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**DOE Safety Metrics Indicator Program (SMIP)**

**Third Quarter FY 2001 Quarterly Report**

**August 2001**

**Final**

**U.S. Department of Energy  
National Transportation Program  
Albuquerque, New Mexico**

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## **DOE Safety Metrics Indicator Program (SMIP)**

### **Third Quarter FY 2001 Quarterly Report**

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August 2001

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## ABBREVIATIONS AND ACRONYMS

ALO	Albuquerque Operations
ANL-E	Argonne National Laboratory-East
ATMS	Automated Transportation Management System
CBFO	Carlsbad Field Office
CH	Chicago Operations
DP	Defense Programs
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy-Idaho Falls Operations Office
DOT	U.S. Department of Transportation
EH	Environmental Safety and Health
EM	Environmental Management
EPA	U.S. Environmental Protection Agency
ER	Energy Research
ETAS	Enterprise Transportation Analysis System
FE	Fossil Energy
FY	Fiscal year
GGT	Gas Generation Test
HAZMAT	Hazardous materials
HQ	DOE Headquarters
ID	Idaho Operations
INEEL	Idaho National Engineering and Environmental Laboratory
HSR	Hazard Significance Rating
LANL	Los Alamos National Laboratory
LL	Lessons learned
LLW	Low-level waste
LMES	Lockheed Martin Energy Systems, Inc.
LSA	Low specific activity
NE	Nuclear Energy
NMMD	Nuclear Materials Management Division
NOC	Nature of Occurrence
NTP	DOE National Transportation Program
NTPA	DOE National Transportation Program Albuquerque
NVOO	Nevada Operations
OAK	Oakland Operations
OH	Ohio Field Office
OR	Occurrence report
ORNL	Oak Ridge National Laboratory
ORO	Oak Ridge Operations
ORPS	Occurrence Reporting and Processing System
P&T	Packaging and transportation
PHMC	Project Hanford Management Contractor
RCRA	Resource Conservation and Recovery Act
RFO	Rocky Flats Operations

RL	Richland Operations
RSF	Repetitive Significance Factor
RW	Radioactive Waste Management
RWMC	Radioactive Waste Management Complex (RWMC)
SC	Office of Science
SMIP	Safety Metrics Indicator Program
SPR	Stakeholder and Publicity Significance Rating
SR	Savannah River Operations
TRAGIS	Transportation Routing Analysis Geographic Information System
TRU	Transuranic
W <sub>EC</sub>	Event consequence measure
W <sub>HC</sub>	Hazard classification measure
WIPP	Waste Isolation Pilot Project
WSRC	Westinghouse Savannah River Company

## EXECUTIVE SUMMARY

The Safety Metrics Indicator Program (SMIP) retrieved 69 packaging- or transportation-related occurrences from the Occurrence Reporting and Processing System (ORPS) during the period from April 1 through June 30, 2001. Only those incidents that occur in preparation for transport, during transport, and during unloading of hazardous material are considered as packaging- or transportation-related occurrences. Other incidents with packaging and transportation (P&T) significance but not involving hazardous material (such as vehicle accidents or empty packagings) are not rated to the SMIP criteria, but are archived in the SMIP Subsidiary Database of occurrences, a sub-database of the main SMIP P&T Occurrence Database.

Fifty-one of the originally-selected 69 occurrences were appropriate for classification to the SMIP criteria, 26 of which have offsite applicability. Eight of the original 69 reports are archived in a subsidiary database because they either do not involve the transport of hazardous material or they do not involve transport by vehicle, plane, boat, or rail. The others were either deleted because more thorough review revealed that they were not strictly related to P&T or they were canceled by the reporting site and removed from the ORPS.

The number and severity of the selected occurrence reports (ORs) are similar with historical reporting. No adverse trends were pronounced. However, when the number of ORs obtained during the third quarter are combined with those obtained during the first and second quarters, it appears that there may be a slight increase over the 150 P&T-related ORs that are typically retrieved from the ORPS annually. On the other hand, the severity of the ORs continues to be non-alarming.

None of the 51 ORs that were rated had event consequence measures ( $W_{EC}$ ) greater than 2, 31 of which were categorized as having a  $W_{EC}$  of 1. This means that all of the third quarter fiscal year (FY) 2001 ORs had only *slight* consequences at worst (i.e., resulting in minimal safety consequences with little potential for ultimately leading to suspected endangerment of people or environmental contamination). Because the event consequence measure is low, the overall hazard significance ratings (HSRs) are relatively low, indicating that the actual risks posed by the occurrences are not highly threatening. In fact, even the 1 reported emergency OR and the 3 unusual ORs had HSRs of 20 or less.

The ORs are summarized in the appendix and listed along with their HSR and stakeholder interest [currently termed the stakeholder and publicity rating (SPR)]. This enables one to get a feel of how the nature of an occurrence and its P&T significance translates into a severity rating.

The information provided in this third quarter report has not been normalized as in the Annual Report of Occurrences because the necessary information is not yet available. Once the majority of the functions of the Enterprise Transportation Analysis System (ETAS) are integrated into the Automated Transportation Management System (ATMS) and the ATMS is subsequently updated and improved, information should be readily available from ATMS, which will provide a basis for speedily normalizing occurrence data. The U.S. Department of Energy (DOE) National Transportation Program Albuquerque (NTPA) is currently working toward this goal.

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# 1. APPLICATION OF SMIP METHODOLOGY

## 1.1 SMIP-RATED ORs FOR THIRD QUARTER FY 2001

SMIP methodology was used to classify and rate the occurrence reports (ORs) according to severity. Table 1, Third quarter FY 2001 SMIP classified occurrences, shows the parameters used to process the 51 P&T occurrences involving hazardous material and their values.

The last three columns of the table are the most significant, representing the top-level measures used in the National Transportation Program (NTP) SMIP for defining the indicators for occurrences involving hazardous material: (1) HSR = Hazard Significance Rating, (2) RSF = Repetitive Significance Factor, and (3) SPR = Stakeholder or Publicity Significance Rating.

The measure HSR is intended to indicate the actual risk posed by an occurrence. The measure RSF is then applied to HSR to indicate whether the occurrence has a history of repetitiveness. (The RSF is the number of repeat incidents multiplied by the HSR.) The combination of HSR and RSF can be used by the NTP to identify specific areas needing special attention or identify where the development of a specific lessons-learned is warranted. The measure SPR is independent of HSR and RSF and is used to identify the level of significance of the occurrence from a stakeholder or publicity perspective.

The HSR is the most important of the indicators. It is a weighted measure of the occurrence's hazard significance from a personnel, public safety, and environmental impact standpoint. The hazard portion is itself weighted by a factor indicating the quantity of hazardous material. HSR is composed of the following three factors:

$$\text{HSR} = W_{\text{EC}} \times W_{\text{HC}} \times Q_{\text{ty}}$$

The HSR was subdivided into three factors to allow analysts to break down an event and consistently make judgments on the various elements that contribute to degradation of safety and potential or actual impacts on the environment. The combined HSR has a numeric range of 1 to 100. [HSRs above 48 for nonradiological materials (68 for radioactive materials) are considered significantly high and deserving of additional attention.]

The Event Consequence Measure,  $W_{\text{EC}}$ , assigns a value ranging from 1 to 5 to indicate the seriousness of the event itself.  $W_{\text{EC}}$  ranges from an anomaly (which has a very low significance of consequence relative to safety and the environment and value of 1) to very serious (which has a major significance relative to safety and the environment and a value of 5). A  $W_{\text{EC}}$  weighting factor is assigned to each event based upon actual consequences resulting from the event.

