**PACKAGING- AND TRANSPORTATION-RELATED
OCCURRENCE REPORTS**

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1. INTRODUCTION

The Oak Ridge National Laboratory (ORNL) Packaging and Transportation Safety Program (PATS), which is sponsored by the U.S. Department of Energy (DOE) Office of Environment, Safety and Health, Office of Facility Safety Analysis, EH-32, has been charged with the responsibility of retrieving reports and information pertaining to transportation or packaging incidents from the Occurrence Reporting and Processing System (ORPS). These selected reports are being analyzed for trends, impact on EH-32 policies and concerns, and lessons learned concerning transportation and packaging safety. This task is designed not only to keep EH-32 aware of current packaging and transportation incidents and potential transportation and packaging problems that may need attention on DOE sites but also to allow future dissemination of lessons learned to the Operations Offices and, subsequently, to management and operating contractors.

This report, which covers the period from January 1 to April 1, 1995, covers the weekly tabular reports OR-95-01 through OR-95-13. These 13 reports, which contained a total of 50 occurrence reports (ORs) relating to packaging and transportation issues, were submitted to EH-32 for its information and use during this quarter. The 50 ORs that were selected from the hundreds reviewed are listed in Table 1. The second column of Table 1 contains the PATS nature of occurrence (NOC) coding for the respective OR, and the third column lists the weekly report issue in which the OR was originally transmitted to DOE-Headquarters (HQ).

Table 1. Occurrences reported in Weekly Reports, second quarter FY 1995

ORPS report No.	PATS NOC	Weekly issue No.
ALO--GEO-GJO-1995-0003	6A	R9513
ALO--TSD-TSS-1995-0002	6A	R9509
ALO--TSD-TSS-1995-0004	2C	R9513
ALO-AO-MHSM-PANTEX-1995-0035	2C	R9508
ALO-AO-MHSM-PANTEX-1995-0036	2C	R9508
ALO-AO-MHSM-PANTEX-1995-0038	5C	R9510
ALO-AO-MHSM-PANTEX-1995-0055	6A	R9512
ALO-KO-SNL-2000-1995-0002	5	R9512
ALO-KO-SNL-2000TTR-1995-0001	6A	R9503
ALO-KO-SNL-7000-1995-0001	5	R9502
ALO-LA-LANL-FIRNGHELAB-1995-0005	5A	R9506
ALO-LA-LANL-MATWAREHS-1995-0002	5	R9510
ALO-PI-MMSC-PINELLAS-1995-0004	1A3	R9509
CH-BH-BNL-BNL-1995-0002	8A	R9503
HQ--BPOI-NPRC-1995-0005	6E	R9509
HQ--BPOI-NPRC-1995-0006	6E	R9509
HQ--REYM-YMSGD-1995-0005	6A	R9512
HQ--SPR-BH-1995-0005	6E	R9512
HQ--TRYM-YMSGD-1995-0001	8D	R9502
ID--LITC-FLEET-1995-0001	6A	R9507
ID--LITC-LANDLORD-1995-0007	1A3	R9512
ID--LITC-PBF-1995-0001	5	R9510
ID--LITC-SMC-1995-0001	8E	R9506
NVOO--REEC-OMDO-1995-0003	1B1	R9507
NVOO--WSIO-NTSO-1995-0001	6A	R9501
OH-FN-FERM-FEMP-1995-0006	8A	R9503
OH-FN-FERM-FEMP-1995-0007	2A	R9503
OH-FN-FERM-FEMP-1995-0008	2A	R9503
OH-MB-EGGM-EGGMAT01-1995-0004	8	R9508
OH-MB-EGGM-EGGMAT02-1995-0001	5C	R9504
ORO--MMES-Y12DPMGMT-1995-0001	8D	R9510
RFO--EGGR-664OPS-1995-0001	5	R9509
RFO--EGGR-SUPPORT-1995-0009	2A	R9508
RFO--EGGR-WSTREPACK-1995-0003	2A	R9509
RL--PNL-PNLBOPER-1995-0011	1B2	R9510
RL--WHC-GENERAL-1995-0004	6A	R9506
RL--WHC-KBASINS-1995-0009	2	R9509

Table 1 (continued)

