Department of Energy
Germantown, MD 20874-1290

May 29, 1996

Dr. George W. Cunningham
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, Suite 700
Washington, DC 20004

Dear Dr. Cunningham:

1995 PROFILE OF THE STATUS OF RADIOLOGICAL PROTECTION PROGRAMS IN THE DOE COMPLEX

The Office of Oversight, Senior Radiological Protection Officer (SRPO), has completed an update of the status of the radiological protection programs within the Department of Energy. In support of our continuous discussions on this matter and in recognition of your staff's interest on this subject, a copy of the report is enclosed for your information. This review is a follow-up of the initial review of the calendar year 1994 status, reported in April 1995. The May 1996 report covers the status of the Department's radiological protection programs during calendar year 1995.

The updated report focuses on significant aspects of radiological protection programs at ten major defense-related sites: Fernald Environmental Management Project, Idaho National Engineering Laboratory, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, Oak Ridge, Pantex Plant, Hanford, Rocky Flats, Sandia National Laboratory - New Mexico, and Savannah River. The profile of the DOE complex is a composite of these ten sites, and although it does not include all sites where DOE has radioactive material or radiation sources, it is believed to be a useful approach to visualizing the complex-wide program and its performance. These ten sites represent approximately 70% of the total collective radiation dose received by DOE and contractor employees at all Department of Energy sites.

Review of the Department's radiation protection programs is a routine effort as part of the Department's oversight mission and its commitment to inform the Board.

Should you have any questions regarding the enclosed report, please contact me on (301) 903-3777, or Oliver D. T. Lynch, at (301) 903-3548.

Sincerely,

Glenn S. Podonsky
Deputy Assistant Secretary
Office of Oversight
Environment, Safety and Health

Enclosure

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OFFICE OF OVERSIGHT
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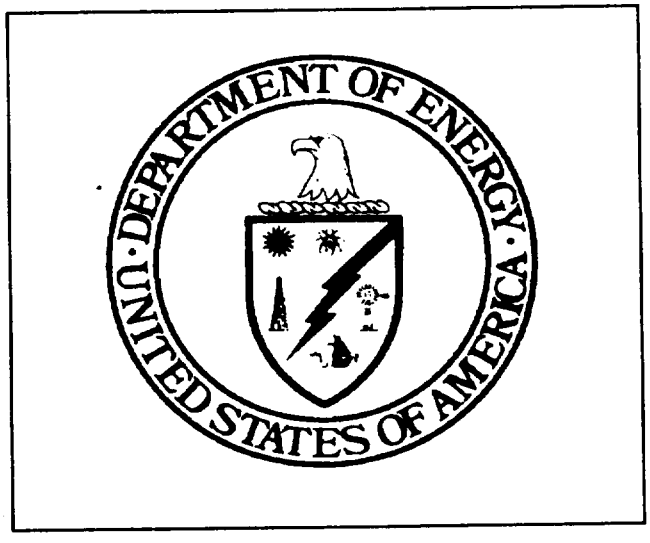

TASK TEAM REPORT

1995 PROFILE OF THE STATUS OF RADIOLOGICAL PROTECTION PROGRAMS IN THE DOE COMPLEX

May 1996

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LIST OF ACRONYMS

AAO	Amarillo Area Office
ABHP	American Board of Health Physics
ALARA	As Low As Reasonably Achievable
AL	Albuquerque Operations Office
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulations
CHCM	Certified Hazards Control Manager
CSP	Certified Safety Professional
DIL	Derived Investigation Level
DoD	Department of Defense
DOE	Department of Energy
DOELAP	DOE Laboratory Accreditation Program
DP	Office of Defense Programs
EH	Office of Environment, Safety and Health
EM	Office of Environmental Management
ER	Office of Energy Research
ES&H	Environment, Safety and Health
FAO	Fernald Area Office
FEMP	Fernald Environmental Management Project
FERMCO	Fernald Environmental Restoration Management Corporation
ID	Idaho Operations Office
IMC	Integrating Management Contractor
INEL	Idaho National Engineering Laboratory
KH	Kaiser Hill
LAAO	Los Alamos Area Office
LANL	Los Alamos National Laboratory
LITCO	Lockheed Idaho Technologies Company
LLNL	Lawrence Livermore National Laboratory
LMES	Lockheed Martin Energy Systems
MKF	MK Ferguson-Oak Ridge Company
MSC	Manufacturing Services Corporation
NE	Office of Nuclear Energy
NRRPT	National Registry of Radiation Protection Technologists
NUREG	Nuclear Regulatory Commission document
OR	Oak Ridge Operations Office
ORNL	Oak Ridge National Laboratory
ORPS	Occurrence Reporting and Processing System
PNNL	Pacific Northwest National Laboratory
PTX	Pantex Plant
RCM	Radiological Control Manual
RCT	Radiological Control Technician
RF	Rocky Flats Site

RFETS	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
RL	Richland Operations Office
SNL	Sandia National Laboratory
SR	Savannah River Operations Office
SRS	Savannah River Site
TEDE	Total Effective Dose Equivalent
TIM	Training Implementation Matrix
TQP	Technical Qualification Program
WHC	Westinghouse Hanford Company
WSRC	Westinghouse Savannah River Company

1995 PROFILE OF THE STATUS OF RADIOLOGICAL PROTECTION IN THE DOE COMPLEX

1.0 INTRODUCTION

The Office of Oversight was created on December 18, 1994, to consolidate oversight of occupational safety, health, safeguards, and security activities within one independent organization. To better understand the status of radiological protection within the Department of Energy (DOE) complex, on February 13, 1995, the Deputy Assistant Secretary for Oversight appointed the Senior Radiological Protection Officer for the Office of Oversight, and on February 21, 1995, tasked him to assess the status of radiological protection programs within the DOE complex.

In response to this task, a report compiling information relative to the status of radiological protection programs at ten major defense-related sites for 1994 was completed and issued in April 1995. Information in the report was expressed as a narrative description, i.e., a "profile" of the radiological protection program across the DOE complex as well as individually for the ten sites. The report focused on significant performance aspects within radiological protection programs, and also served as a foundation for subsequent updating and performance trend analysis by the Office of Oversight.

Radiological performance data for the DOE complex is currently documented in a variety of reports. The DOE Office of Environment, Safety and Health (EH) produces an annual exposure report (last published in 1994 for 1991 data), which provides collective dose breakdowns by operations office, facility type, and worker categories. The DOE Office of Environmental Management (EM) has recently begun producing a report containing radiological data and performance indicators with a focus on EM sites; the latest EM report was produced in March 1996 for 1994 data.

Given the lack of timely data and limited scope of these other reports, the Office of Oversight Senior Radiological Protection Officer deemed it appropriate to reissue this oversight report with updated 1995 performance data. The Office of Oversight will use this report in evaluating of radiological protection performance and scheduling oversight activities.

During review of data collected for the production of this report, anomalies were noted that call into question the quality of data maintained or the methodology of collection for some topics presented in the previous report. As an example, discrepancies were noted with data collected on radioactive/mixed waste inventories; consequently, these data were not used for trend analysis. Although efforts have been made to resolve uncertainties associated with the data presented in this report, the uncertainties should

be recognized, and, for those particular topics, this report should be used as a general indicator of radiological program status rather than as a definitive resource.

2.0 SCOPE

Radiological performance and dose data, program staffing numbers, and information on facility-specific radiological hazards were collected for the following DOE sites: Fernald, Hanford, Idaho, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, Oak Ridge (Oak Ridge National Laboratory, Y-12, and K-25), Pantex, Rocky Flats, Sandia National Laboratory - New Mexico, and Savannah River. These data were collected by the EH Residents at these respective sites using a formal questionnaire. Since these ten sites contain all types of radiological hazards and most of DOE's workers, data from these sites are generally representative of the status of radiological protection across the complex.

A significant addition to the current report was the collection of data relative to the qualifications and training of DOE and contractor radiological protection staff. These data were collected to review the status of commitments made in DOE Implementation Plans for Defense Nuclear Facilities Safety Board Recommendations 91-6 and 93-3.

3.0 RESULTS: RADIOLOGICAL PROTECTION PROFILE OF THE DOE COMPLEX

Radiological performance data indicate that for the conditions experienced during 1995, workers within the complex were adequately protected from exposure to radiation and radioactive materials. Radiological protection programs have been established and are being implemented consistent with Presidential guidance, "Radiation Protection Guidance to Federal Agencies for Occupational Workers," issued on January 20, 1987. The Department's primary standard for implementing this guidance is 10 CFR 835, "Occupational Radiation Protection." DOE contractors were required to be in compliance with 10 CFR 835 as of January 1, 1996. DOE Order 5480.11 and the DOE Radiological Control Manual remain in effect to the extent they are retained in individual site operating contracts or the radiological protection plans required by 10 CFR 835.