The second factor that is used in developing the HSR is the Hazard Classification Measure,  $W_{\text{HC}}$ . This measure indicates the relative risk to personnel and the environment posed by the general physical contents of the hazardous material involved in the event. The value assigned to  $W_{\text{HC}}$  is based upon the hazardous material classification methodology specified in the U.S. Department of Transportation (DOT) hazardous material regulations and upon pragmatic judgment.

**Table 1. Third quarter FY 2001 SMIP classified occurrences**

Report Number	Pkg/Trn	HM/W	Off/On	NOC	HC	WHC	WEC	Qty	HSR	RSF	SPR
ALO-AO-BWXP-PANTEX-2001-0037	T	HM	ON	5	7	1	1	1	1	0	1
ALO-AO-BWXP-PANTEX-2001-0043	T	W	ON	3	9	1	1	2	2	0	3
ALO-AO-BWXP-PANTEX-2001-0055	T	HM	OFF	4	7	4	1	3	12	0	3
ALO-LA-LANL-TA55-2001-0019	T	HM	ON	3	7	4	1	4	16	0	1
ALO-LA-LANL-WASTEMGT-2001-0007	T	HM	OFF	4	7	4	1	5	20	0	3
ALO--MCTC-GJPOTAR-2001-0002	P	HM	OFF	1A3	7	4	2	1	8	0	2
CH-AA-ANLE-ANLEAPS-2001-0002	T	HM	OFF	5A	9	1	1	2	2	0	2
CH-AA-ANLE-ANLEPFS-2001-0005	T	HM	OFF	5B	9	1	1	1	1	0	2
CH-BH-BNL-BNL-2001-0014	T	HM	ON	1A1	7	4	2	2	16	0	1
ID--BBWI-CFA-2001-0004	T	W	ON	1A1	9	1	2	2	4	0	1
ID--BBWI-CFA-2001-0010	T	HM	ON	5A	8	2	1	2	4	0	1
ID--BBWI-LANDLORD-2001-0008	T	HM	ON	4	7	4	2	1	8	0	1
ID--BBWI-RWMC-2001-0009	T	HM	OFF	5	7	4	1	4	16	0	3
ID--BBWI-RWMC-2001-0014	T	HM	OFF	4	7	4	2	4	32	0	3
ID--BBWI-RWMC-2001-0015	T	HM	OFF	4	7	4	2	4	32	0	3
ID--BBWI-TAN-2001-0010	P	HM	ON	1A3	7	4	2	1	8	0	1
ID--BBWI-TRA-2001-0006	P	HM	ON	5	7	4	1	5	20	0	1
NVOO--BN-NTS-2001-0006	P	W	OFF	5C	8	2	1	2	4	0	3
NVOO--DTRA-NTS4-2001-0001	P	HM	OFF	1B2	3	2	2	2	8	0	3
ORO--BJC-X10ENVRES-2001-0008	T	HM	OFF	5	7	4	1	2	8	0	2
ORO--BJC-X10ENVRES-2001-0011	T	HM	OFF	4	7	4	1	2	8	0	2
ORO--BJC-X10ENVRES-2001-0015	T	HM	OFF	5B	7	4	1	5	20	0	2
ORO--BJC-X10ENVRES-2001-0020	T	HM	OFF	5	7	4	1	1	4	0	2
ORO--BNFL-K32-2001-0003	T	HM	OFF	7E	7	4	2	2	16	0	3
ORO--BNFL-K32-2001-0004	P	HM	ON	1A1	7	4	2	1	8	0	1
ORO--BWXT-Y12NUCLEAR-2001-0021	P	HM	ON	5	7	4	2	2	16	0	1
ORO--BWXT-Y12SITE-2001-0014	P	W	OFF	1B3	3	2	2	2	8	0	1

**Table 1. Third quarter FY 2001 SMIP classified occurrences (continued)**

Report Number	Pkg/Trn	HM/W	Off/On	NOC	HC	WHC	WEC	Qty	HSR	RSF	SPR
ORO--BWXT-Y12SITE-2001-0020	P	HM	OFF	4	7	4	1	1	8	0	2
ORO--ORNL-X10BOPLANT-2001-0001	T	HM	OFF	5	9	1	1	2	2	0	1
ORO--ORNL-X10BOPLANT-2001-0002	T	HM	OFF	5	9	1	1	2	4	0	2
ORO--ORNL-X10CHEMTEC-2001-0005	T	HM	ON	1A1	7	4	2	3	24	0	1
ORO--ORNL-X10METCER-2001-0002	P	HM	OFF	1A3	7	4	1	1	4	0	1
ORO--ORNL-X10PLEQUIP-2001-0006	P	HM	ON	1B1	3	2	2	2	8	0	1
RFO--KHLL-371OPS-2001-0052	T	HM	ON	5	7	4	1	4	16	0	1
RFO--KHLL-NONPUOPS2-2001-0001	T	HM	ON	3	9	1	1	2	2	0	1
RFO--KHLL-PUFAB-2001-0043	T	HM	ON	5	9	1	1	2	2	0	1
RFO--KHLL-SOLIDWST-2001-0028	P	HM	ON	2B	7	4	1	2	8	0	1
RFO--KHLL-TRANSOPS-2001-0001	T	HM	ON	3	9	1	1	2	2	0	1
RFO--KHLL-WSTMGTOPS-2001-0027	T	HM	ON	5	7	4	1	4	16	0	1
RL--PHMC-FSS-2001-0007	T	HM	OFF	5A	8	2	1	3	6	0	1
RL--PNNL-PNNLBOPER-2001-0007	T	HM	OFF	5	3	2	1	1	2	0	2
SR--WSRC-CSWE-2001-0007	T	HM	OFF	5A	9	1	1	2	2	0	2
SR--WSRC-HCAN-2001-0011	T	HM	ON	1A2	7	4	2	1	8	0	1
SR--WSRC-HTANK-2001-0019	T	HM	ON	1A3	7	4	2	2	16	0	1
SR--WSRC-LTA-2001-0006	T	HM	ON	4	7	4	1	3	12	0	1
SR--WSRC-REACL-2001-0005	T	HM	OFF	1A3	7	4	2	2	16	0	10
SR--WSRC-SLDHZD-2001-0005	T	HM	ON	1A3	7	4	2	1	8	0	1
SR--WSRC-SLDHZD-2001-0006	T	HM	OFF	5C	7	4	1	5	20	0	3
SR--WSRC-SLDHZD-2001-0007	P	HM	ON	2B	7	4	2	5	40	0	1
SR--WSRC-SS-2001-0001	T	HM	OFF	5	7	4	1	4	16	0	3
SR--WSRC-WVIT-2001-0008	T	HM	ON	1A2	7	4	2	2	16	0	1

$W_{HC}$  ranges from a low value of 1 for relatively innocuous hazardous materials (Class 9 materials) to a maximum value of 4 for the most hazardous of the hazardous materials (including Class 1 explosives, Class 4.1 wetted explosives, and radioactive materials).

The factor  $W_{HC}$  provides an indication of a materials potential hazard, but it does not provide a measure of the quantity of material involved. The quantity of material in a shipment can significantly affect the actual hazard posed. One indicator of the relative amount or quantity of material in a shipment is the type of package used. For example, with radioactive materials, where a graded approach to packaging is used, the lower-integrity packages are used for either lower quantities of material or the less hazardous of that class of materials.

Thus, the factor  $Q_{ty}$  is used to indicate the relative amount and graded hazard within a class.  $Q_{ty}$  is based on the type of packaging used in the shipment, which indicates the relative amount and hazard. For example, for radioactive materials, transport of a very low quantity of material is allowed in an excepted package (indicating a very low risk), and the  $Q_{ty}$  value for these packagings is 1. In contrast, a Type B package is used where the risk posed by the contents is high, and the  $Q_{ty}$  value assigned for a Type B package is 5. In addition, a measure is assigned for  $Q_{ty}$  to account for the presence of contamination.