ORPS report No.	PATS NOC	Weekly issue No.
RL--WHC-KBASINS-1995-0012	8E	R9513
RL--WHC-PFP-1995-0011	4	R9509
RL--WHC-SOLIDWASTE-1995-0004	4	R9507
RL--WHC-TPLANT-1995-0001	1A3	R9504
RL--WHC-TRANS&PKG-1995-0001	8E	R9507
SAN--LLNL-LLNL-1995-0011	6A	R9507
SAN--LLNL-LLNL-1995-0015	6A	R9508
SAN--LLNL-LLNL-1995-0017	4	R9510
SR--WSRC-HBLINE-1995-0013	5C	R9511
SR--WSRC-LTA-1995-0026	1A3	R9511
SR--WSRC-REACK-1995-0005	6A	R9502
SR--WSRC-SLDHZD-1995-0001	2C	R9502
SR--WSRC-TRIT-1995-0008	5C	R9511

2. PATS FY 1995 SECOND-QUARTER SUMMARY OF SELECTED ORs

2.1 Categorization of ORs

DOE Order 5000.3B categorizes ORs into three types: emergency, unusual, and off-normal. For transportation, DOE Order 5000.3B defines these three categories as the following:

1. *Emergency* is an offsite transportation event involving the release of a reportable quantity of hazardous substance (per 49 CFR Part 171.8) that is transported in support of departmental operations.
2. *Unusual* is an offsite transportation event involving the release of hazardous material in a quantity greater than limited quantities (or any release of radioactive material) or any shipment of radioactive material or hazardous waste that arrives at its destination (1) with a nonreconcilable shipping paper discrepancy or unaccounted-for package related to material quantity or (2) with radiation or contamination levels in excess of U.S. Department of Transportation (DOT) allowable limits. Violations of Federal Motor Carrier Safety or Federal Aviation Administration (FAA) Regulations involving a release of hazardous material are also included. Onsite "unusual occurrences" are defined similarly for releases.
3. *Off-normal* is defined as an offsite event involving a release of hazardous material, other than radioactive, that does not exceed a limited quantity. Violations of marking, labeling, placarding, routing, or separating/segregating materials are included in its definition, as is any transportation event involving departmental property resulting in vehicular or aircraft damage of more than \$5000 (or total losses). Included in this definition are also violations of DOT Federal Motor Carrier Safety or FAA Regulations; evidence of improper classification of hazardous materials; improper selection or assembly of a hazardous material package; cargo that has shifted during transport; or transportation activities performed by unqualified personnel. Onsite "off-normal" events are defined similarly.

2.2 Emergency and Unusual Occurrences Reported

Only one of the 50 occurrences that were retrieved and reviewed from the ORPS during this quarter was categorized as unusual. All the other ORs were categorized as off-normal. Following is a brief description of the OR which was categorized as unusual. The occurrence number assigned by the ORPS to the report appears in brackets at the end of the description.

Preliminary documentation review of two labpack containers of waste which are presently stored at the Central Waste Complex of Hanford indicates the potential for incompatible waste. In September 1994, Lawrence Berkeley Laboratory (LBL) sent a request for a Storage Disposal Approval Record to Hanford. The request was rejected by the Westinghouse Hanford Company (WHC) Solid Waste Disposal/Generator and Waste Acceptance Services (GWAS) because the 55-gal drum with the labpacks contained incompatible waste. Because of some confusion as to why the waste was rejected (similar material had been shipped before), four WHC chemists reviewed the data for two labpacks previously received from LBL for reactive/incompatible compounds. All four chemists agreed that there was a potential for incompatible chemical mixtures with the labpacked sub-containers. GWAS informed Solid Waste Management (SWM) that additional containers stored in GWAS's facilities may be in question. SWM has secured the facility and made notifications so that no personnel can come near the suspect waste. A task team is being developed to analyze the situation and identify corrective actions. [RL--WHC-SOLIDWASTE-1995-0004]

2.3 Significant Off-Normal Occurrences Reported

There were several off-normal incidents that are noteworthy not because of the danger of level of safety involved but because they have occurred so frequently and continue to occur. It is obvious from reading the four ORs below that a lessons learned bulletin needs to be prepared, disseminated, and observed to prevent future occurrences pertaining to packages being designated as "empty" when they are not:

Twelve explosive component containers labeled "Empty" were received on 2/17/95. When opened on 2/22/95, one of the containers was found to contain 10 detonator cable assemblies. These assemblies contained small quantities of high explosives. Plant Standard 1-1001 establishes procedures and assigns responsibility for assuring and certifying that production part containers and returnable support materials are empty prior to storage, disposal, or shipment. When the last of the containers were opened on 2/23/95, another of the empty-labeled packages was found to contain detonator cable assemblies. [ALO-AO-MHSM-PANTEX-1995-0035]