To assess the risks associated with a worker's exposure to radiation, the nuclear industry, including DOE, uses the "rem" as the basic unit of radiation dose measurement. Department and regulatory requirements limit a worker's total effective dose equivalent (TEDE) (the sum of external and internal doses) to 5 rem per year, except in special situations. Radiation dose to members of the general public is limited to 0.1 rem per year. Radiation doses to populations are indicated as collective doses in terms of person-rem, i.e., the sum of all TEDE received by the population (such as the DOE workforce).

As in 1994, during 1995 no worker exposures in excess of the annual TEDE limit of 5 rem were reported for the ten sites reviewed. One worker was potentially exposed in excess of 5 rem at the Lawrence Livermore National Laboratory; however, evaluation of the actual dose (resulting from a radioactive material intake) has not been completed. Approximately 96% of the DOE workers monitored for external exposure at the ten sites received doses less than that permitted for members of the general public (0.1 rem). This can be attributed to line management's commitment to safety, radiation worker training and performance, and the contractors' radiological protection staffing commitment of 881 non-hourly and 2222 hourly workers. This large percentage may also indicate that large numbers of personnel are provided dosimetry when not required by Department regulations or directives.

The Nuclear Regulatory Commission reported in NUREG-0713, Vol. 16, "Occupational Radiation Exposure at Commercial Power Reactors and Other Facilities 1994," that 151,556 individuals were monitored for external exposure and accumulated a collective dose of 24,740 person-rem, with 50,473 individuals (33.3 percent) receiving deep dose equivalents in excess of 0.1 rem. For comparison, in 1995, the ten DOE sites routinely monitored 76,597 individuals for external exposure and accumulated a collective dose of 1448 person-rem. Of these, 3255 individuals (4.3 percent) received a deep dose equivalent in excess of 0.1 rem.

The DOE field radiological protection staff consisted of 65 personnel in 1995, including both Federal employees and support service contractors.

The profile presented here is a composite of ten DOE sites. Although it does not include all sites where DOE has radioactive material or radiation sources, it is believed to be a useful approach to visualizing the complex-wide program and its performance. Review of collective dose values for the ten sites included in this report determined that they constitute the majority of the Department's total collective dose, and are therefore fairly representative of overall program performance. For example, in 1994 the collective dose at the ten sites was 1308 person-rem, or approximately 70% of the DOE-wide total of 1835 person-rem.

General Overview

DOE's mission involves many activities that could result in worker exposure to radiation, and the generation of liquid, airborne, and solid radioactive waste streams. DOE reported 407 nuclear and 888 radiological facilities within the ten sites involved in weapons maintenance and dismantlement; operation of nuclear reactors; handling of plutonium, uranium, and thorium in various forms; handling and storage of mixed fission products and spent nuclear fuel; processing of radioactive waste; use of accelerators and x-ray machines; and a myriad of activities associated with remediation of formerly used facilities. DOE sites have established posted radiological controls, including controls for radiation areas, high radiation areas, very high radiation

areas, airborne radioactive material areas, contamination areas, and high contamination areas.

During 1995, 121 radiological events were reported pursuant to DOE Order 5000.3B as unusual radiological occurrences. No radiological emergencies were reported. The unusual radiological occurrences involved topics such as radiological monitoring equipment operability, skin contamination, and discovery of radioactive materials outside controlled areas.

Radiological Protection Organizations

For the ten sites, DOE had 65 designated radiological protection positions, some part-time, filled by 46 Federal employees and 19 support service contractors in 1995. Five of the DOE radiological protection individuals are certified by the American Board of Health Physics (ABHP); two of the individuals are registered by the National Registry of Radiation Protection Technologists (NRRPT). Four of the DOE support contractors are ABHP certified and one is registered by the NRRPT.

DOE contractor organizations currently have 881 non-hourly and 2222 hourly radiological protection positions. This represents a 9 percent decrease in the total staffing level since 1994. Of these positions, 81 of the non-hourly personnel (9 percent) are certified by the ABHP, and 302 (14 percent) are registered by the NRRPT or certified by state organizations.

Personnel Dosimetry

External dosimetry programs at all ten sites have received certification from the DOE Laboratory Accreditation Program (DOELAP). This program is very similar to the National Voluntary Laboratory Accreditation Program used in the commercial nuclear industry. During 1995, DOE contractors at the ten sites issued DOELAP-approved personnel dosimeters to 76,597 individuals, a 9 percent decrease from 1994. Also during 1995, 3,255 personnel received deep dose equivalents greater than 100 mrem, representing an approximate 13 percent increase compared to 1994.

The collective TEDE for 1995 was 1,448 person-rem—an 11 percent increase from 1994. No exposures in excess of the 5 rem TEDE limit were reported; however, a potential exposure in excess of 5 rem may have occurred as the result of an accidental intake at Lawrence Livermore National Laboratory. The resulting worker dose from that intake is still being evaluated. No planned special exposures, as permitted by DOE regulations, were authorized during the period.

During 1995, 32,626 individuals participated in contractor-operated bioassay monitoring programs, an approximate 25 percent reduction from 1994. The reduction resulted largely from intentional cost-saving reductions in the number of personnel

monitored at three sites. Fourteen individuals received intakes of radioactive material resulting in committed effective dose equivalents (CEDE) in excess of 100 mrem. Nine of the ten sites included in this review have formal technical basis documents for their internal dosimetry/bioassay programs, and each program includes some form of quality assurance measures to verify the program's ability to detect intakes of radioactive material. Sufficient contractor personnel and procedural resources have been provided to effect compliance with the dose requirements of 10 CFR 835.

Training and Qualification Programs

DOE radiological protection personnel (those whose work directly impacts radiological protection program development, management, implementation, oversight or assessment) are required by DOE Order 360.1 and by the Department's implementation plan in response to Defense Nuclear Facilities Safety Board Recommendation 93-3 to participate in the Department's technical qualification program (TQP). At the ten sites evaluated, TQP participants have been identified, qualification standards have been issued, professional qualifications have been reviewed against the technical standards, and individual development plans are being created to correct qualification deficiencies. The qualification status of individual DOE radiological protection professionals is maintained on individual qualifications cards or the technical qualifications record system. Since completion of the technical qualification requirements is not required until 1998, individuals are in various stages of qualification. Contractors directly supporting the DOE radiological protection staff are not required by the local DOE to participate in the technical qualification program since they are presumed to be qualified when they are hired. The qualification status of DOE radiological protection personnel, including education, experience, certifications, and registrations, is indicated in Table 1. Of the 46 DOE radiological protection professionals, one has a Ph.D., 17 have Master of Science degrees, 26 have Bachelor of Science/Arts degrees, one has an Associate of Science degree, and one has no degree.

Management and operating contractor participation in a technical qualification program depends upon the specific contract provisions and requirements established by the DOE contracting office. DOE contractor qualifications for technical personnel are currently addressed by DOE Order 5480.20A, although previous versions of this order may be in effect because of earlier contract requirements. All of the ten sites evaluated require contractor implementation of DOE Order 5480.20A; however, implementation may not necessarily be complete or established across each site. Contractors have all submitted the Training Implementation Matrix (TIM) required by DOE Order 5480.20A, although Lawrence Livermore's is incomplete, and Sandia - New Mexico's only applies to Technical Area V. Of the TIMs submitted, DOE has approved all except the one for the K-25 site at Oak Ridge. With the exception of the TIMs for the Idaho, Lawrence Livermore, Rocky Flats, and Sandia - New Mexico sites, key radiological protection positions are included. Within the last three years, DOE

Table 1. DATA ON DOE RADIOLOGICAL PROTECTION PROFESSIONALS AND SUPPORT SERVICE CONTRACTORS AT TEN DOE OPERATIONS/AREA/FIELD OFFICES

LOCATION	HIGHEST ACADEMIC DEGREE	YEARS OF PROFESSIONAL EXPERIENCE	ABHP, NRRPT OR OTHER CERTIFICATIONS
FERNALD			
DOE	BS Nuclear Engineering	11	NRRPT ABHP Part 1 (1995)
1 Contractor	BS Physical Science	14	NRRPT, CHCM[4]
IDAHO			
DOE	MS Rad Protection	20	ABHP
DOE[1]	MS Health Physics	5	None
DOE	BS Health Physics	2	None
LLNL			
DOE	BS Chemistry	26	None
DOE[2]	BS Physics	20	None
DOE[2]	BS Industrial Engineering	12	None
DOE[2]	MS Health Physics	21	ABHP
DOE[2]	BS Biological Sciences	25	None
LANL			
DOE	MS Rad Chemistry	12	None
DOE	MS Nuclear Engineering	1	None
DOE	BS Electrical Engineering	1	None
1 Contractor	MS Health Physics	5	None