Similar arguments were used to establish the weighting factors for non-radioactive hazardous materials. As a result,  $Q_{ty}$  infers the quantity and relative hazard posed by the hazardous material. It is based upon the packaging requirements for hazardous material specified in the DOT hazardous material regulations and upon pragmatic judgment. The factor  $Q_{ty}$  ranges from a low value of 1 for limited-quantity shipments in excepted packages to a maximum value of 5 for the largest quantities in a class and the most hazardous within a class of materials.

The other parameters of the table are chiefly for classification:

1. The parameter Pkg/Trn is used to denote whether the occurrence is related to packaging, transport, or both.
2. The parameter HM/W is used to identify whether the occurrence involves hazardous material or waste (e.g., Resource Conservation and Recovery Act (RCRA) waste, low-level waste (LLW), transuranic (TRU waste, etc.).
3. The parameter On/Off is used to define whether the occurrence is attributed to onsite or offsite activities.
4. The parameter NOC is the nature of occurrence as identified by the NTP program, not as identified in the ORPS. The NTP NOC evaluates occurrences from the transportation specialist's perspective, whereas the ORPS-assigned NOC is more generic, including other categories.
5. The parameter HC is used to identify the hazard class (or classes) of materials involved in the occurrence. This parameter is key in developing the HSR.



The classification of ORs includes other parameters, such as responsibility allocation (or ownership), which assigns the occurrence to the program—rather than the site—that produced it. However, this parameter was not shown in Table 1 because it will not be discussed in this quarterly report. The other parameters used for classification of the ORs and a fuller discussion of the methodology can be found in the September 1999 SMIP publication *DOE Packaging and Transportation Measurement Methodology for the Safety Metrics Indicator Program*.

## 1.2 FY 2001 THIRD QUARTER ORs ARCHIVED IN THE SUBSIDIARY DATABASE

Eight occurrences were archived in the Subsidiary Database that addressed P&T issues but either did not involve the transport of hazardous material or did not involve transport by truck, boat, plane, or rail. Table 2 presents these occurrences.

The types of incidents that were captured this quarter can be determined by reviewing their titles in Table 2 below.

**Table 2. FY 2001 third quarter ORs of subsidiary database**

Report number	Title	NOC	Off/On
ALO-LA-LANL-FIRNGHELAB-2001-0007	Two pulse-forming network tanks fall off flatbed truck during transportation	5D	ON
HQ--SPR-WH-2001-0003	Offsite brine spill from brine disposal pipeline	1B1	OFF
ORO--ORNL-X10PLEQUIP-2001-0004	Violation of Laboratory Procedure ORNL-TS-001, "ORNL Motor Carrier Safety"	6A	ON
RL--PHMC-324FAC-2001-0005	3-82B cask lift fixture (spreader bar)	2A	ON
RL--PHMC-324FAC-2001-0007	3-82B cask lifting fixture (spreader bar) configuration control	2C	ON
RL--PHMC-SNF-2001-0017	Cask transport thread damage, canister storage building	2A	ON
RL--PHMC-SNF-2001-0023	Cask lid bolts torqued out of sequence	2C	ON
RL--PHMC-WSCF-2001-0004	Facility personnel transferred waste from one SAA to another SAA which is a procedural violation	3	ON

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## 2. FY 2001 THIRD QUARTER SUMMARY OF SELECTED ORs

### 2.1 CATEGORIZATION OF ORs

Using the definitions for occurrence types provided by DOE Order 232.1-1A, "Occurrence Reporting and Processing of Operations Information," the P&T ORs selected for the third quarter were categorized emergency, unusual, or off-normal.

### 2.2 EMERGENCY AND UNUSUAL OCCURRENCES REPORTED

Three of the 51 occurrences that were retrieved and reviewed from the ORPS during this quarter were categorized as unusual and one was categorized as an emergency. All the other ORs were categorized as off-normal. Following is a brief description of the ORs that were categorized as emergency or unusual. The occurrence number assigned by the ORPS to the report appears in brackets at the end of the description.

#### Emergency

A container holding approximately 4 cubic yards of dry radioactive material had been transported from a waste yard to the warehouse area for weighing prior to shipment. After weighing, the container was taken off a truck by a forklift for return to the scrap yard. During transport of the container to the scrap yard, the forklift's front left tire hit a depression in the road that caused container load to shift and fall off the forklift. The contents of the container then spilled on the ground. There was no spread of material outside the immediate area, and there were no personnel injuries. [CH-BH-BNL-BNL-2001-0014]

#### Unusual

1. While an annual OSR surveillance was being performed in TRA-657, a low hazard, non-nuclear facility, it was discovered that documentation for a DOT type B shipping container could not be located. Further investigation showed that although the contents of the container were known (33 pieces of fuel rod from the HB Robinson commercial nuclear power plant), the inventory of radioactive material stored in the container was incomplete. Calculations of the radioactive inventory showed that the sum of ratios for the nuclides present exceeded the threshold for a nuclear facility. Further searches found additional documentation of the radioactive material inventory and confirmed the calculations. [ID--BBWI-TRA-2001-0006]
2. On June 20, 2001, an authorization basis violation was discovered to exist because of the failure to adequately implement all of the controls within the Site Safety Analysis Report. It was determined that the controls for the loading and unloading of nuclear material to and from transport vehicles outside of nuclear facilities were not implemented as required. Specifically, trucking personnel were observed at two Material Stewardship Waste Storage Facilities unloading waste boxes two at a time. Through the discovery process, it was determined that STC-5 limits the unloading/loading of the boxes to one at

a time. The controls for this evolution are included in the Site SAR Site Transportation Control #5 (STC-5), but the required actions of the control were not implemented into the working procedures. [RFO--KHLL-TRANSOPS-2001-0001]

3. On 4/26/01, Westinghouse Savannah River Company Nuclear Materials Management Division (NMMD) was notified that the JRC-20T-01 cask was surveyed at the Japanese Atomic Energy Research Institute in Japan when it was received on February 17, 2001, and was found with higher surface contamination than expected. This cask was shipped offsite on 1/5/01 and surveyed in Japan on 2/17/01. The results were relayed to NMMD on 4/26/01. The maximum non-fixed contamination reported by the Japanese on the surface of the cask was 6.9 Bq/cm<sup>2</sup> beta-gamma (6.9 Bq/cm<sup>2</sup> is equal to 414 dpm/cm<sup>2</sup> or 41,400 dpm/100 cm<sup>2</sup>). The contamination was found in two locations between the fins of the cask on the cask body. At the time the cask was offered for shipment, the NMMD survey met the limit of  $\leq 220$  dpm/100cm<sup>2</sup> beta gamma and  $\leq 22$  dpm/100cm<sup>2</sup> alpha. [SR--WSRC-REACL-2001-0005]

### 2.3 SIGNIFICANT OFF-NORMAL OCCURRENCES REPORTED

Only one incident which was categorized as off-normal had an HSR or RSF greater than 32. The event (report number SR--WSRC-SLDHZD-2001-0007) happened because a Type B packaging for a low specific activity (LSA) shipment was not used for one of the containers in a radioactive waste shipment from one onsite vault area to another.

The OR was not particularly dangerous, but large SMIP-rating numbers were assessed on two of its safety measures. It had an Event Consequence Measure of slight (which is a numerical assignment of 2) because it resulted in "minimal safety consequences with little potential for ultimately leading to suspected endangerment of people ... contamination of property ... or pollution of the environment." However, because it was a radioactive shipment necessitating a Class B packaging, it had a Hazard Classification Measure of 4 and a Quantity Classification Measure of 5.

