHG-TANKFARM-2003-0007	River Protection Project	EM
7	464	RFO--KHLL-FACOPS-2003-0001	Rocky Flats	EM
8	465	RL--PHMC-324FAC-2003-0003	Hanford	EM
9	467	OH-FN-FFI-FEMP-2003-0004	FEMP	EM
10	468	ID--BBWI-SMC-2003-0004	INEEL	DP
11	470	ID--BBWI-CFA-2003-0008	INEEL	EM
12	472	RL--PHMC-FSS-2003-0004	Hanford	EM
13	473	RL--PHMC-GENERAL-2003-0004	Hanford	EM
14	498	RP--CHG-TANKFARM-2003-0026	River Protection Project	EM
15	499	SR--WSRC-FSSBU-2003-0006	SRS	EM
16	500	RL--PHMC-FSS-2003-0005	Hanford	EM
17	503	HQ--BSYM-YMSGD-2003-0002	Yucca Mtn.	RW
18	504	RL--PHMC-SNF-2003-0021	Hanford	EM
19	505	ORO--ORAU-ORISE-2003-0001	ORAU	SC
20	509	ORO--ORNL-X10ATY12-2003-0004	ORNL	SC
21	513	ORO--ORNL-X10EAST-2003-0005	ORNL	SC
22	514	ALO-LA-LANL-ESHSUPT-2003-0002	LANL	DP
23	515	OH-FN-FFI-FEMP-2003-0012, 06-26-03	FEMP	EM
24	516	ORO--BJC-X10WSTEMRA-2003-0006	ORNL	EM
25	521	ALO-LA-LANL-LANL-2003-0007	LANL	DP
26	522	ORO--ORNL-X10EAST-2003-0005	ORNL	SC
	DCS# (Internal use only)	**Defective Item ORPS ID#**	**Site**	**PSO**
27	415	RL--PHMC-SNF-2003-0006	Hanford	EM
28	538	ID--BNFL-AMWTF-2003-0002	INEEL	EM
29	539	ORO--FWEC-TRUWPFAC-2003-0001	ORNL	EM

The following sections provide a brief summary of the ORPS reports for the current period grouped by 1) ratchet straps/tie-downs, 2) bolts/fasteners, 3) electrical equipment, 4) improper heat-treated aluminum, and 5) other issues. The reports that follow are not presented in numerical order.

Suspect/Counterfeit Ratchet Straps/Tie-Downs

Reports 1, 4, 5, 6, 7, 12, and 15: These reports address suspect/counterfeit ratchet straps and tie-downs that were found at various DOE facilities.

Report 1: RL--BHI-REMACT-2003-0001 (DCS 404). On January 15, 2003, a contractor Quality Services engineer noticed a set of nylon tie-downs on a flatbed trailer that was being used by a subcontractor in the 100-K Remedial Action Project area. Since these types of tie-downs have been known to contain S/CI in the past, the engineer inspected the ratcheting mechanisms and found one with a bolt having a head marking on a ½" x 3" bolt with retainer nuts that corresponded to the S/CI Grade 8 fasteners identified in the Standard Linear Accelerator Center Environment, Safety, and Health Bulletin 09c dated March 1996. One of the ratchet straps was identified with a suspect bolt, used as the load-bearing pivot point for the attachment of the strap to the ratchet mechanism. Subsequently, S/CI pivot bolts were found in the ratchet mechanism of other tie-down straps, and are described below.

January 27, 2003: Cargo straps were discovered by subcontractor personnel on January 24, 2003, and immediately segregated for verification. S/CI fasteners were found in the cargo straps.

January 31, 2003: Two cargo tie-down strap ratchet mechanisms containing S/C bolts were discovered at a Hanford equipment yard. A Quality Services engineer discovered the suspect straps while walking down the equipment yard to identify S/CI. The bolts were marked as Grade 8 with no manufacturer's mark.

February 12, 2003: A Quality Services engineer discovered a tie-down strap that contained S/C bolts while conducting a walkdown. The bolts were in 4' x 4' x 4' waste boxes that were shipped from another Hanford facility. The bolts were marked as Grade 8 with no manufacturer's mark.

April 8, 2003: A Quality Services engineer determined that the pivot bolt in a ratchet mechanism for a 2-inch-wide cargo tie-down strap was suspect. The pivot bolt is a 3/8"-diameter grade 8 bolt with no manufacturer's identification. Its intended use was to secure a power sprayer/washer in the bed of a 3/4-ton government pickup truck.