OAK RIDGE			
DOE	MS Nuclear Engineering	14	ABHP
DOE	MS Health Physics	25	ABHP Part 1 (1993)
DOE	MS Public Health	15	CSP[5]
DOE	BS Biology	16	None
DOE	MS Rad Health	27	None
DOE	MS Nuclear Engineering	15	None
DOE	MS Nuclear Engineering	26	None
DOE	BS Rad Health	12	None
DOE	MS Health Physics	18	None
DOE	MS Health Physics	30	ABHP
1 Contractor	BA Physics	35	ABHP
PANTEX			
DOE	BS Biological Sci	15	None
1 Contractor	BA Business Management	24	None
RICHLAND			
DOE	MS Env Science	27	None
DOE[1]	MS Health Physics	8	ABHP Part 1 (1995)
DOE[1]	MS Biology	6	None
DOE	BS Nuclear Engineering	19	ABHP Part 1 (1995)
DOE	BA Communications	14	None
DOE	BS Chemical Engineering	15	None
DOE	BS Rad Technology	20	NRRPT
DOE	BS Physics	21	None

DOE	BS Physics	6	None
1 Contractor	BS Public Health	41	None
ROCKY FLATS			
DOE[1]	PhD Rad Biology	30	None
DOE	BS Nuclear Engineering	15	None
DOE	BA Ecological Systems	30	None
DOE[1]	BS Physics	27	None
Contractor[3]	None	27	None
Contractor[3]	BS Math	37	None
Contractor[3]	MS Health Physics	30	None
Contractor[3]	MS Health Physics	20	ABHP
SANDIA - NM			
DOE	BS Soil Science	25	ABHP
SAVANNAH RIVER			
DOE	BS Civil Engineering	28	None
DOE	MS Nuclear Physics	30	None
DOE	BS Health Physics	5	None
DOE	None	8	None
DOE	BS Biology/ Chemistry	24	None
DOE	AS Nuclear Science	26	ABHP Part 1 (1994)
DOE	BS Electrical Engineering	16	None
DOE	BS Health Physics	16	ABHP Part 1 (1994)
DOE	BS Math/Computer Science	5	None

Contractor	MS	Average experience is 16 years	ABHP
Contractor	MS		ABHP
Contractor	MS		None
Contractor	BS		None
Contractor	BS		None
Contractor	BS		None
Contractor	BS		None
Contractor	BS		None
Contractor	AS		None
Contractor	None		None

1 Part-time assignment to radiological protection

2 These four individuals provide matrix support to the individual assigned to the LLNL site.

3 Support contractor data for Rocky Flats reflects current incumbents only, and does not represent contractual requirements.

4 Certified Hazard Control Manager

5 Certified Safety Professional

Operations Offices have evaluated the contractor's technical qualification program at Los Alamos National Laboratory, the K-25 site at Oak Ridge, Pantex, Richland, Rocky Flats, and Savannah River.

Site Profiles

The profiles for the ten sites are presented in matrix form in Attachment 1. Specific portions of this material are further developed in graphical form in Attachment 2. Individual site radiological protection program profiles for each of the ten sites are provided as Attachment 3. The questionnaire used to gather the data included in this profile is provided as Attachment 4. Members of the review team are identified in Attachment 5.

4.0 CONCLUSIONS

- Adequate radiological protection programs are in place and are being implemented consistent with DOE standards.

- Collective TEDE dose shows an 11 percent increase from 1994 for the ten sites. This is consistent with anecdotal information from the EH Resident site offices reporting increased radiological work activities at the sites.

- During 1995, workers at the ten sites were adequately protected from exposure to radiation and radioactive materials. No doses in excess of DOE limits were reported. However, a potential overexposure resulting from an accidental intake of radioactive material at Lawrence Livermore is still being evaluated.

- The number of individuals participating in routine external dosimetry and/or routine bioassay programs far exceeds the number of individuals who would require monitoring pursuant to 10 CFR 835. This remains true despite the fact that slightly fewer personnel were monitored in 1995 than in 1994.

- Approximately 14 percent of the individuals filling the DOE radiological protection positions and their direct support contractors are certified by the American Board of Health Physics (ABHP). This is comparable to an estimated percentage of professional health physicists nationwide who are certified by the ABHP (10 percent).

- There were approximately 9 percent fewer contractor radiological protection program staff positions in 1995 than in 1994.

- Approximately 9 percent of the contractor radiological protection professional staff are certified by the ABHP. Approximately 14 percent of the radiological control technicians are registered by the NRRPT or have x-ray certification by the state.

- DOE staff in radiological protection positions are participating in the DOE technical qualification program. Percent completion of the program is highly variable and reflects the varying stages of implementation.

- Technical qualification programs for contractor radiological protection professionals are largely in place, either through formal implementation of DOE Order 5480.20A or through informal procedures assuring that radiological protection personnel are qualified when hired and receive training to meet the intent of the Order.

ATTACHMENT A

MATRIX OF RADIOLOGICAL DATA

Attachment A
1995 SITE CONTACTS

SITE NAME	DOE AREA OPERATIONS OFFICE	DOE RP CONTACT /PHONE	PROGRAM BASIS	M&O CONTRACTOR	M&O CONTRACTOR R CONTACT/PHONE
Fernald (FEMP)	Fernald Field Office (DOE/FN)	Dennis Riley / (513) 648-3147	10 CFR 835	Fernald Environmental Restoration Management Corporation (FERMCO)	Michael C. Tester / (513) 738-690
Hanford (RL)	Richland Operations Office (DOE/RL)	B. M. Pangborn / (509) 372-3841	DOE RadCon Manual; 10 CFR 835; DOE Order 5480.11	Westinghouse Hanford Company (WHC)	D. J. Newland / (509) 372-3132
Idaho (INEL)	Idaho Operations Office (DOE/ID)	W. R. Whitham / (208) 526-4151	DOE RadCon Manual; 10 CFR 835; DOE Order 5480.11	Lockheed Idaho Technologies Company (LITCO)	G. L. Courtney / (208) 526-4422
Livermore (LLNL)	Oakland Operations Office (DOE/OAK)	Mike Cornell / (510) 422-0138	10 CFR 835	University of California	George Campbell / (510) 422-5217
Los Alamos (LANL)	Los Alamos Area Office (DOE/LAAO); Albuquerque Operations Office (DOE/ALO)	Jimmy D. Harris / (505) 665-5050	10 CFR 835 with parts of DOE RadCon Manual	University of California	Joe Graf / (505) 667-5296
Oak Ridge (OR)	Oak Ridge Operations Office (DOE/ORO)	Harold J. Monroe / (423) 576-9439	10 CFR 835; DOE Order 5480.11	Lockheed Martin Energy Systems & Lockheed Martin Energy Research	Bobby Oliver/ (423)241-2097; Steve Sims/ (423)574-6692
Pantex (PTX)	Amarillo Area Office (DOE/AAO); Albuquerque Operations Office (DOE/ALO)	H. Griffith / (806) 477-3198	DOE RadCon Manual; 10 CFR 835; DOE Order 5480.11	Mason & Hanger, Silas-Mason	R. D. Enge / (806) 477-4435
Rocky Flats (RFETS)	DOE - Rocky Flats Field Office (DOE/RFFO)	Bruce Wallin / (303) 966-3096	10 CFR 835; DOE Order 5480.11	Integrating Management Contractor - Kaiser-Hill	T. Gilmartin / (303) 966-6629

Attachment A
1995 SITE CONTACTS

SITE NAME	DOE AREA OPERATIONS OFFICE	DOE RP CONTACT /PHONE	PROGRAM BASIS	M&O CONTRACTOR	M&O CONTRACTOR R CONTACT/PHONE
Sandia (SNL)	Kirkland Area Office (DOE/KAO); Albuquerque Operations Office (DOE/ALO)	David R. Steffes / (505) 845-4314	10 CFR 835	Lockheed Martin Energy Systems (LMES)	Joseph Stiegler / (505) 845-3484; Ross A. Miller / (505) 844-5068
Savannah River (SR)	Savannah River Operations Office (DOE/SRO)	John Anderson / (803) 725-1975	DOE RadCon Manual; 10 CFR 835; DOE Order N441.1	Westinghouse Savannah River Company (WSRC)	Norman Mims / (803) 725-2480