There were another two ORs that had HSRs of 32:

1. Because of concerns of the Environmental Protection Agency (EPA), the Carlsbad Field Office (CBFO) directed officials at the DOE Idaho Field Office (DOE-ID) to suspend shipments of transuranic (TRU) waste from the Radioactive Waste Management Complex (RWMC) at the Idaho National Engineering and Environmental Laboratory (INEEL) to the Waste Isolation Pilot Project (WIPP) until the EPA could conduct a surveillance of the RWMC Waste Assay Gamma Spectrometer System. The action by the EPA is in response to disclosure by INEEL that waste drums processed through its Waste Assay Gamma Spectrometer System were shipped to WIPP for disposal prior to INEEL's receiving certification authority from the CBFO to use this system as a basis for waste certification and shipment. [ID--BBWI-RWMC-2001-0014]
2. The waste characterization process used at the RWMC to certify TRU waste for transport to the WIPP was not properly validated for 37 drums of TRU waste. Nineteen of these

drums had been shipped to WIPP for disposal. All the drums involved were recently processed through the Gas Generation Test (GGT) System, and the problem was discovered during an internal critique regarding the use of the GGT procedure. This problem resulted from deviation from the established procedure when several steps in the process were bypassed by taking unvalidated data directly from the server and inputting that data directly into the Transuranic Reporting, Inventory, and Processing System database. [ID--BBWI-RWMC-2001-0015]

These occurrences will be revisited throughout the fiscal year and compared with other similar occurrences to determine whether NTPA needs to issue a lessons learned bulletin to address future occurrences of the same type.

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### 3. DISTRIBUTION BY ORGANIZATION AND PARAMETERS

#### 3.1 DISTRIBUTION BY SMIP PARAMETERS

Application of the SMIP severity ratings allows the true significance of the events to be seen. Instead of providing a simple count, these measures allow the threat and severity of an occurrence to be weighed and compared with each other. Looking at the type of material that is being shipped can indicate the magnitude of the problems that could arise. Hence the number of ORs by hazard class is given as Table 3. Note that over two-thirds of the ORs are Hazard Class 7; Class 7 material constitutes the majority of material being shipped as is consistent with past shipping practices. Hazard Class 9, miscellaneous material, also includes many shipments that involve radioactive waste or material, albeit at a lesser activity level.

Even though many of the occurrences involve radioactive material, all of the ORs have event consequence measures ( $W_{EC}$ ) of 2 or less. Thirty-one of the 51 ORs were categorized as having a  $W_{EC}$  of 1 and the others had a  $W_{EC}$  of 2. This means that all of the third quarter FY 2001 ORs had only *slight* consequences at worst (i.e., resulting in minimal safety consequences with little potential for ultimately leading to suspected endangerment of people or environmental contamination). Because the event consequence measure is low, the overall HSRs are relatively low, indicating that the actual risks posed by the occurrences are not highly threatening. In fact, none of the ORs reached the SMIP alarm threshold of 48 for ORs involving non-radioactive material and 60 for occurrences involving radioactive material. See Table 4 for a listing of the number of ORs and the range of HSRs attained.

**Table 3. Distribution of ORs by Hazard Class**

Hazard Class (HC)	Number of ORs
1	0
2	0
3	4
4	0
5	0
6	0
7	34
8	3
9	10
-----	
Total	51

**Table 4. Distribution of ORs by HSR**

HSR	Number of ORs
1	2
2	8
4	6
6	1
8	13
12	2
16	11
20	4
24	1
32	2
40	1
-----	
Total	51

### 3.2 DISTRIBUTION OF ORs BY ORGANIZATION

Table 5 presents the DOE Program Offices and the number of ORs that were reported to them. (Figure 1 is a graphical representation of this distribution.) Environmental Management (EM) programs reported over 64.7% of the ORs generated during this quarter, though one of the occurrences was caused by others (non-DOE sites or non-DOE contractors). Defense programs (DP) accounted for about 17.6% of the ORs reported, while Office of Science (SC) accounts for about 15.7%. Reporting a combined 42 ORs, EM and DP reported about 82% of the P&T-related ORs filed this quarter, which is consistent with past FY reporting profiles.

Non-DOE contractor "others" account for only one 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 6 presents the Operations Offices and the number of ORs that were reported to them; Figure 2 graphically shows this distribution.



**Table 5. OR distribution by DOE Program Office**

Code	Description	No. of ORs	
		Owner	Others
DP	Defense Programs	9	0
EH	Environmental Safety and Health	0	0
EM	Environmental Management	32	1
ER	Energy Research	0	0
FE	Fossil Energy	0	0
NE	Nuclear Energy	1	0
RW	Radioactive Waste Management	0	0
SC	Office of Science	8	0
	Total	50	1
	Grand total		51