Report 4: OH-WV-WVNS-HMT-2003-0001 (DCS 411). A Quality Assurance (QA) inspector and a QA engineer identified a suspect bolt on a ratchet lever tie-down strap that was to be used to secure a high-integrity container of low-level radioactive waste to a shipping pallet for shipment to the Nevada Test Site.

The bolt head carried the six marks of a grade 8 bolt, but did not contain a manufacturer's mark. All additional ratchet leveler tie-down strap assemblies were inspected and found to be satisfactory. The suspect bolt was confiscated by

the QA inspector and secured in a locked area. The shipping vendor was contacted to obtain the name of the ratchet tie-down strap assembly manufacturer, which was identified as Kinedyne.

Report 5: RL--PHMC-GENERAL-2003-0002 (DCS 457) Two ratchet cargo straps with S/C pivot bolts were found on 01/09/03. As a result of this discovery, the contractor conducted a site-wide surveillance to determine if additional tie-down straps were present or in use. That surveillance resulted in the discovery of an additional 250+ S/C bolts in tie-down straps. This occurrence report incorporates six other occurrences with S/C pivot bolts in the ratchet mechanism of tie-down straps, which are described below.

RL--PHMC-FSS-2003-0001 (DCS 399) On January 9, 2003, two ratchet cargo straps with S/C pivot bolts were found. The straps were used as tie-downs for a 4' x 4' x 8' waste box. The box was hauled on a flatbed trailer within the site. The ratchet mechanisms were removed from service, and other ratchet straps were removed for inspection.

RL--PHMC-FFTF-2003-001 (DCS 402) On January 16, 2003, five ratchet cargo straps with S/C pivot bolts were found. The straps were used as tie downs for various cargo loads. The ratchet cargo straps were removed from service, and an inspection of all cargo straps was initiated.

RL--PHMC-324FAC-2003-0001 (DCS 403) On July 20, 2003, four ratchet tie-down assemblies containing S/C bolts were found at the Hanford site. The discovery was triggered by a Project Hanford Lessons Learned document. The suspect parts were removed from service.

RL--PHMC-SNF-2003-0003 (DCS 406) During a routine inspection on January 24, 2003, a QA engineer discovered that 10 out of 13 tie-down ratchets in a government truck and storage unit contained bolts with no manufacturer markings. The tie-downs were not in use at the time of discovery. The ratchets were removed from the truck and storage unit, tagged, and secured in locked storage to prevent reuse. QA inspected additional tie-down ratchets that may have contained S/C bolts.

RL--PHMC-WRAP-2003-0001 (DCS 408) On January 24, 2003, a QA engineer discovered that 10 out of 13 tie-down ratchets contained pivot bolts without manufacturer markings. The tie-downs were found in a government truck and storage unit. The tie-downs were not in use at the time of discovery.

RL--PHMC-TPLANT-2003-0003 (DCS 409) On January 29, 2003, plant personnel inspecting hold-down straps found eight S/C bolts in a storage area. The hold-down straps were in the original packaging, and had never been used. On January 30, 2003, a second shipment of hold-down straps was received and immediately inspected. Eleven additional S/C bolts were identified. The bolts were removed from service to prevent use.

Report 6: RP--CHG-TANKFARM-2003-0007 (DCS 459) On February 20, 2003, a warehouse inspection identified nine ratchet tie-downs/strapping devices, and one come-along, containing S/C bolts. The tie-downs and come-along were not

inspected upon receipt, having been purchased without a quality specification. The S/CI were placed in a controlled area to await disposition.

Report 7: RFO--KHLL-FACOPS-2003-0001 (DCS 464) On March 3, 2003, 16 of 24 ratchet straps securing laundry-handling trailers were discovered with counterfeit bolts shortly after they were installed. The incident initially was not reported because it was considered identical to a previously submitted roll-up report (RFO-KHLL-WSTMGTOPS-2002-0001) involving the discovery of ratchet straps containing suspect/counterfeit bolts. The suspect straps are of the load-hugger ratchet style, 2" x 27', rated for 3,300 pounds, and manufactured by Lift-All. The straps were removed from the trailers and replaced with approved equipment.

Report 12: RL--PHMC-FSS-2003-0004 (DCS 472) On April 10, 2003, personnel assigned to quality control activities discovered a total of six S/C fasteners on customer-supplied flammable gas exhauster Skid-A. The fasteners hold the fan/motor mount to the skid. A hold tag was installed on the equipment.