1995 FACILITY RADIOLOGICAL DATA and DATA SUMMARY

Major Facility Descriptions

PRINCIPLE HAZARDS	FEMP	RL	ID	LANL	LLNL	OR	PTX	RF	SNL	SR
X = Present at site.										
Plutonium handled? (18)		x		x	x	x	x	x	x	x
Dispersable? (18a)		x		x	x	x		x		x
Enriched Uranium handled (19)	x	x	x	x	x	x	x	x	x	x
Dispersable? (19a)	x	x	x	x	x	x	x	x		x
Natural U or Thorium? (20)	x	x		x	x	x	x	x	x	x
Dispersable? (20a)	x	x		x	x	x	x	x	x	
Depleted U handled? (21)	x	x	x	x	x	x	x	x	x	x
Dispersable? (21a)	x	x	x	x	x	x	x	x	x	x
Mixed fission/activation products? (22)		x	x	x	x	x			x	x
Dispersable? (22a)		x	x	x	x	x			x	x
Tritium? (23)		x		x	x	x	x	x	x	x
Dispersable? (23a)		x		x	x	x	x	x	x	x
X-ray machines? (24)	x	x	x	x	x	x	x	x	x	x
Sealed sources? (24a)		x	x	x	x	x	x	x	x	x
Accelerators? (25)		x		x	x	x			x	
Reactors? (26)		x	x	x	x	x			x	x
Yes = Site currently has.										
Radiation areas (27)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
High radiation areas (28)	yes	yes	yes	yes	yes	yes		yes	yes	yes
Very high radiation areas (29)	yes	yes	yes	yes	yes	yes	yes		yes	yes
Airborne radioactive material areas (30)	yes	yes	yes	yes		yes		yes	yes	yes
High contamination areas (31)	yes	yes	yes	yes	yes	yes		yes	yes	yes
Airborne radioactive effluents (32)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Liquid radioactive effluents (33)	yes	yes	yes	yes	yes	yes		yes	yes	yes
Planned special exposures in 1995 (34)										
Does the site have a technical basis document on file for the internal dosimetry/bioassay program? (42)	yes	yes	yes	yes	no	yes	yes	yes	yes	yes
What quality assurance has been performed to confirm the continuing ability of the bioassay programs to detect DILs for the radioisotopes present at the site? (43)	In house QA & blind spike	In house QA	Lab intercom-parison	In house QA	DOE intercom-parison	Single blind & double blind	DOE intercom-parison & blind spike	Audits	blind spike & auditing	In house QA
Does the site have in place adequate people and procedures to comply with the requirements of 10 CFR 835 and/or 5480.11? (45)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Did any personnel exposures exceed the limits specified in 10 CFR 835.202 or DOE 5480.11(9)(b)? (46)	no	no	no	no	no	no	no	no	no	no

1995 FACILITY RADIOLOGICAL DATA and DATA SUMMARY

Major Facility Descriptions

PROGRAM CHARACTERISTICS	FEMP	RL	ID	LANL	LLNL	OR	PTX	RF	SNL	SR
What is the status of implementation of DOE 360.1 and the Rad. Protection Qual. Standard, Defense Nuclear Facilities Technical personnel? (47)										
Identification of appropriate participants? (47a)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Issuance of the qualification standards? (47b)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
A review of professional qualifications against the technical standard? (47c)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Creation of individual development plans to correct qualification deficiencies? (47d)	yes	yes	yes	yes	no	yes	yes	yes	yes	yes
Have qualification cards been established for all affected DOE personnel? (47e)	yes	no	yes	yes	yes	yes	yes	yes	yes	yes
What percentage of the required qualifications identified have been met by each affected individual? (47f)	100%	0-96%	10%	0-40%	78-96%	80%	21%	<10%	90%	60%
On a sampling basis of only the key contractor radiological protection personnel, determine the status of the contractor's implementation of the Radiation Protection Technical Qualification Program. (48)										
Have participants been identified? (48a)	yes	yes	no	yes	no	yes	yes	yes	yes	yes
Have qualification standards been issued? (48b)	yes	yes	no	yes	no	yes	no	yes	no	yes
Have professional qualifications been reviewed against the technical standard? (48c)	yes	yes	no	yes	no	yes	no	yes	no	yes
Have mechanisms been established to correct qualification deficiencies? (48d)	yes	partial	no	yes	yes	yes	no	yes	no	yes
What percentage of the required qualifications identified have been met by the individuals in the chosen sample? (48e)	100%	77-96%	0%	100%	n/a	80%	0%	100%	0%	60%
What is the status of implementation of 5480.20A? (49)										
Does the site contract require implementation of DOE Order 5480.20A? (49a)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Has contractor submitted a training implementation matrix per DOE Order 5480.20A? (49b)	yes	yes	yes	yes	incomplete	yes	yes	yes	yes	yes
Has DOE approved TIM? (49c)	yes	yes	yes	yes	3/8	X-10, Y-12	yes	yes	yes	yes
Does TIM include key radiological protection positions? (49d)	yes	yes	no	yes	no	yes	yes	no	no	yes
Has DOE documented an evaluation of the contractor program in last 3 years? (49e)	yes	yes	no	yes	no	K-25	yes	yes	no	yes
Has the contractor established and implemented a formal program...? (49f)	yes	yes	no	yes	no	yes	n/a	yes	no	in process

1995 FACILITY RADIOLOGICAL DATA and DATA SUMMARY

1995 Radiological Data

FOR M&O CONTRACTORS	FEMP	RL	ID	LANL	LLNL	OR	PTX	RF	SNL	SR	TOTAL
TEDE Person-Rem (1) *	30	273	286	236	10			259	10	22	846
# dosimeters (2)	2726	11001	6550	7968	8613	16006	2985	4988	3260	12500	76597
# people bioassay monitoring (44)	1600	2550	5900	350	400			295		10000	21095
# doses > 100 mrem (3)	42	646	521	468	34	125	110	674	18	617	3255
# CEDE > 100 mrem (4)	0	2	0					0		2	4
# Non-hourly positions (5)	78	174	63	68	22	110	26	136	19	185	881
# of ABHP-certified health physicists (6)	2	14	7	4	10			10		10	57
# of hourly RP positions (7)	128	441	146	127	33	417	36	334	57	503	2222
# NRRPT or state X-ray certification (8)	25	80	14	30	8		6	50	10	17	240
# skin contamination (9)	19	27	28	31	4	32	0	22	3	19	185
# of sq. ft. of surface contamination (10)	5100000	978832	494230	1000	2056						6576118
Cu. ft. rad waste shipped in 1995 (11)	722061	224658	42412	110128	15500	21312	7545	26128	19	2613	1172376
Cu. ft. rad waste stored 12/31/95 (12)	978760	919295	225218	2000				200		6500	2131973
Cu. ft. mixed waste stored onsite (13)	52149	293981	2254689	297226	18821	2400000	4304	660297	3863	120564	6105895
# nuclear facilities (14)	2	22	35	9						0	68
# radiological facilities (15)	5	389	9	53	66	203	36	14	100	13	888
# ORPS unusual rad occurrences (16)	0	12	0	3							15
# ORPS emergency rad occurrences (17)	0	0	0	0	0	0	0	0	0	0	0
FOR DOE											
# dosimeters (35)	48	448	179	67	200	467	97	210	17	530	2263
# doses >100 mrem (36)	0	0	0	0	0					0	0
# CEDE > 100 mrem (37)	0	0	0	0	0	0	0	0	0	0	0
# of rad protection positions (38)	0	10	3	0	1					0	14
# of ABHP certified HPs (39)	0	0	1	0	1	3	0	1	1	2	9
1995 person-days/year rad assignments (41)	238	434	560	62	256	620	500	1600	260	3360	7890

* LLNL TEDE included 3.1 person-rem incurred at PTX.