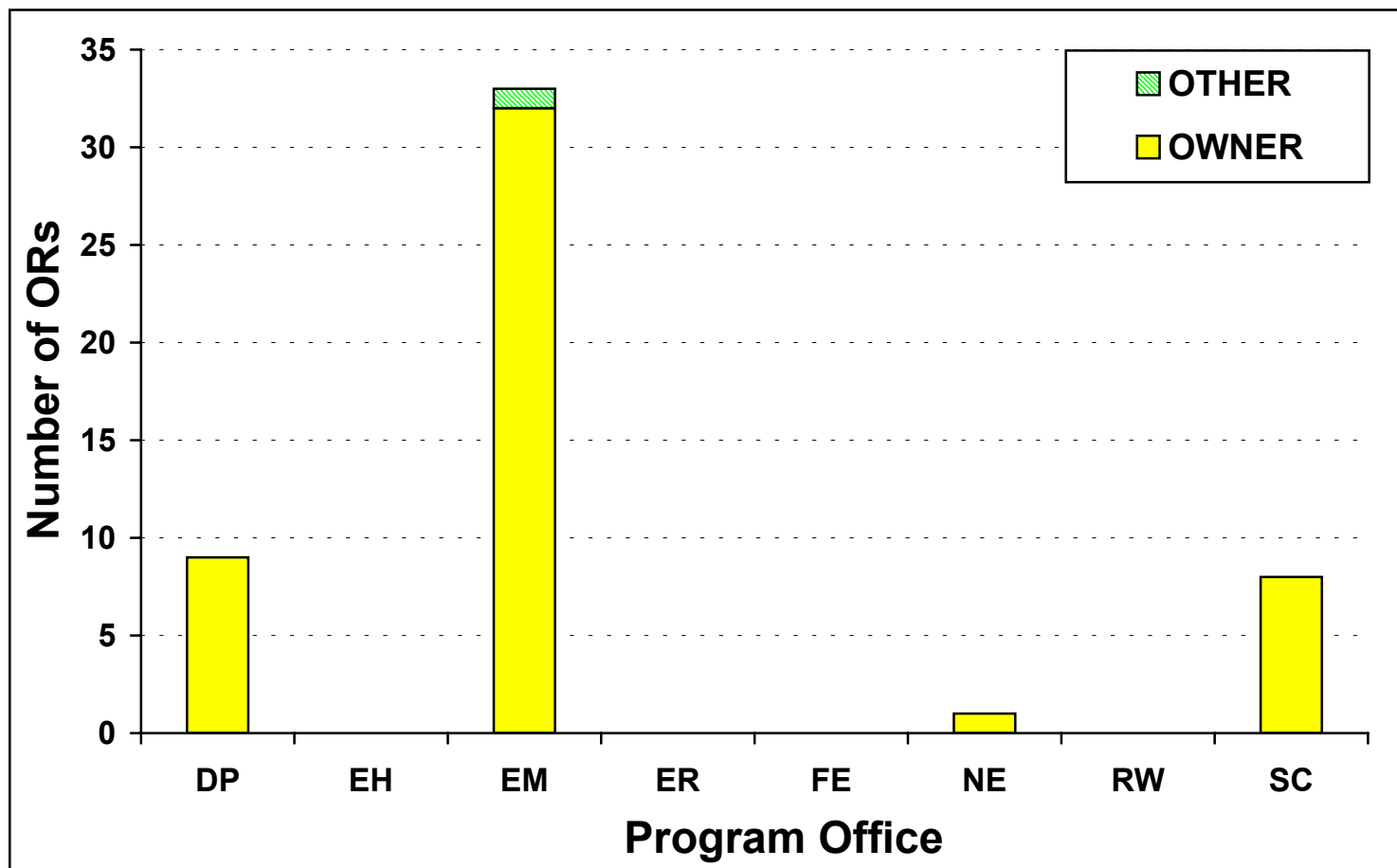


Fig. 1. ORs distribution by DOE Program Office.

**Table 6. OR distribution by DOE Operations Office**

Code	Description	No. of ORs	
		Owner	Others
ALO	Albuquerque Operations	6	0
CH	Chicago Operations	3	0
HQ	DOE Headquarters	0	0
ID	Idaho Operations	8	0
NVOO	Nevada Operations	2	0
OAK	Oakland Operations	0	0
OH	Ohio Field Office	0	0
ORO	Oak Ridge Operations	13	1
RFO	Rocky Flats Operations	6	0
RL	Richland Operations	2	0
SR	Savannah River Operations	10	0
	Total	50	1
	Grand total		51

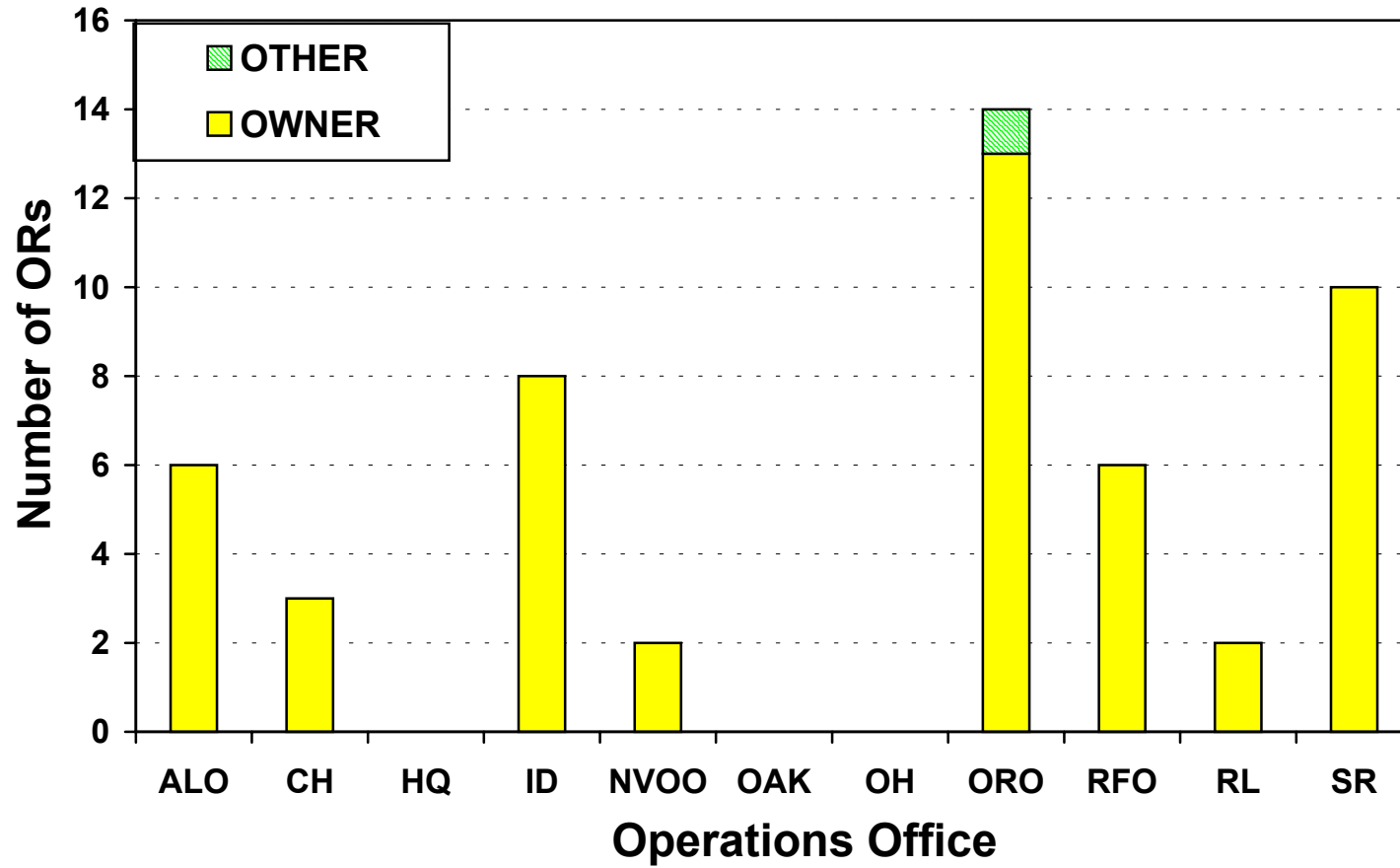


Fig. 2. ORs distribution by Operations Office.

### 3.3 DISTRIBUTION BY NOC

The SMIP categories for coding the nature of the packaging and transportation events are presented along with the quarter's distribution of ORs by code in Table 7. Figure 3 lists the NOCs in a bar-chart format. Shipping preparation events and contamination events continue to be the most frequently occurring types of occurrences. This quarter, 21% (8 of 38) of the occurrences were concerned with violations related to shipping preparation. Also, 21% of the occurrences were related to contamination events (NOC 1). Events involving “storage incident to transport” (NOC 3) accounted for 18% of the ORs reported. Though accounting for only 16% of the events reported, improper hazardous material characterization (NOC 4) can be very serious. However, none of these events had HSRs of greater than 24, and their event consequences were slight. Still, this category will necessitate special attention to ensure that these events do not become more frequent.

**Table 7. OR distribution by NOC**

Code and description	No. of ORs
1. Contamination/Release	
1A. Radioactive	0
1A1. Environmental	4
1A2. Personnel	2
1A3. Equipment	6
1B. Hazardous Materials	
1B1. Environmental	1
1B2. Personnel	1
1B3. Equipment	1
Total	15
2. Packaging	0
2A. Damaged	0
2B. Incorrect Selection	2
2C. Incorrect Procedures	0
Total	2
3. Storage Incident to Transport	4
Total	4

**Table 7. OR distribution by NOC (continued)**

Code and description	No. of ORS
4. Improper Hazardous Material Characterization	8
Total	8
5. Shipment Preparation	13
5A. Shipping Papers	4
5B. Marking	2
5C. Labeling	2
5D. Loading and Tie-downs	0
5E. Placards	0
5F. Radiation Survey	0
Total	21
6. Modal Safety	
6A. Motor or Driver Safety	0
6B. Aircraft Safety	0
6C. Rail Safety	0
6D. Barge Safety	0
6E. Pipeline	0
Total	0
7. Occurrences Created by Others (non-DOE or DOE/Contractor)	0
7A. Shipping Preparation	0
7B. Packaging	0
7C. Reserved	0
7D. Vehicle or Driver Safety	0
7E. Contamination	1
7F. Not otherwise specified	0
Total	1
Grand Total	<u>51</u>