While performing empty verification on a shipment of 18 containers, it was discovered that 1 of the containers had 3 components (containing a small amount of high explosives) under a foam insert. This did not meet the requirements of Plant Standard 1-1001 for assurance that containers are empty prior to storage, disposal, or shipment. Some of the labels on the containers also did not meet the Standard requirements. [ALO-AO-MHSM-PANTEX-1995-0036]

Mound received explosives (8 explosive test units; approximately 100 mg of explosive each) in explosive shipping pipes labeled as "empty" that were sent through Sandia National Laboratory's (SNL) nonexplosive shipping.
[ALO-KO-SNL-2000-1995-0002]

An "empty" 500-gal sulfuric acid tank was shipped from the Power Burst Facility to the Test Reactor Area via a site carrier. When the tank was inspected (nearly one month after receipt), it was discovered that it was approximately 75% full of sulfuric acid. The tank was neither certified under the requirements of Packing Group II nor had a DOE-approved Transport Plan.
[ID--LITC-PBF-1995-0001]

This next incident is considered significant because of its implications. The real question is whether the violations would have been discovered if the brakes had not locked and drawn attention to the departing trailer.

The brakes locked on a loaded three-axle trailer being moved from TA-39 to Johnson Controls World Services, Inc. The trailer contained four compressed-gas cylinders of nitrogen and three compressed-gas cylinders of argon. However, the Hazardous Material Transfer Form did not accompany the movement of the material and, the trailer was out of compliance with DOT vehicle inspection requirements. [ALO-LA-LANL-FIRNGHELAB-1995-0005]

2.4 Distribution of ORs by Organization

Table 2 presents the DOE Program Offices and the number of ORs that were reported to them. (Figure 1 is a graphical representation of this distribution.) DP programs reported almost half of the ORs generated during this quarter, although three of these occurrences were caused by others (non-DOE sites or non-DOE contractors). EM programs accounted for over a third of the ORs reported. The ORs from these two programs together are more than 84% of the total reported this quarter, which is consistent with past reporting profiles.

Table 3 is complemented by the bar chart presented as Fig. 2. Note that the previously designated San Francisco Operations Office (SAN) is listed in Table 3 with its current title, Oakland Operations (OAK). Also, the Ohio Field Office (OH) is a new entry to the table. Ohio Field Office was implemented on the ORPS and has been used for all Fernald, West Valley, and EG&G Mound reports that were transmitted to the ORPS as notification reports on or after January 17, 1995. Table 4, OR distribution by contractor organizations, and the corresponding Fig. 3 show the contractor organizations that contributed the ORs. Non-DOE contractor "others" account for only 16% of the

occurrences reported this quarter. Violations attributed to "others" have been separated from the ORs that are clearly the full responsibility of the reporting group so that such occurrences are not charged to the reporting Program Office, the Operations Office, or the contractor. ORPS makes no distinction between reporter and violator.

Table 2. OR distribution by DOE Program Office

Code	Description	No. of ORs	
		Owner	Others
DP	Defense Programs	21	3
EM	Environmental Management	15	3
ER	Energy Research	1	1
FE	Fossil Energy	3	0
NE	Nuclear Energy	1	0
RW	Radioactive Waste Management	<u>1</u>	<u>1</u>
	Totals	42	8
	Grand total		<u>50</u>

Fig. 1. OR distribution by DOE Program Office.

Table 3. OR distribution by DOE Operations Office

Code	Description	No. of ORs	
		Owner	Others
ALO	Albuquerque Operations	13	0
CH	Chicago Operations	0	1
HQ	DOE Headquarters	4	1
ID	Idaho Operations	3	1
NVOO	Nevada Operations	2	0
OAK	Oakland Operations	3	0
OH	Ohio Field Office	3	2
ORO	Oak Ridge Operations	0	1
RFO	Rocky Flats Operations	3	0
RL	Richland Operations	6	2
SR	Savannah River Operations	5	0
Total		42	8
Grand total			<u>50</u>

Fig. 2. OR distribution by DOE Operations Office.