Report 15: SR--WSRC-FSSBU-2003-0006 (DCS 499) On June 6, 2003, seven tie-down straps were recovered with S/C fasteners, and another 40 fasteners were found that had been replaced in tie-downs. The markings on these fasteners are on the head mark list. The tie-down straps and fasteners were tagged and impounded.

Suspect/Counterfeit Bolts and Fasteners

Reports 2, 8, 9, 10, 11, 13, 14, 16, 19, 20, 21, 23, 24, and 26: These reports address S/C bolts and fasteners that were found at various DOE facilities. Many of these reports involved legacy issues.

Report 2: OAK--LLNL-LLNL-2003-0005 (DCS 407). On January 28, 2003, suspect/counterfeit bolts were found on a glovebox exhaust system. The head marks were on the DOE Suspect Fastener Head mark List. The bolts connected the duct support bank to the seismic brace, and did not bear significant loads. The S/CI were three ½ inch-diameter Grade 5 bolts and ½ inch-diameter carbon steel Grade 2 bolts. The Quality Assurance Manager will develop a comprehensive plan to address suspect/counterfeit items.

Report 8: RL--PHMC-324FAC-2003-0003 (DCS 465). On March 11, 2003, two bolts were found with head marks that are on the suspect/counterfeit item list. Within a week, a Qualify Control Inspector confirmed the presence of eight S/C bolts. During a follow-up inspection, personnel entering the work area noticed potential suspect bolts. The facility took all monorails out of service pending satisfactory inspection of all similar equipment and replacement of any suspect parts.

Report 9: OH-FN-FFI-FEMP-2003-0004 (DCS 467). On March 12, 2003, Quality Control and Safety personnel found 54 S/C bolts during a receipt inspection at the north rail yard. A Fairmont #RMC-305A Tie Inserter/Remover, was found to have Grade 5 and Grade 8 bolts with head marks on the Suspect Fastener Head Mark List. The bolts were marked with white paint, and the owner was instructed not to use the equipment. On April 3, 2003, Quality Control personnel reported that they had found 48 suspect/counterfeit bolts while inspecting a manlift. A model S40 manlift had Grade 8 bolts in the hub cap covers without head marks. The

manlift was tagged out of service until an engineering evaluation could be performed.

Report 10. ID--BBWI-SMC-2003-0004 (DCS 468). During a routine facility management housekeeping walkthrough and inspection, 31 suspect bolts and nuts were found in TAN-629. Examination of the bolts revealed that the bolts were material removed from equipment that had recently been disassembled and removed from the facility for controlled storage and excess. The discovered suspect fasteners were transferred to a controlled and locked suspect fastener container for subsequent destruction and disposal.

Report 11: ID--BBWI-CFA-2003-0008 (DCS 470). On March 24, 2003, a quality receipt inspector identified four S/C bolts. The bolts were part of a come-along assembly ordered from a local vendor, and lacked manufacturer head markings. The receipt inspector tagged and secured the bolts for shipment back to the vendor.

Report 13: RL--PHMC-GENERAL-2003-0004 (DCS 473). During an April 23, 2003, safety inspection, personnel identified a drum lid restraining device with one S/C bolt. The device is used to secure the lid on a potentially pressurized drum while the drum lid locking rig is removed. Further inspection identified that three out of the four drum lid restraining devices contained S/C bolts. A preliminary search of the facility identified an additional three transportation-related hold-down straps with SC/ bolts. With the exception of the drum lid restraining device, none of the other devices or straps was in use. The restraining devices and straps containing S/CI bolts were segregated. On May 21, a nuclear chemical operator found that the mechanism from a drum lid strap contained an S/C bolt. The mechanism was found in a seldom-accessed area. The facility was thoroughly searched, and facility managers in other areas were encouraged to inspect their facilities.

Report 14: RP--CHG-TANKFARM-2003-0026 (DCS 498). On June 5, 2003, during a facility cleaning and inspection, some of the bolts used to hold five breakers together were found to have head marks on the Suspect Fastener Head Mark List. The suspect fasteners were discovered when the breakers were removed from service and inspected. Quality Control placed a hold tag on the five breakers.

Report 16: RL--PHMC-FSS-2003-0005 (DCS 500). On May 27, 2003, the stores transportation supervisor was notified of possible suspect bolts on the rear section of a trailer. The trailer was placed out of service, and two other trailers were found with S/C bolts. Investigators concluded that the trailer manufacturer installed a bolt with improper head marks, indicating that the bolt was of a type that had been identified in the past as being on the Suspect/Counterfeit list. The SC/I fasteners were removed to a warehouse for final disposition.