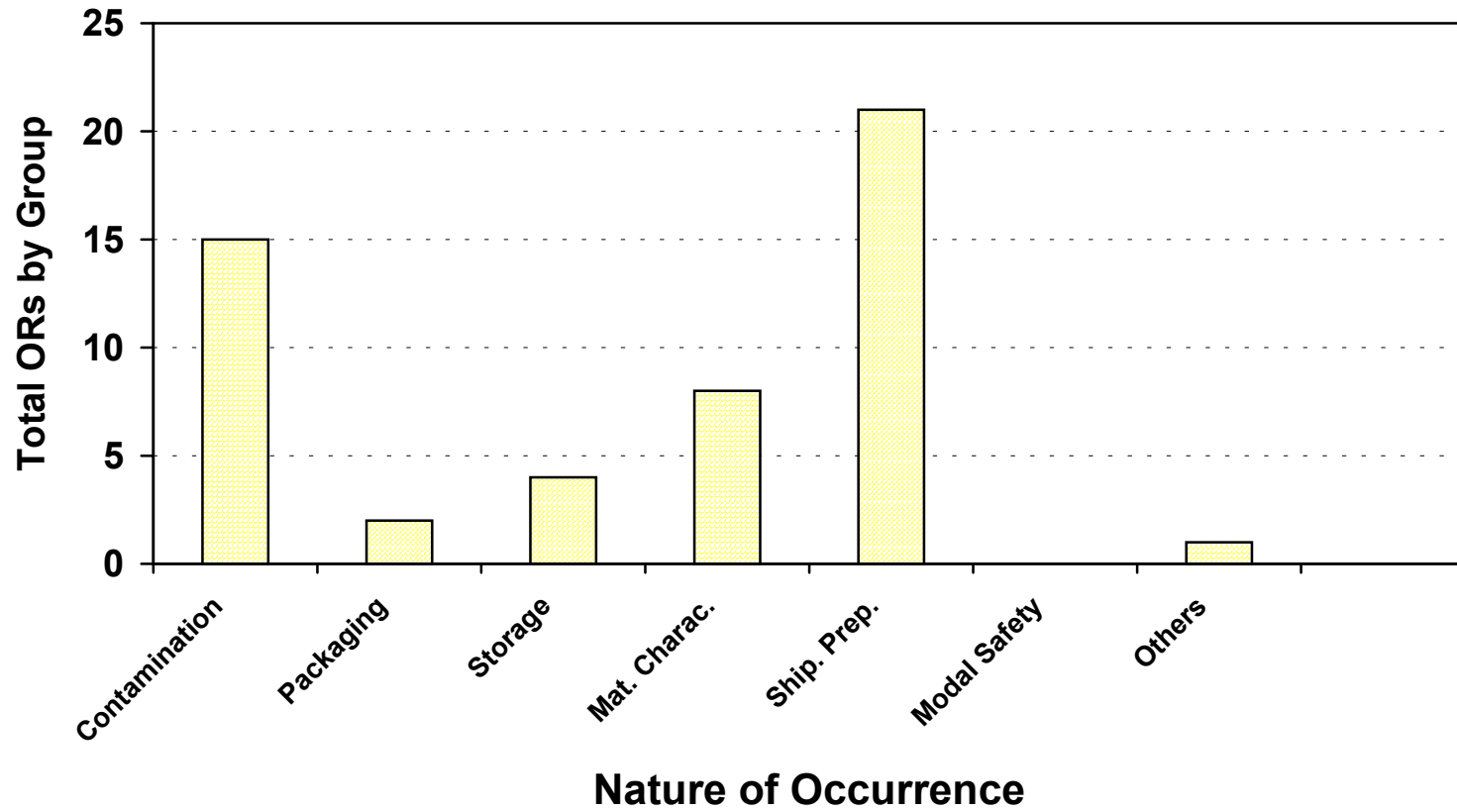


Fig. 3. ORs distribution by NOC.

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#### 4. FUTURE DIRECTION

Based upon the number of occurrences included in this third quarter report and the number of first and second quarter P&T-related reports included in the SMIP P&T Occurrence Database (approximately 110), it is possible that the total number of FY 2001 occurrences will be over 200. This would represent a 25% increase in occurrences because the previous five fiscal years have averaged 150 occurrences annually. However, the occurrences that have been selected for the first and second quarter have not been thoroughly reviewed. Hence it is possible that the increase in ORs will not be as pronounced as the preliminary data indicate.

The NTPA is working on integrating functions of ETAS into ATMS. Once ETAS functionality has been incorporated into ATMS and other updates and improvements have been implemented, ATMS will be able to more speedily provide data and consistent information that can be used for normalization of ORs.

This report will be posted electronically on the NTPA website at <http://www.ntp.doe.gov/>. Because this is the first time that the NTPA has published a quarterly report, the format is not yet fixed. The descriptive summary of the ORs provided in the appendix may be considered for incorporation into the annual report itself. While keeping in mind that the FY annual report is much more detailed with analysis, suggestions from the DOE field on how to make the report more comprehensive would be appreciated.

The quarterly report for the fourth quarter of FY 2001 will be completed during October 2001.

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**Appendix A**

**SUMMARY TABLE OF THIRD QUARTER FY 2001 OCCURRENCES**

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**Table A.1. Summary of third quarter FY 2001 occurrences**

<b>Report Number</b>	<b>Summary of Occurrence</b>	<b>HSR</b>	<b>SPR</b>
ALO-AO-BWXP-PANTEX-2001-0037	An unauthorized move of low-level radioactive soil samples (contained within two shipping coolers) was initiated by General Stores. The samples were originally received at General Stores from an off-site laboratory.	1	1
ALO-AO-BWXP-PANTEX-2001-0043	On March 21, 2001, Safety-Kleen serviced parts washers from Pantex and loaded the recyclable material on their truck for shipment to Denton, Texas. The waste material was manifested with destination through Safety-Kleen, Amarillo Branch Office, to final deposition at Safety-Kleen Recycling Center in Denton, Texas. On April 17, 2001, the Waste Operations Department was notified by the Amarillo Branch Office Manager that two containers weighing 66 pounds (approximately 8 gallons) were misplaced.	2	3
ALO-AO-BWXP-PANTEX-2001-0055	At 0806 on May 30, 2001, the Explosives Storage Operations Section Manager received information from the Pantex Traffic Department about an explosives shipment from Pantex to LLNL. The LLNL Traffic Department informed them that a shipment sent by Pantex to LLNL on January 31, 2001 was misidentified.	12	3
ALO-LA-LANL-TA55-2001-0019	Technical Area 55 (TA-55) deputy Facility Manager determined that a Potentially Inadequate Safety Analysis involving the TA-55 waste drum staging facility located at TA-55, Building 185 (TA-55-185), existed.	16	1
ALO-LA-LANL-WASTEMGT-2001-0007	LANL determined that shipping manifest discrepancies resulted in a violation of DOT shipping and labeling regulations associated with two recent shipments of transuranic waste from LANL to the Waste Isolation Pilot Project (WIPP). Essentially, the shipping manifest documented a lower amount of transuranic activity in the waste containers than had been determined by certified assay.	20	3