Table 4. OR distribution by contractor organizations

Code	Description	No. of ORs	
		Owner	Others
BNL	Battelle National Laboratory	0	1
BPOI	Bechtel Petroleum Operations, Inc.	2	0
EGGM	EG&G Mound	1	1
EGGR	EG&G Rocky Flats	3	0
FERM	Fernald Environmental Management Project	2	1
GEO	Chem-Nuclear Geotech	1	0
LANL	Los Alamos National Laboratory	2	0
LITC	Lockheed Idaho Technologies Company	3	1
LLNL	Lawrence Livermore National Laboratory	3	0
MHSM	Mason & Hanger, Silas-Mason Co., Inc.	4	0
MMES	Martin Marietta Energy Systems, Inc.	0	1
MMSC	Martin Marietta Specialty Components	1	0
PNL	Pacific Northwest Laboratories	1	0
REEC	Reynolds Electrical & Engineering Co.	1	0
SNL	Sandia National Laboratory	3	0
SPR	Strategic Petroleum Reserve—Boeing	1	0
TSD	Transportation Safeguards Division	2	0
WHC	Westinghouse Hanford Company	5	2
WSRC	Westinghouse Savannah River Company	5	0
WSIO	Wackenhut Services, Inc.	1	0
YMSGD	Yucca Mountain Site Geologic Disposal	<u>1</u>	<u>1</u>
	Totals	42	8
	Grand total		<u>50</u>

Fig. 3. OR distribution by contractor organizations.

The PATS categories for coding the nature of the packaging and transportation events are presented along with the quarter's distribution of ORs by code as Table 5. Figure 4 lists the NOCs in a bar-chart format. This quarter, 20% of the occurrences were related to violations of shipping preparation (compared to 25% of last quarter). Modal Safety violations (NOC 6) accounted for the largest number of ORs categorized by NOC with 14, or 28%. Similarly to last quarter, packaging violations (NOC 2) were identified nine times. Note that NOC 4, "Improper Hazardous Material Characterization," is the new designation for what was previously called "Improper Waste Characterization." It was felt that the revised term was more appropriate and would be applicable to the total area of interest.

Table 5. OR distribution by NOC

Code and Description	No. of ORs
1. Contamination/Release	
1A. Radioactive	0
1A1. Environmental	0
1A2. Personnel	0
1A3. Equipment	4
1B. Hazardous Materials	0
1B1. Environmental	0
1B2. Personnel	1
1B3. Equipment	<u>1</u>
Total	6
2. Packaging	1
2A. Damaged	4
2B. Incorrect Selection	0
2C. Incorrect Procedures	<u>4</u>
Total	9
3. Storage Incident to Transport	<u>0</u>
Total	0
4. Improper Hazardous Material Characterization	<u>3</u>
Total	3

Table 5 (continued)

Code and Description	No. of ORs
5. Shipment Preparation	5
5A. Shipping Papers	1
5B. Marking	0
5C. Labeling	4
5D. Loading and Tie-downs	0
5E. Placards	<u>0</u>
Total	10
6. Modal Safety	
6A. Motor or Driver Safety	11
6B. Aircraft Safety	0
6C. Rail Safety	0
6D. Barge Safety	0
6E. Pipeline	<u>3</u>
Total	14
7. Reserved	
8. Occurrences Created by Others (non-DOE or DOE/Contractor)	1
8A. Shipping Preparation	2
8B. Packaging	
8C. Reserved	0
8D. Vehicle or Driver Safety	2
8E. Contamination	3
8F. Not otherwise specified	<u>0</u>
Total	8
Grand total	<u><u>50</u></u>

Fig. 4. NOC.

3. FUTURE DIRECTION

From studying at the four off-normal incidents that involved packages designated as being empty which were discovered not to be so, it is obvious that this type of occurrence can be reduced if not eliminated. For this purpose, PATS will develop and release a lessons learned bulletin on what constitutes an empty container, how it should be marked, and how empties should be treated. Still, even a lessons learned bulletin is not likely to be effective in aiding prevention of recurrence if the bulletin is not disseminated to the workers performing the work. In addition to disseminating lessons learned, some measures need to be developed to assure that the bulletins are getting into the hands of the

supervisors and operators who can benefit from them. Hence, PATS will be looking for means and methods to ensure that lessons learned are reaching the appropriate audience and are being acted upon. Feedback from site lessons learned coordinators is needed to assure that lessons learned bulletins have been received and—if applicable—will be used onsite.

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