Report 19: ORO--ORAU-ORISE-2003-0001 (DCS 505). During a June 19, 2003, inspection, 13 S/C bolts were discovered in the supply room. A further search yielded another 27 S/C bolts. The bolts were removed from the stockroom bin and taken from service pending disposal. An updated head mark list was posted in the stockroom next to the bolt bins.

Report 20: ORO--ORNL-X10ATY12-2003-0004 (DCS 509). On June 23, 2003, inspectors found several S/C bolts in an overhead monorail hoist. The next day, a QA inspector verified that the bolts were S/C. There were 20 ? -inch bolts, 8 ½-inch bolts, and 3 ¼-inch Grade 5 bolts, common in both load-bearing and nonload-bearing applications, which had suspect head marks, and 4 ¾-inch Grade 5 bolts with no head marking. The hoist was removed from service.

Report 21: ORO--ORNL-X10EAST-2003-0013 (DCS 513) On June 26, 2003, a Quality Division Inspector discovered four S/C bolts in a nonload-bearing application. Further inspection found one additional bolt. The bolts were replaced.

Report 23: OH--FN-FFI-FEMP-2003-0012 (DCS 515). On June 26, 2003, the Fluor Fernald Quality Control personnel discovered 12 S/C bolts at a laydown area during the receipt inspection of a Genie model #Z-45 manlift. The bolts had no head markings, and were located in the hubcap of a wheel. The equipment was tagged out of service. The rental company replaced the S/CI bolts and removed them from the site.

Occurrence #2 and #3: On June 30, 2003, Quality Control personnel found 48 S/C bolts on each of two rented 40-foot scissor lifts during receipt inspection. Each wheel had 12 S/C bolts in the hubcap. The bolts were Grade 8 with no head markings. The equipment was tagged out of service, and the vendor was notified to replace and remove the S/CI bolts.

Occurrence #4: On July 15, 2003, during inspection of incoming materials for S/C bolts, Quality Control personnel discovered tie-down ratchet assemblies lacking load rating identification with an S/C bolt. The tie-down ratchet assemblies were removed to a controlled area.

Occurrence #5: During receipt inspection of a rented Genie manlift, 48 bolts were found in the hubcaps of the wheels without head markings.

Report 24: ORO--BJC-X10WSTEMRA-2003-0006 (DCS 516). During a quality control inspection of an overhead crane, contractor personnel found four ? -inch Grade 5 S/C bolts in a nonsafety, nonload-bearing application on a cover plate. The crane was out of service at the time of the inspection. The crane will remain out of service until the engineering evaluation is completed.

Report 26: ORO--ORNL-X10EAST-2003-0005 (DCS 522). A Quality Division Inspector discovered four S/C bolts in a non-load bearing application. After further inspection, one additional bolt was discovered. The bolts were replaced.

Suspect/Counterfeit Electrical Equipment

Reports 3 and 17: These reports address suspected/counterfeit electrical equipment that was found at various DOE facilities.

Report 3: CH-PA-PPPL-2003-0001 (DCS 410). A shipment of 480-volt breakers was received on January 29, 2003. Personnel inspected the shipment and reported the breakers as suspect. QA personnel then inspected the breakers and determined them to be suspect because of their labeling and worn condition. The original equipment manufacturer does not authorize these breakers to be refurbished. The

vendor had no knowledge of the status of the breakers. The breakers were quarantined pending disposition. Further investigation revealed that the breakers were ordered from a parts broker that does not inspect for quality prior to shipment.

Report 17: HQ--BSYM-YMSGD-2003-0002 (DCS 503). On June 12, 2003, two 20-amp circuit breakers were received from a local supplier. Receipt inspection revealed that the circuit breakers showed evidence of use such as scratches on the cases, lettering discrepancies on the reset lever, dirt, corrosion, discoloration, and weathered labels (one to the point of being illegible). The circuit breakers were placed on hold and tagged. The circuit breakers were returned to the supplier.

Improperly Heat-Treated Aluminum

BACKGROUND: In June 2002, the Government-Industry Data Exchange Program (GIDEP) issued an Agency Action Notice regarding the improper heat-treating of aluminum parts by Temperform USA. The notice stated that Temperform USA allegedly provided false certifications of heat-treating processes and quality inspections from 1998 to at least 2000 on numerous Department of Defense (DoD) programs. Although the notice was directed primarily at DoD, NASA, and commercial prime contractors involved with aviation and aeronautical programs, the notice recommended that other organizations "…review all orders or procurements associated to aluminum alloy parts, (especially parts identified as "flight safety-critical") for possible impact…".