**Table A.1. Summary of third quarter FY 2001 occurrences (continued)**

Report Number	Summary of Occurrence	HSR	SPR
ALO--MCTC-GJPOTAR-2001-0002	An employee of the Grand Junction Office (GJO) contractor MACTEC-ERS was performing a radiological survey of scrap-galvanized pipe at the Tuba City, Arizona environmental remediation site when he detected radioactivity above established limits. Shortly thereafter it was determined that some of the potentially contaminated piping had been donated to a local public school for use in building fences.	8	2
CH-AA-ANLE-ANLEAPS-2001-0002	Federal Express (FedEx) returned experiment samples to the Laboratory due to improper shipping documentation: specifically, the absence of an authorization signature on the Shipper's Declaration for Dangerous Goods.	2	2
CH-AA-ANLE-ANLEPFS-2001-0005	Plant Facilities Services Shipping and Materials was notified—by return of a package from FedEx— that the package had been rejected at the FedEx acceptance-screening center. Because of the omission of an identification number on the external surface of the package, the package was rejected due to noncompliance with the marking requirements for packages of hazardous materials as indicated in 49 CFR 172.301(a).	1	2
CH-BH-BNL-BNL-2001-0014	A container holding approximately 4 cubic yards of dry radioactive material spilt its contents while being transported by forklift.	16	1
ID--BBWI-CFA-2001-0004	Acidic samples from a tank had been collected, placed in a cooler, and taken to the gate in the fence surrounding the tank where a step-off pad was located. As the samples were surveyed, a bag containing four 40-milliliter (ml) vials was dropped on the asphalt and one vial broke, rupturing the bag and contaminating the asphalt to 100,000 dpm/probe area beta/gamma.	4	1

**Table A.1. Summary of third quarter FY 2001 occurrences (continued)**

Report Number	Summary of Occurrence	HSR	SPR
ID--BBWI-CFA-2001-0010	A Central Facilities Area Warehouse delivery was made to a Test Reactor Area (TRA) building which consisted partially of a box that contained a Lithium Hydride desiccant and five pallets holding one hundred and twenty 24-volt batteries. This resulted in several violations: (1) the driver did not have the shipping papers in his direct possession, (2) the delivery truck was not marked with the appropriate placard for "Corrosive" materials, and (3) a potential issue was raised concerning the segregation of these materials.	4	1
ID--BBWI-LANDLORD-2001-0008	Radiological Controls Technicians performing routine surveys at the Central Facilities Area (CFA) landfill found two pieces of equipment with fixed beta-gamma contamination. The levels of contamination exceeded the reportability threshold for on-site contamination found outside a controlled area. The Idaho Nuclear Technology and Engineering Center (INTEC) is suspected to have lost control of radioactive material.	8	1
ID--BBWI-RWMC-2001-0009	It has been determined that one of the transuranic (TRU) waste drums shipped from the INEEL to the WIPP in TRU waste shipment IN010053 was not the drum identified on the shipping documents.	16	3
ID--BBWI-RWMC-2001-0014	Because of concerns by the EPA, the Carlsbad Field Office (CBFO) directed officials at the DOE-ID to suspend shipments of transuranic (TRU) waste from the Radioactive Waste Management Complex (RWMC) at the INEEL to the WIPP until the EPA could conduct a surveillance of the RWMC Waste Assay Gamma Spectrometer System. The action by the EPA is in response to disclosure by INEEL that waste drums processed through its Waste Assay Gamma Spectrometer System were shipped to WIPP for disposal prior to INEEL's receiving certification authority from the CBFO to use this system as a basis for waste certification and shipment.	32	3

**Table A.1. Summary of third quarter FY 2001 occurrences (continued)**

Report Number	Summary of Occurrence	HSR	SPR
ID--BBWI-RWMC-2001-0015	The waste characterization process used at the RWMC to certify TRU waste for transport to the WIPP was not properly validated for 37 drums of TRU waste. Nineteen of these drums have been shipped to WIPP for disposal. This problem resulted from deviation from the established procedure when several steps in the process were bypassed.	32	3
ID--BBWI-TAN-2001-0010	While preparing for a shipment to the Power Burst Facility, two Waste Generator Services personnel received contamination on their gloves that was up to levels of 20,000 dpm/gamma of Cs-137.	8	1
ID--BBWI-TRA-2001-0006	During an annual surveillance in TRA-657, a low hazard, non-nuclear facility, it was discovered that documentation for a DOT type B shipping container could not be located. Further investigation showed that although the contents of the container were known, the inventory of radioactive material stored in the container was incomplete. Calculation of the radioactive inventory showed that the sum of ratios for the nuclides present exceeded the threshold for a nuclear facility.	20	1
NVOO--BN-NTS-2001-0006	The Bechtel Nevada Hazardous Waste Operations received a call from a vendor that disposes of the facilities hazardous waste reporting that they had received a jar of elemental mercury that had a radioactive "trifol" label attached to it.	4	3
NVOO--DTRA-NTS4-2001-0001	While a shipment of dimethyl methylphosphonate was being loaded without authorization, personnel were contaminated by it.	8	3
ORO--BJC-X10ENVRES-2001-0008	After truck was loaded with three super-sack containers of radiologically contaminated soil, the driver departed without the required shipping papers.	8	2



**Table A.1. Summary of third quarter FY 2001 occurrences (continued)**

Report Number	Summary of Occurrence	HSR	SPR
ORO--BJC-X10ENVRES-2001-0011	Three samples from the Tank W1-A excavation were shipped to an off-site facility as "Radioactive Material, Limited Quantity of Material." Survey of the package at the off-site facility indicated a contact reading of 4.5 mr/hr. DOT regulations state that "Limited Quantity" shipments must not exceed 0.5 mr/hr on contact.	8	2
ORO--BJC-X10ENVRES-2001-0015	A subcontractor shipped a fissile controlled shipment from ETTP to ORNL, Building 7824, Waste Examination Assay Facility. The transport index was not included on the hazardous material shipping papers, as required by 49 CFR 172.203.	20	2
ORO--BJC-X10ENVRES-2001-0020	A subcontractor performing work at ORNL Building 3505 returned a leased JLG lift to the vendor without notifying contractor personnel. Later, Bechtel Jacobs Company personnel identified the possibility that an offsite release survey had not been performed prior to return to the vendor; indeed, radiation levels exceeding the levels for offsite release were confirmed.	4	2
ORO--BNFL-K32-2001-0003	An unloaded railcar used exclusively by the BNFL project for the transport of low-level radioactive waste containers to the EnviroCare facility in Utah arrived at the project site with loose debris that had maximum contamination levels of 1,060 dpm/100 cm <sup>2</sup> removable and 48,000 dpm/100 cm <sup>2</sup> total.	16	3
ORO--BNFL-K32-2001-0004	Yellow discoloration was found in a staging area for LLW shipping containers. The staging area is inside a controlled area that was not designated as a radiologically controlled area. A survey of the area discovered radioactive contamination (240K total, 2K removable dpm/100 cm <sup>2</sup> beta/gamma and 50K total, less than 1000 dpm/100 cm <sup>2</sup> transferable alpha).	8	1