** Question 10 not tracked by LANL.

***Some positions at RL, ID, LLNL, and RF provide part-time support.

1995 Data Summary

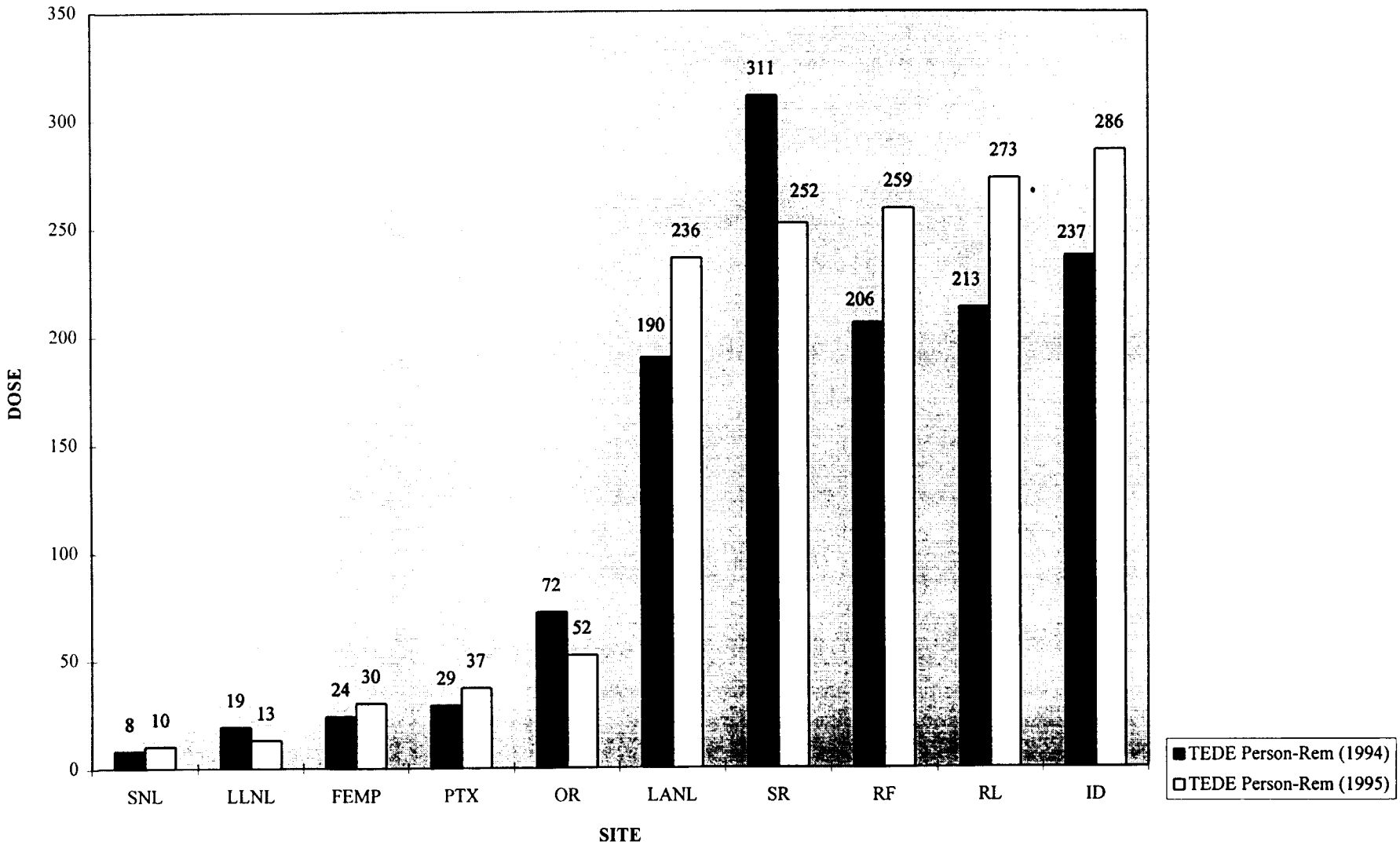
	SITES	SUM	RANGE MINIMUM	RANGE MAXIMUM	AVERAGE
FOR M & O CONTRACTORS					
TEDE Person-Rem	10	1448	10	286	145
# dosimeters	10	76597	2726	16006	7660
# people bioassay monitoring	10	32626	50	12000	3263
# doses > 100 mrem	10	3255	18	674	326
# CEDE > 100 mrem	10	14	0	7	1
# Non-hourly positions	10	881	19	185	88
# of ABHP-certified health physicists	10	81	2	14	8
# of hourly RP positions	10	2222	33	503	222
# NRRPT or state X-ray certification	10	302	8	80	30
# skin contamination	10	185	0	32	19
# of sq. ft. of surface contamination	9	28527639	1000	20365579	3169738
Cu. ft. rad waste shipped in 1995	10	1172376	19	722061	117238
Cu. ft. rad waste stored - 12/31/95	10	28832259	14183	24335655	2883226
Cu. ft. mixed waste stored onsite	10	6105895	3863	2400000	610589
# nuclear facilities	10	407	8	179	41
# radiological facilities	10	888	5	389	89
# ORPS unusual rad occurrences	10	121	0	53	12
# ORPS emergency rad occurrences	10	0	0	0	0
FOR DOE					
# dosimeters	10	2263	17	530	226
# doses > 100 mrem	10	5	0	5	1
# CEDE > 100 mrem	10	0	0	0	0
# of radiological protection positions	10	65	1	19	7
# of ABHP certified HPs	10	9	0	3	1
# rad protection NRRPT	10	3	0	2	0.3
1995 person-days/year rad assignments	10	7890	62	3360	789

NOTE: Numbers have been automatically rounded.