In response to the GIDEP Notice, the DOE Quality Assurance Working Group (QAWG) e-mailed its members in July 2002 requesting sites to determine if any weapons systems, support devices, or other programs had parts or raw material that may have been heat treated, supplied, or tested by Temperform USA. A follow-on e-mail was sent to QAWG members in December 2002 to provide additional information and to clarify the request.

In February 2003, the Defense Nuclear Facilities Safety Board (Board) wrote to the Secretary of Energy of its concerns with the Department's progress in addressing the Temperform USA issue. The letter requested that the Department issue a report documenting the implementation of the complete set of actions required to verify that no aluminum parts heat-treated by Temperform USA are in use in safety-related or mission-sensitive applications.

Although the QAWG had collected a substantial amount of information, it was not clear that the investigation results were adequate or consistent, or that they would support an adequate response to the Board's request. On February 11, 2003, EM sent a memorandum to its sites to clarify the information needed to complete the investigation.

On March 18, 2003, the Assistant Secretary for Environment, Safety and Health (EH) sent a memorandum to EM and NA requesting them to verify completion of their inquiries into possible use of items heat-treated by Temperform USA. The EH memorandum included additional lines of inquiry. The Defense Criminal Investigative Service granted the Department permission to release to its contractors the affected part numbers and the identity of the companies that sent parts to Temperform USA. That list of the companies who had parts processed at Temperform USA or who approved Temperform USA as a vendor was included with the EH and EM memoranda. The part number list, consisting of over 1,200 pages, was distributed to EM and NA to support their investigation.

EM and NA completed their investigations and submitted the results of their reviews to EH. EH reviewed the reports to determine if any issues remained that required further corporate attention. EH's review supported the EM and NA conclusions that no heat-treated aluminum materials, parts, components, or equipment supplied by Temperform USA are in safety-related or mission-critical applications at defense nuclear facilities. No new issues requiring corporate action were identified.

Report 25: This report addresses S/CI associated with improperly heat-treated aluminum at LANL.

Report 25: ALO-LA-LANL-LANL-2003-0007 (DCS 521) In January 2003, LANL became aware of potentially defective aluminum stock from Temperform USA due to improper heat-treating. LANL screened a list of over 300 contractors who could potentially use or further distribute the defective materials. Only one contractor, Allied Signal, was identified and it was determined that there was no impact on LANL operations from this source. LANL reviewed just-in-time contracts and determined that Reliance Metals sold Temperform aluminum stock. Reliance documents revealed that 41 LANL purchases of Temperform materials had been made between 1999 and 2003 by Laboratory and subcontractor personnel. LANL located all 41 end users of this suspect material and evaluated the potential for safety impact. The April 30 final report, containing the analysis of the 41 end users, was validated by Weapons Quality Council members. The report concluded that none of the 41 uses resulted in a safety-significant impact.

In a final report dated April 30, 2003, LANL reported the results of its internal review relating to suspect aluminum stock. The review was in response to information concerning improperly heat-treated aluminum stock from Temperform USA. LANL reviewed its purchases of the suspect aluminum stock, identified 41 end users of the suspect aluminum stock, and evaluated the impacts to safety. Five items could not be located, but the end users did not fabricate safety-related or weapons components. Of the 36 remaining end users, one, involving the fabrication of pit storage containers, was identified as potentially safety-significant. The others were found to have no impact to safety.

The pit storage containers are pressurized to 3-4 psig with an inert gas to prevent corrosion. Because the containers must be pressurized, analysts determined the impact of improper heat-treating on the maximum design pressure of the containers and found that although the specified temper of the 6061 aluminum was T6, the actual temper was assumed to be as low as T0. The analysts determined that the containers were safe to use at least up to 7 psig and that the containers were safe to use at their maximum design pressure. The containers remained in use until their replacements became available in May 2003.

Other Suspect/Counterfeit Items

Reports 18 and 22: These reports address other suspected/counterfeit items that were found at various DOE facilities.

Report 18: RL--PHMC-SNF-2003-0021 (DCS 504). On June 17, 2003, pre-filters procured for general and local exhaust HVAC systems showed evidence of being S/CI.