**Table A.1. Summary of third quarter FY 2001 occurrences (continued)**

Report Number	Summary of Occurrence	HSR	SPR
ORO—BWXT-Y12NUCLEAR-2001-0021	A critique was conducted on the improper intraplant shipment of parts. The parts were moved from Building 9204-2E to Building 9204-2 in a container marked as empty.	16	1
ORO—BWXT-Y12SITE-2001-0014	Analytical Chemistry was notified by BWXT Y-12 Environmental Compliance Department that a drum of organic waste had leaked a small amount of its contents around the bung and that some liquid was visible on the top of the drum. The organic waste is a Class 3 liquid that included RCRA and polychlorinated biphenyl (PCB) wastes.	8	1
ORO—BWXT-Y12SITE-2001-0020	The Y-12 RadCon Organization contacted the DOE to notify them that approximately four used utility poles had been released to the public without being adequately surveyed for radiological contamination.	8	2
ORO—ORNL-X10BOPLANT-2001-0001	In the process of making an off-site delivery of one helium dewar, the truck drivers failed to pick up the necessary shipping papers. A transportation specialist prepared the necessary shipping papers and proceeded to give them to the drivers when he discovered that the drivers had already left for delivery.	2	1
ORO—ORNL-X10BOPLANT-2001-0002	During an assessment of ORNL's Pollution Prevention Program, it was discovered that used photographic wastes were sent for reclamation and an employee without the necessary training signed the shipping paper. Additionally, some used film was occasionally transported under a shipping paper instead of a manifest. In those cases, the material was not properly classified in accordance with EPA and DOT Regulations.	4	2

**Table A.1. Summary of third quarter FY 2001 occurrences (continued)**

Report Number	Summary of Occurrence	HSR	SPR
ORO—ORNL-X10CHEMTEC-2001-0005	Building 3047 facility personnel were moving on-site transfer casks when contamination was detected on and beneath the cask. The highest levels of contamination were 9 milliroentgens/hour beta-gamma and 250,000 disintegrations per minute (dpm)/square centimeters (cm <sup>2</sup> ) beta-gamma transferable on the concrete beneath the cask.	24	1
ORO—ORNL-X10METCER-2001-0002	ORNL personnel were notified that intake air filters received at Toxco Company at the ETTP site were discovered with elevated radiation readings of about 1200 dpm, or 200 dpm over the 1000–dpm release limit.	4	1
ORO—ORNL-X10PLEQUIP-2001-0006	Plant and Equipment Division hoisting and rigging personnel were loading transformers into a vendor truck. During the final loading operation, a valve sheared off a transformer allowing approximately 90 gallons of oil to leak onto the truck and ground.	8	1
RFO--KHLL-371OPS-2001-0052	Facility management discovered that during a planned shipment of drums that occurred on 6/11/01 to Building 569, facility personnel did not follow all procedural requirements. Material was moved across Material Balance Area boundaries without proper documentation and without notification to appropriate personnel when an anomalous condition was discovered.	16	1
RFO--KHLL-NONPUOPS2-2001-0001	The Facility Manager was notified that personnel packaging waste the previous afternoon in Building 444 had used an uncertified crane to lift waste materials into a storage container for disposal. This overhead crane did not meet the monthly and annual inspections requirements.	2	1
RFO--KHLL-PUFAB-2001-0043	The Building 707 Configuration Control Authority was notified that 30 drums containing concrete berm waste had been shipped to Building 371. However, the Nuclear Material Drum Transfer Report sent with the drums only had 29 drums listed. Further investigation determined that the 30th drum that was sent was planned for shipment on the following day.	2	1

**Table A.1. Summary of third quarter FY 2001 occurrences (continued)**

Report Number	Summary of Occurrence	HSR	SPR
RFO--KHLL-SOLIDWST-2001-0028	It was discovered that a legacy pipe overpack component was shipped from Building 776 to Building 664 without verification of proper package integrity.	8	1
RFO--KHLL-TRANSOPS-2001-0001	An Authorization Basis violation was discovered to exist due to the failure to adequately implement all of the controls within the Site Safety Analysis Report. It was determined that the controls for the loading and unloading of nuclear material to and from transport vehicles outside of nuclear facilities were not implemented as required. The specific observation that triggered the issue was that Trucking personnel were observed at two Material Stewardship Waste Storage Facilities unloading waste boxes two at a time rather than singly.	2	1
RFO--KHLL-WSTMGTOPS-2001-0027	A shipment of 10 drums was received from Bldg 371 with the Nuclear Material and Drum Transfer Report indicating that there were 16 drums in the shipment.	16	1
RL--PHMC-FSS-2001-0007	Smoke generators were transported by Transportation Operations Stores drivers to 2355 Stevens Drive without proper hazardous material documentation.	6	1
RL--PNNL-PNNLBOPER-2001-0007	A PNNL staff member transported an unmarked "cooler" containing thirteen 10 ml vials from the Marine Sciences Laboratory in Sequim, WA to the Richland, WA in her personal vehicle. The vials contained samples of a minute quantity of test material suspended in ethanol, a Class III flammable substance.	2	2
SR--WSRC-CSWE-2001-0007	A package containing hazardous material was picked up by FedEx from the Savannah River Site. Prior to leaving the Augusta, GA., FedEx terminal, it was discovered the package label did not contain the shipper's return address, which is in violation of DOE Order 232.1A.	2	2

**Table A.1. Summary of third quarter FY 2001 occurrences (continued)**

Report Number	Summary of Occurrence	HSR	SPR
SR--WSRC-HCAN-2001-0011	Two samples from H-Canyon vessel 12.1 were delivered to the 772-F sample unloading area. A radiological survey by Radiological Control Operations (RCO) personnel identified alpha contamination on one of the secondary containment polyethylene (poly) bottles and the hands of the sample truck driver. The sample truck driver's left and right hands were contaminated with 600 and 400 dpm per 100 cm <sup>2</sup> of alpha radioactivity, respectively.	8	1
SR--WSRC-HTANK-2001-0019	During a routine weekly contamination survey of a restricted use truck, transferable beta-gamma contamination levels of 200,000 dpm per probe and fixed beta-gamma contamination levels of 35 mrem/hr at 5 cm were identified in the bed of the truck.	16	1
SR--WSRC-LTA-2001-0006	Actinide Technology Section notified the Savannah River Technology Center Laboratory Operations shift manager that a shipment of a reportable quantity of Special Nuclear Material was received at 773-A, E-Wing Sample Receiving from H-Canyon. The nuclear material custodian, who had the appropriate Intercustodial & Intersectional Nuclear Transport Report, did not directly receive the sample. Receipt by E-Wing personnel is a violation procedure.	12	1
SR--WSRC-REACL-2001-0005	WSRC Nuclear Materials Management Division was notified that the JRC-20T-01 cask was surveyed at the Japanese Atomic Energy Research Institute in Japan when it was received and was found with surface contamination higher than expected	16	10
SR--WSRC-SLDHZZ-2001-0005	Upon completion of filling a transport tanker at TRU Pad 6, the tanker was being moved from TRU Pad 6 to the Effluent Treatment Facility. Prior to the transport tanker leaving E-Area, operations checked the tanker for leaks and found approximately one half a cup of liquid on the top of the tanker. The smears indicated 56 dpm alpha and less than 200 dpm beta gamma.	8	1

**Table A.1. Summary of third quarter FY 2001 occurrences (continued)**

<b>Report Number</b>	<b>Summary of Occurrence</b>	<b>HSR</b>	<b>SPR</b>
SR--WSRC-SLDHZZ-2001-0006	The facility was notified by the WIPP in New Mexico that TRUPACT II containers 140 and 141 were mislabeled. These containers were shipped from the Savannah River Site.	20	3
SR--WSRC-SLDHZZ-2001-0007	The appropriate packaging for a low specific activity shipment, Type B, was not used for one of the containers in a radiological waste shipment from N-Area to E-Area Vaults.	40	1
SR--WSRC-SS-2001-0001	After an IGLOO shipment of tritium was scheduled and subsequently canceled during April, another IGLOO shipment was confused with it during a May shipment.	16	3
SR--WSRC-WVIT-2001-0008	An operator alarmed a Personnel Contamination Monitor after working in a contamination area on the removal and placement of contaminated pump volute into a B-25 box. Personnel found 100,000 dpm beta-gamma emitting contamination on the employee's left modesty clothing shirtsleeve (personal T-shirt).	16	1