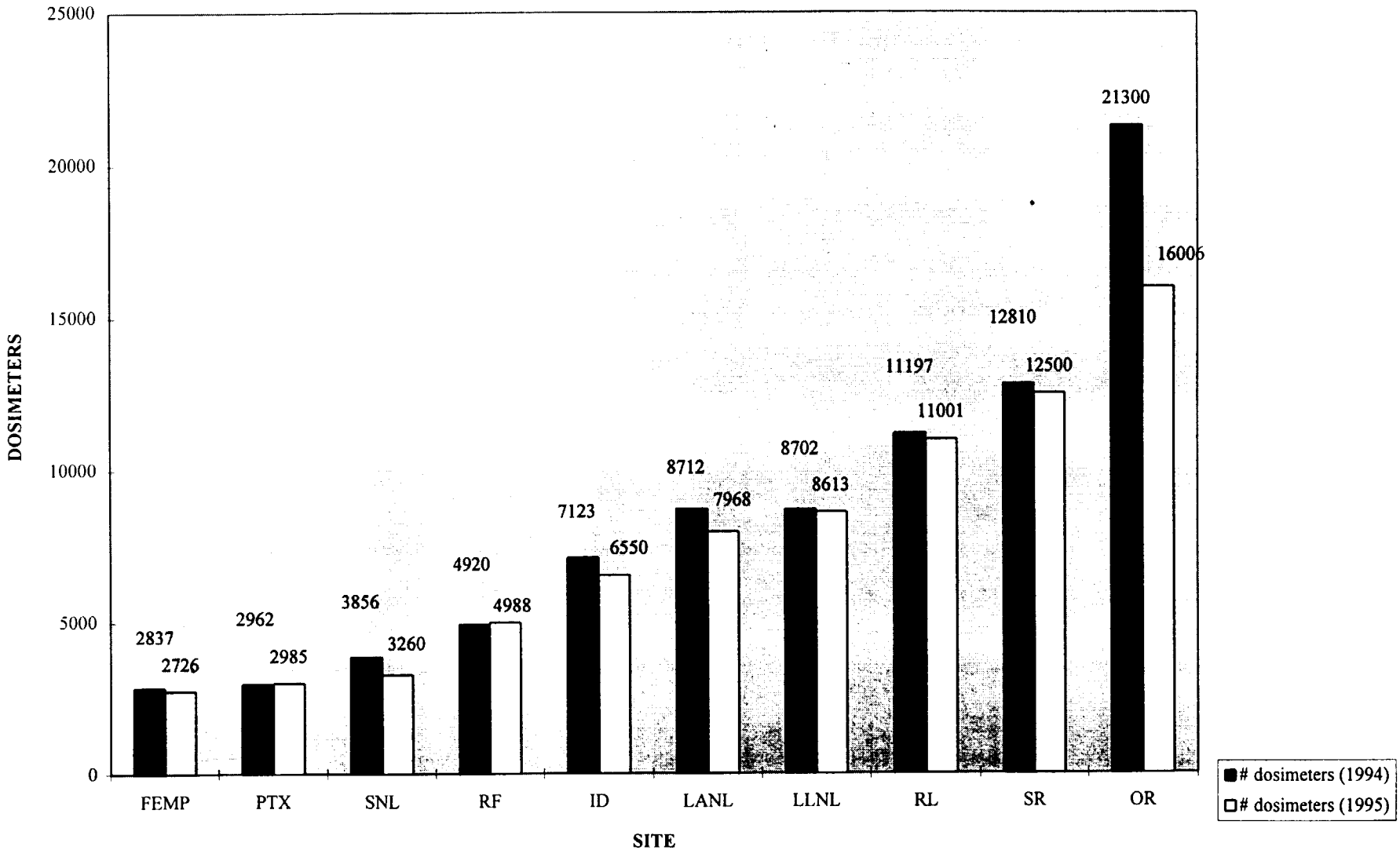
ATTACHMENT B

GRAPHICAL PRESENTATION OF SPECIFIC DATA RELATIONSHIPS

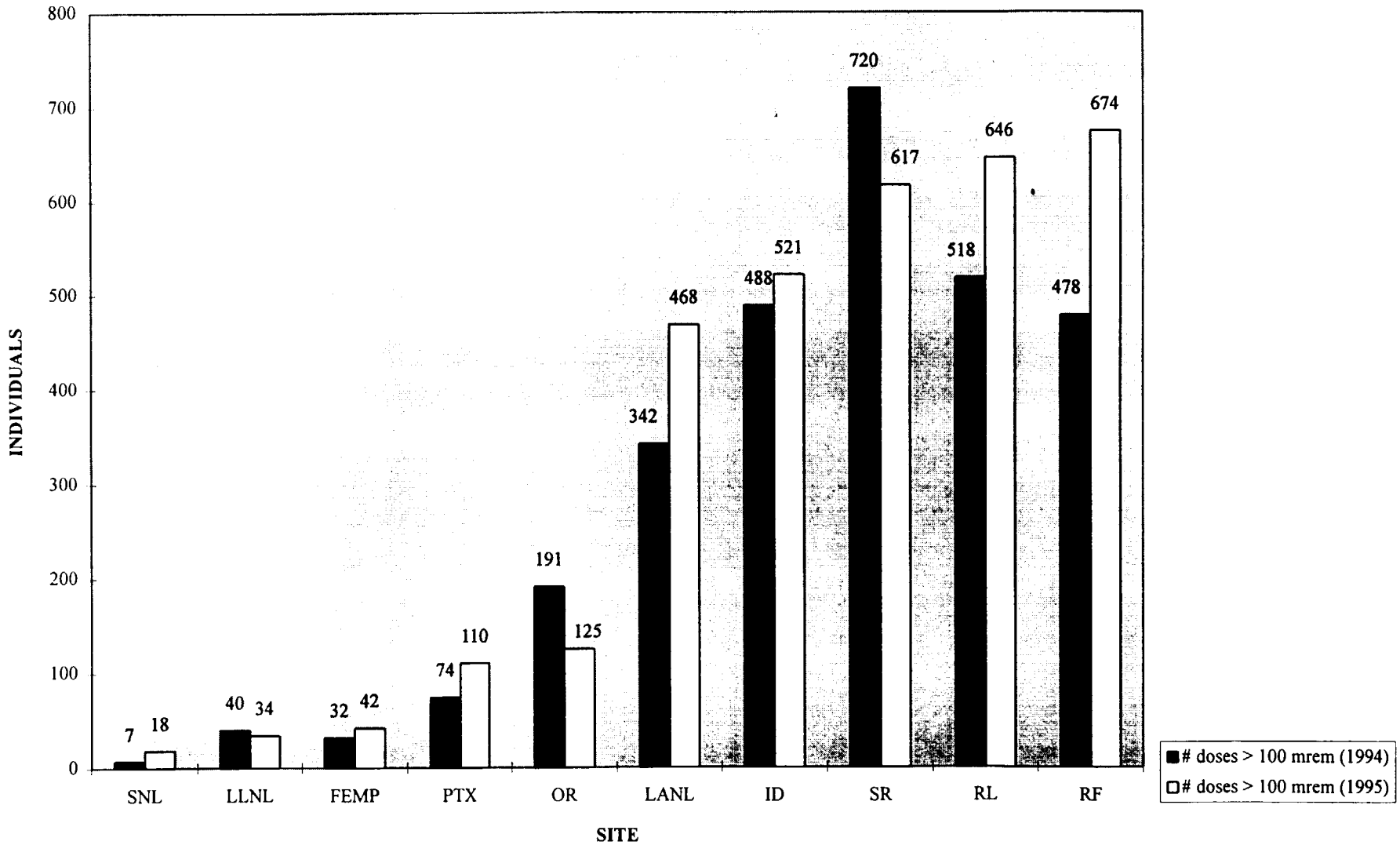
1994-95 COMPARISON - COLLECTIVE TEDE PERSON-REM



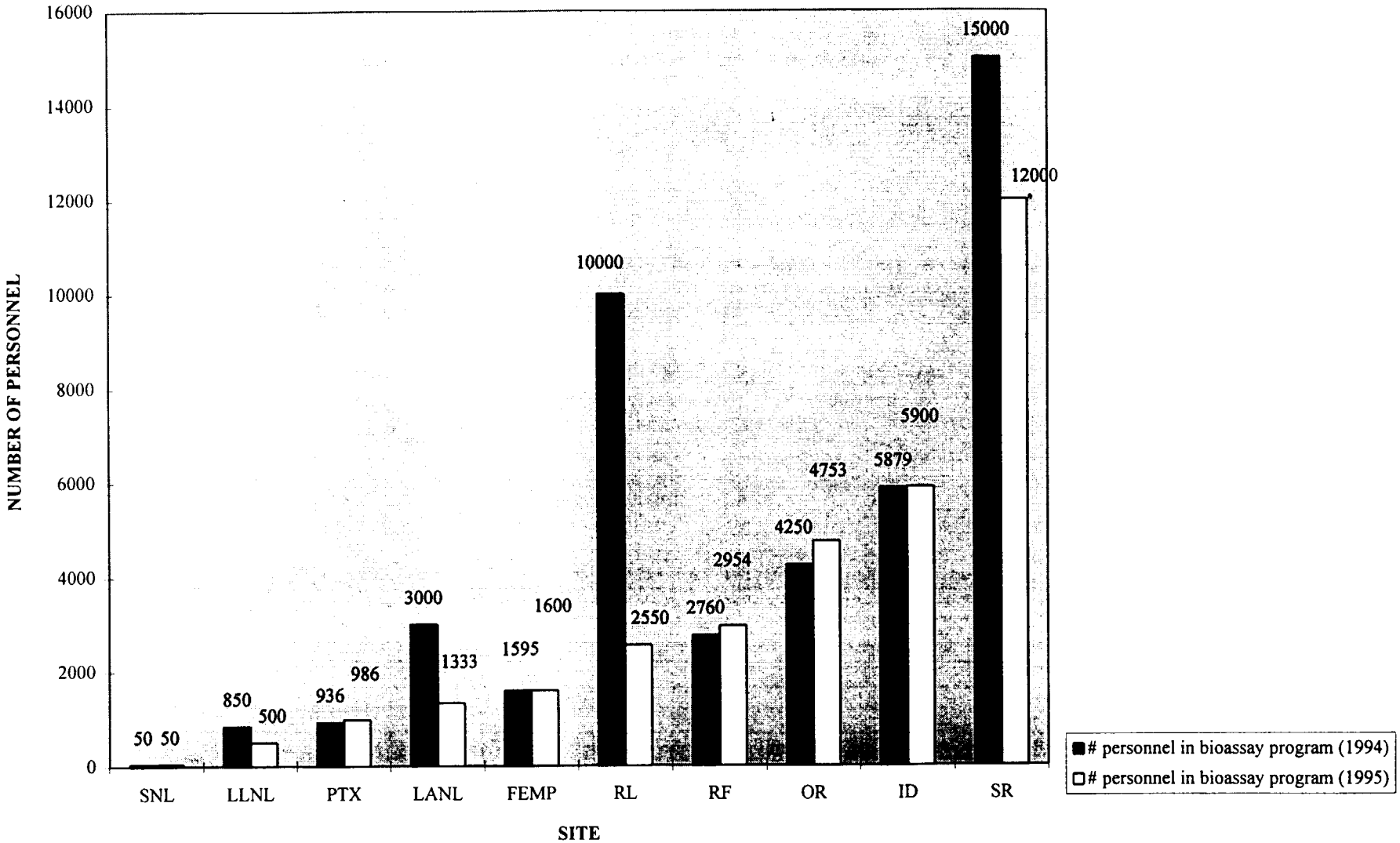
1994-95 COMPARISON - NUMBER OF PERSONNEL DOSIMETERS ROUTINELY USED



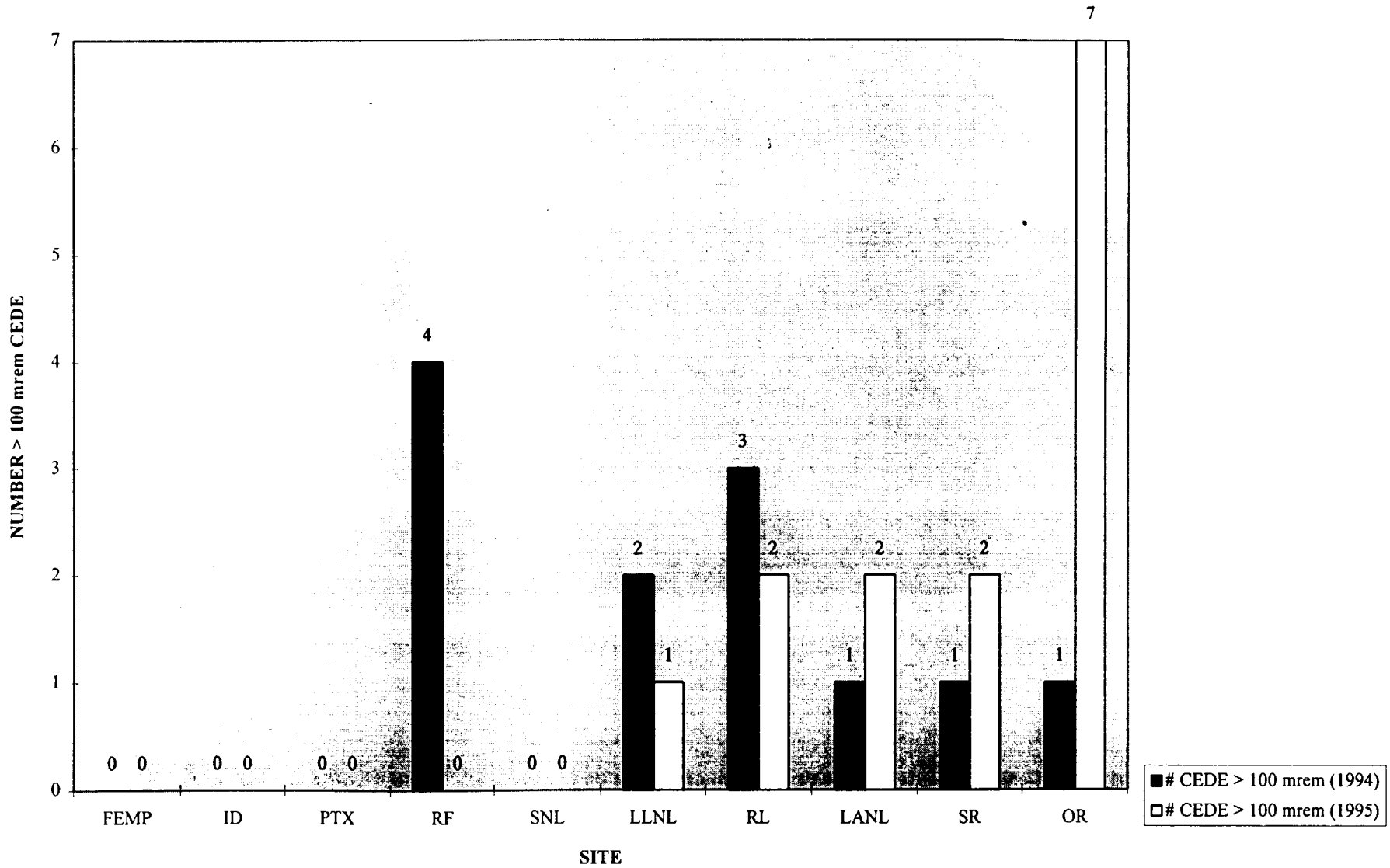
1994-95 COMPARISON - NUMBER OF INDIVIDUALS WITH DEEP DOSE > 100 mrem