Specifically, 1) a generic label was affixed to the box, and it was apparent that another label had been removed; 2) the part number was handwritten on the filter frame with a permanent marker; and 3) the filter media was paper instead of metallic. The pre-filters were placed in a holding area and appropriately labeled. The pre-filters are general-service items that do not perform a safety function.

Report 22: ALO-LA-LANL-ESHSUPT-2003-0002 (DCS 514). On March 6, 2003, during receipt inspection, a quality control inspector noticed that the flanges on four braided pump connectors did not meet the specified thickness or show the required markings. The flanges were tagged and separated to prevent use. Further evaluation is ongoing.

3.0 PROCUREMENT/QUALITY ASSURANCE ISSUES

The following items, though not S/CI, are significant because they address potential procurement and quality assurance issues, including the purchase and receipt of potentially defective items within the DOE complex.

3.1 Defective Items

Reports 27, 28, and 29: These reports address defective items that were found at various DOE facilities.

Report 27: RL--PHMC-SNF-2003-006 (DCS 415) On February 12, 2003, QA personnel tagged lifting fixtures out of service because of substandard fabrication welding performed by a subcontractor. The welding quality issues were identified after one of the lifting fixtures showed signs of failure after a load test had been performed. The lifting fixtures arrived at the facility with the required QA acceptance tag attached. The issues identified were significant enough to call into question the subcontractor's welding program. As a result, all the lifting fixtures fabricated by this subcontractor have been removed from service until examination and/or repairs are completed.

Report 28: ID--BNFL-AMWTF-2003-0002 (DCS 538) On May 21, 2003, an engineer installing a detector on a waste drum assay machine was tightening a self-sealing fitting that failed, releasing refrigerant gas. A rubber seat and spring were also ejected from the valve. The valve fitting was under a pressure of approximately 265 psi. Further investigation revealed that the vendor-supplied instructions for the installation of this fitting failed to specify a maximum torque value for tightening the fittings, which resulted in the engineer using what he felt to be good engineering judgment. Because of the lack of torque details in the vendor installation instructions, the contractor is further investigating the cause and has requested that the vendor return the failed parts so that they can verify the vendor's findings and develop effective corrective actions. The contractor assumes that all 10 filter installations are suspect, and has directed the vendor to supply new replacement filter/dryers for all installed detectors.

Report 29: ORO--FWEC-TRUWPFAC-2003-0001 (DCS 539) During system checkout and preoperational testing of a liquid radioactive waste processing system on May 21, 2003, the diaphragms in several valves were found to be leaking. Investigators determined that a slight change made to the diaphragms by the manufacturer in 2000 reduced the service life of the diaphragms in certain valve configurations. The manufacturer was alerted to the observations of the diaphragm's reliability and subsequently adjusted the actuators in the valves to compensate for the diaphragm change. The manufacturer also performed accelerated diaphragm life testing to affirm its evaluation as to the cause of premature leaks. The valve actuators were replaced, and pressures adjusted accordingly.

4.0 REFERENCES

1. U.S. DOE Memorandum from J. Layton to the Deputy Secretary, *Assignment of Responsibility for Addressing Suspect/Counterfeit Products Issues*, January 1996.

2. U. S. Department of Energy, *Resolution of Outstanding Issues Identified from Inspector General Report DOE/IG-0304:* Concerns with the Effectiveness of the Department's Quality Assurance Program Regarding Production Substitution Issues, June 21, 1996.

3. DOE M 231.1-2, *Occurrence Reporting and Processing of Operations Information*, August 2003.

4. DOE O 231.1A, *Environment, Safety and Health Reporting*, August 2003.

5. DOE O 414.1A, *Quality Assurance*, July 2001.

6. DOE G 440.1-6, *Implementation Guide for use with Suspect/Counterfeit Items Requirements of DOE O 440.1*, Worker Protection Management, June 1997.

7. DOE-STD-3009-94, *Preparation Guide for U.S. DOE Nonreactor Nuclear Facility Safety Analysis Reports*, Change 2, April 2002.

8. DOE Order 5480.30, *Nuclear Reactor Safety Design Criteria*, Change 1, March 2001.

9. 10 CFR 830.120, *Nuclear Safety Management*, January 2003.

APPENDIX A

SUSPECT INDICATIONS LIST

Lockheed Martin Idaho Technologies Company published LMITCO Internal Report INEL-95/227, Guidelines for Identifying Suspect/Counterfeit Material, September 1995. INEL-95-227 includes a comprehensive tabulation of suspect indications. The table is reproduced here and has been updated with information through December 2001.

Components with the following indications are considered suspect.