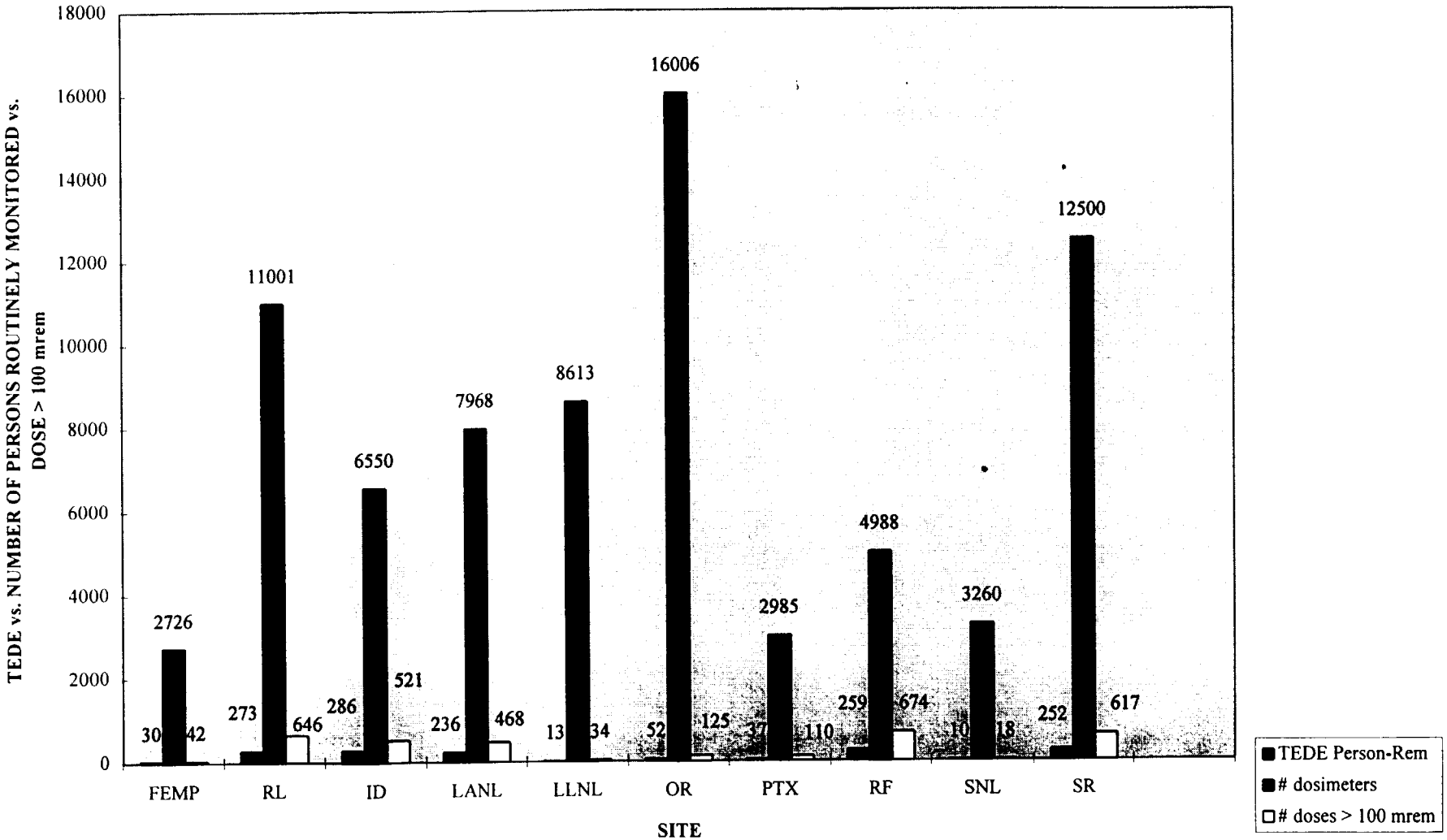
1994-95 COMPARISON - NUMBER OF PERSONNEL IN BIOASSAY PROGRAM



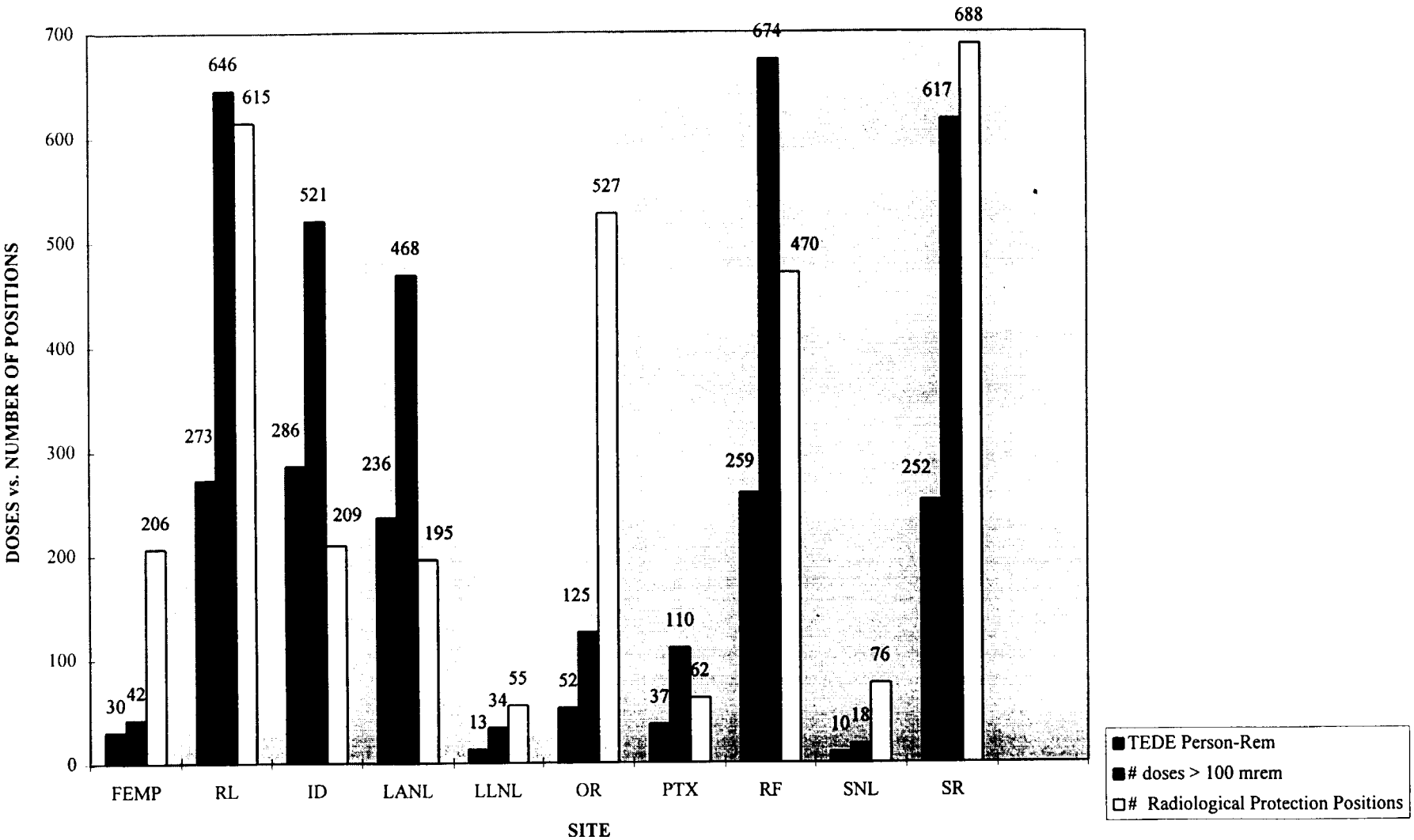
1994-95 COMPARISON - NUMBER OF PERSONNEL WITH CEDE > 100 mrem