I. PIPING AND PIPING COMPONENTS (INCLUDING MECHANICAL AND METAL PRODUCTS)

A. General Indications:

- ? Used component appearance
- ? Unusual or inadequate packaging
- ? Foreign newspapers used as packaging
- ? Scratches on component outer surface
- ? Evidence of tampering
- ? Components with no markings
- ? Pitting or corrosion
- ? External weld or heat indications
- ? Questionable or meaningless numbers
- ? Typed labels
- ? Evidence of hand-made parts
- ? Painted stainless steel
- ? Ferrous metals that are clean and bright
- ? Excess wire brushing or painting
- ? Ground-off casting marks with stamped marks in the vicinity
- ? Ground-off logo mark
- ? Signs of weld repairs
- ? Threads showing evidence of wear or dressing
- ? Inconsistency between labels
- ? Old or worn nameplates
- ? Nameplates that look newer than the component
- ? Missing manufacturers standard markings and logos
- ? Overlapping stamps
- ? Different colors of the same part
- ? Traces of Prussian Blue
- ? No specification number
- ? No size designation
- ? Missing pressure class rating
- ? Other missing designations per the specification
- ? Markings not legible
- ? Evidence of restamping

? Deficient welds on chemical/nuclear shipping casks
? Thinner than expected
? Parts identified as “China” only

B. General Valve Indications:

? Wrench marks on valve packing glands, nuts, and bolts
? Nameplates attached with screws rather than rivets
? Poor fit between assembled valve parts
? Dirty internals
? Scratched or marred fasteners or packing glands
? Gate valve: gate off-center when viewed through open end
? Fresh sandblasted appearance of valve bodies, eye bolts fittings, stems
? Loose or missing fasteners
? Different types of hand wheels on valves of the same manufacturer
? Some parts (e.g., hand wheels) look newer than the rest of the valve
? Improper material (e.g., bronze nut on a stainless stem)
? Post-manufacturing alteration to identification/rating markings
? Indication of previous joint welding

C. Specific Valve Indications:

Valves produced by the following manufacturers generally have the following features and are considered suspect if they are missing these features.

Crane Valves:

? Body cast or forged markings:
? Crane name
? Pressure rating
? Pattern number
? Nameplate Information:
  - Made from stainless steel (silver color) with black lettering
  - Attached by drive screws OR attached on valve stem underneath handle.
  - Valve size, pressure class, operating pressure at temperature
  - Body material
    - Seat material on valve body and valve seat
    - Stem trim material and heat-treat conditions
    - Certification data Military specification, if applicable
    - Drawing number Shop Order Number (SO#)
    - Body cast or forged markings including the name “Crane”
    - Valve class
    - Valve size
    - Grade of steel
    - Melt number

Powell Valves (Wm. Powell Co.):

? Body cast or forged markings including the name "Powell"
? Valve class
? Valve size
? Grade of steel
? Melt number
? Nameplate Information:
  - Riveted to valve body OR attached to valve stem underneath handle
  - Attached with single end welded wire (small valves)
  - Serial number
  - Valve size
  - Figure number
  - Body style
  - Valve stem, disc, and seat type
  - Strength at temperature
  - Strength at 100°F
  - "The Wm. Powell Co. Cin., Oh. Made in U. S.A."

Vogt, Henry Machine Co., Inc.:

? Body cast or forged markings:
  - The name "Vogt"
  - Pressure rating
  - Pattern number
  - Size
  - Material specification
  - Two code ID - 3-letter code and a 4-digit code
? Nameplate Information:
  - Made from aluminum with electro-chemical etched lettering
  - Attached on valve stem underneath handle
  - Valve size
  - Pressure class, operating pressure at temperature
  - Body material
  - Internal seat material or internal H.F.
  - Stem trim material
  - Specification number
  - Drawing number
  - Pressure rating

Walworth Valves:

? Body cast or forged markings:
  - The name "Walworth"
  - Pressure class
  - Size
  - Heat code
  - Serial number (stamped)

? Nameplate Information
  - Made from aluminum
  - Attached by drive screws
  - Attached to cover at times
  - Valve size
  - Pressure class and operating pressure at temperature
  - Body material
  - Internal seat material or H.F.
  - Stem trim material and heat treat conditions
  - Figure number
  - Serial number
  - Location of manufacture
  - Item code number

Masoneilian - Dresser Valves:

? Masoneilian or Worthington Controls stamped on nameplate
? MN or Masoneilian on valve body

Watts Valves:

? Marked as FBV-1
? Made in Taiwan
? Certification Marks are: UL, CGA, 2G, AGA, FM

II. ELECTRICAL COMPONENTS

A. General Indications:

? Screwdriver marks on terminals
? Different screw types or materials on terminals
? Handwritten or typed rather than stamped tags
? Missing tags (usually UL approval tag)
? Pitted or worn contacts and lugs
? Not in manufacturer's box or container
? Signs of paint or smoke
? Insufficient nameplate information
? Missing terminals
? Screws used in place of rivets
? Body worn or discolored
? Rough metal edges
? Scratched or marred surfaces
? Metal color inconsistencies
? Modified or restamped nameplates
? Improper fastening of nameplates
? Plastic parts of different colors
? Discolored or faded manufacturer's labels
? Past due calibration stickers (internal and external)

? Broken or damaged solder terminations
? Broken or damaged termination lugs
? Contact surfaces that do not mate properly
? Lubrication that appears to be old
? Shipping in plain packaging (no manufacturer bar code)

B. Specific Indications:

Molded Case Circuit Breakers:
? Handle modified to change ampere rating
? Style is no longer manufactured
? Unusual packaging: bulk packaging, generic packages, and cheap appearance
? Refurbisher's name on breaker
? Broken seal between halves
? Contradicting amperage ratings

Fuses:
? Label missing or weathered
? Wear marks on bases

Power (Draw Out) Circuit Breakers:
? Different color or shape of over current devices
? Suspicious-looking auxiliary trip devices

Motor Starters:
? Poor fitting or wrong voltage rated operating coil

Motor Control Centers:
? Breakers that are not easily opened or closed with compartment door closed
? Exposed buss work with compartment doors open

Electromechanical Relays:
? Poor or loose fitting relays

Potter-Brumfield Relay:
? Sloppy coil lead solder joints
? Painted relay base grommets (normally clear)
? Terminal strips fastened with eyelets
? Painted rivets fastening the terminal strip to the relay housing
? Termination screws in brown paper bags (should be in clear heat-sealed plastic bags)
? Use of bubble wrap (plastic with Styrofoam should be used)
? Repainted inner bell surface
? Missing or inconsistent date codes, inspection stamp, and test stamp
? Incorrect shaft relay cover clearance, shaft play, and lack of bearing lubricant
? Tops of rotor shafts painted a color other than black

? Non-uniform numbers stamped on the contact decks, indicating decks made up from various relays
? Incorrect coil (i.e., 125 VDC relay with 200 VDC coil)

Capacitors:
? Polished surfaces scratched or dented
? Termination lugs scarred
? Buildup of debris and dirt in termination guards
? Plain packaging (no manufacturer bar codes)

III. FASTENERS

A. General Indications:
? No manufacturer's or grade mark (unless certified to a specification not requiring marking)
? Evidence of machining marks
? Poor thread form, evidence of wear, or dressing
? Head marks shown on the Suspect Fastener Head Mark List
? Foreign manufacturer not meeting Public Law 101-592
? No markings for nuts or washers packaged with labels indicating that they were manufactured to a code or MILSPEC, which requires marking
? Head markings are marred, missing, or appear to have been altered
? Head markings are inconsistent with a heat/lot
? Double stamping
? Metric and SAE stamping

V. DOCUMENTATION AND CERTIFICATION:

A. General Indications:
? Use of correction fluid or correction tape
? Type style or pitch change is evident
? Documentation has missing (or illegible) signature, initial, or data
? Document is excessively faded or unclear
? Inconsistent technical data
? Certification or test results are identical between items when normal variations should be expected
? Document is not traceable to the items procured
? Technical data are inconsistent with code or standard requirements
? Documentation is not delivered as required on the purchase order, or is in an unusual format
? Lines on forms are bent, broken, or interrupted indicating that data have been deleted or exchanged by "cut-and-paste"
? Handwritten entries are on the same document where typed or pre-printed data exist
? Data on a single line are located at different heights
? Product recall

IV. STAINLESS STEEL WIRE ROPE:

A. General Indications:

? None, or incomplete documentation.

V. PRESSURE TRANSMITTERS:

A. General Indications:

? The bellows body had dimple marks on it as if it had been clamped tightly in a vise.
? An internal relay normally factory set at 9 psi was set at 17 psi.
? An internal nozzle was clogged with dirt and rust.
? An internal bellows had scratch marks on it as if someone had attempted to pry it out with a screwdriver or other tool.

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