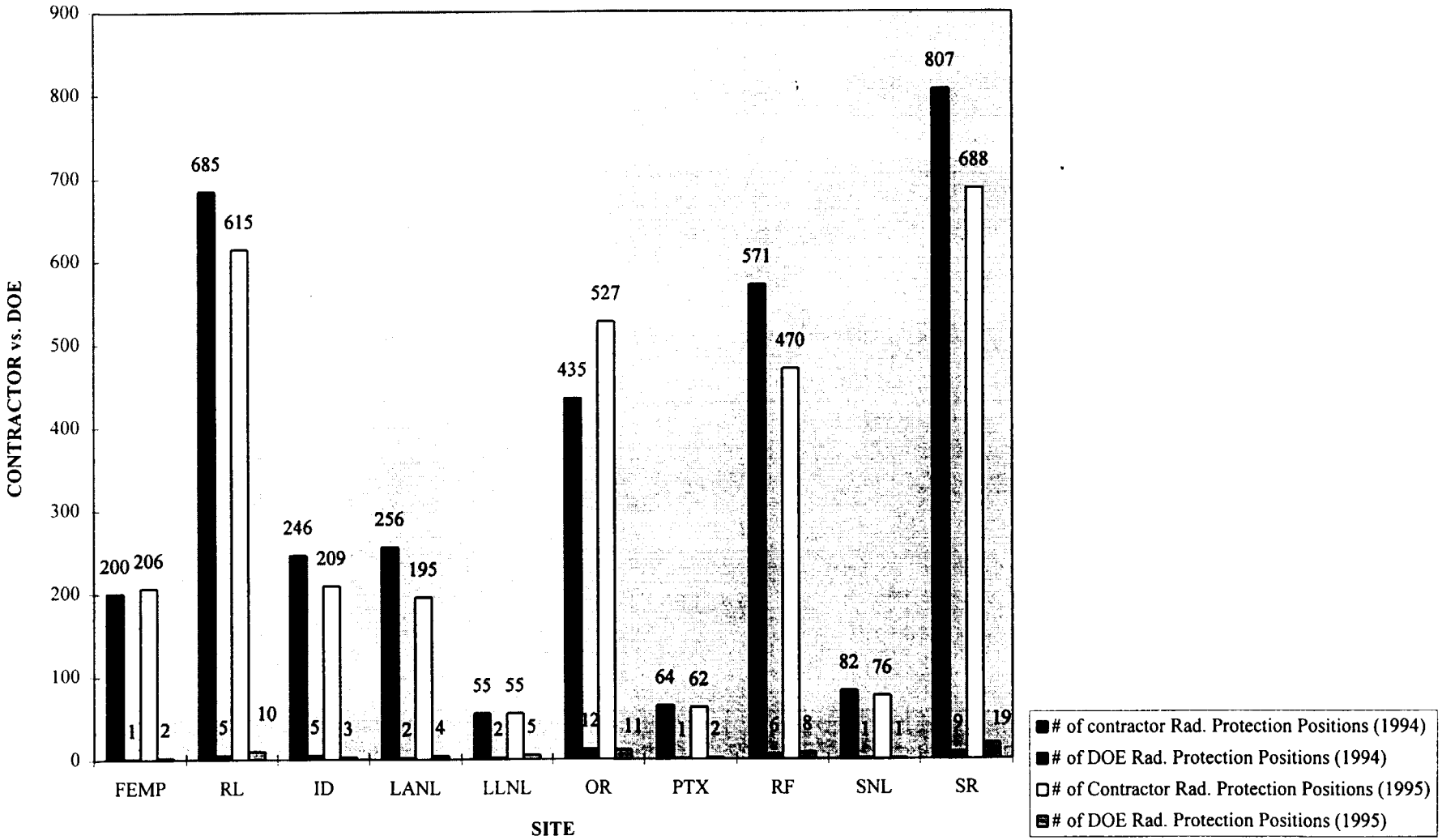
1995 COMPARISON OF TEDE PERSON-REM vs. NUMBER OF PERSONS ROUTINELY MONITORED vs. NUMBER THAT RECEIVED > 100 mrem DEEP DOSE



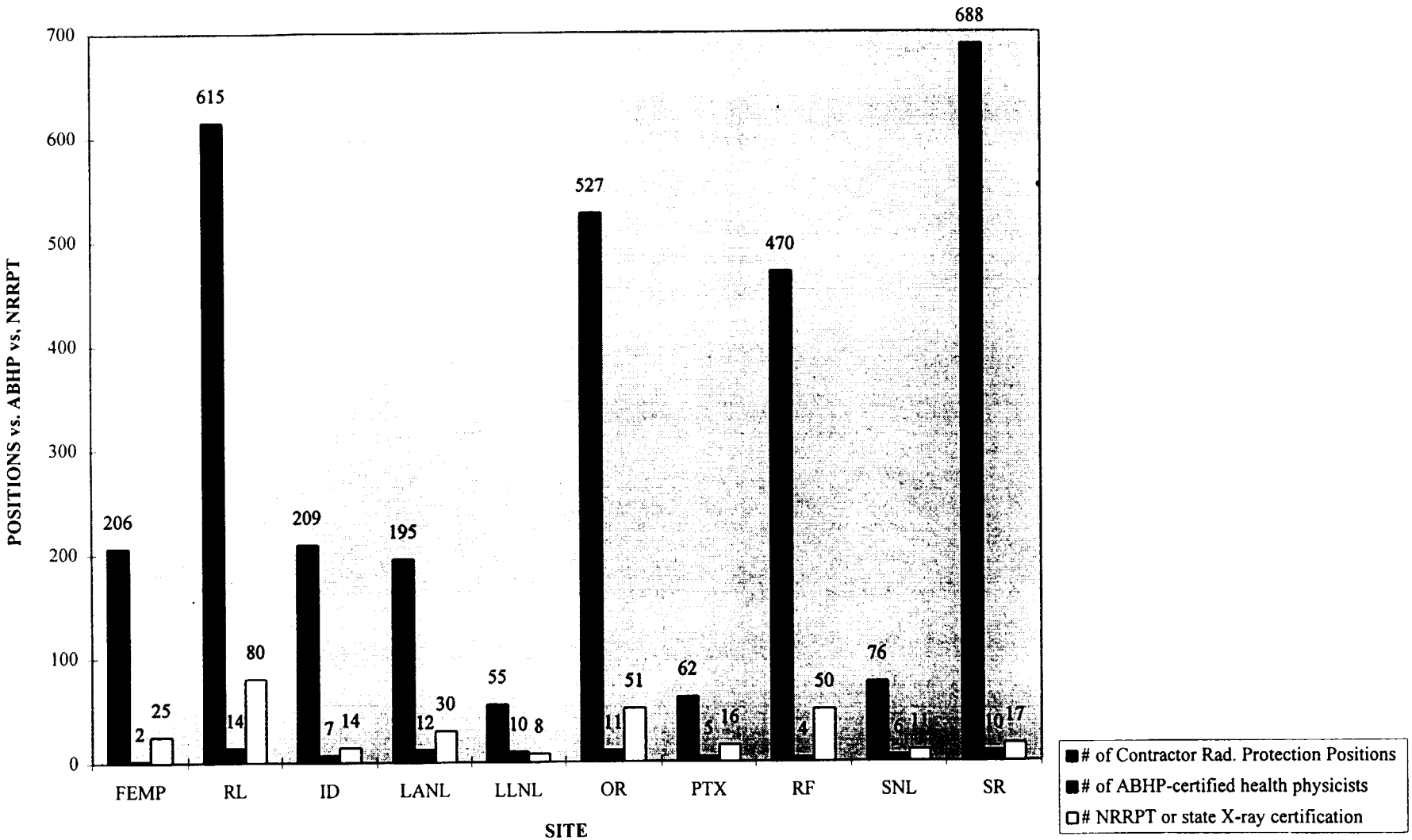
1995 COMPARISON OF DOSES TO THE NUMBER OF CONTRACTOR RADIOLOGICAL PROTECTION POSITIONS



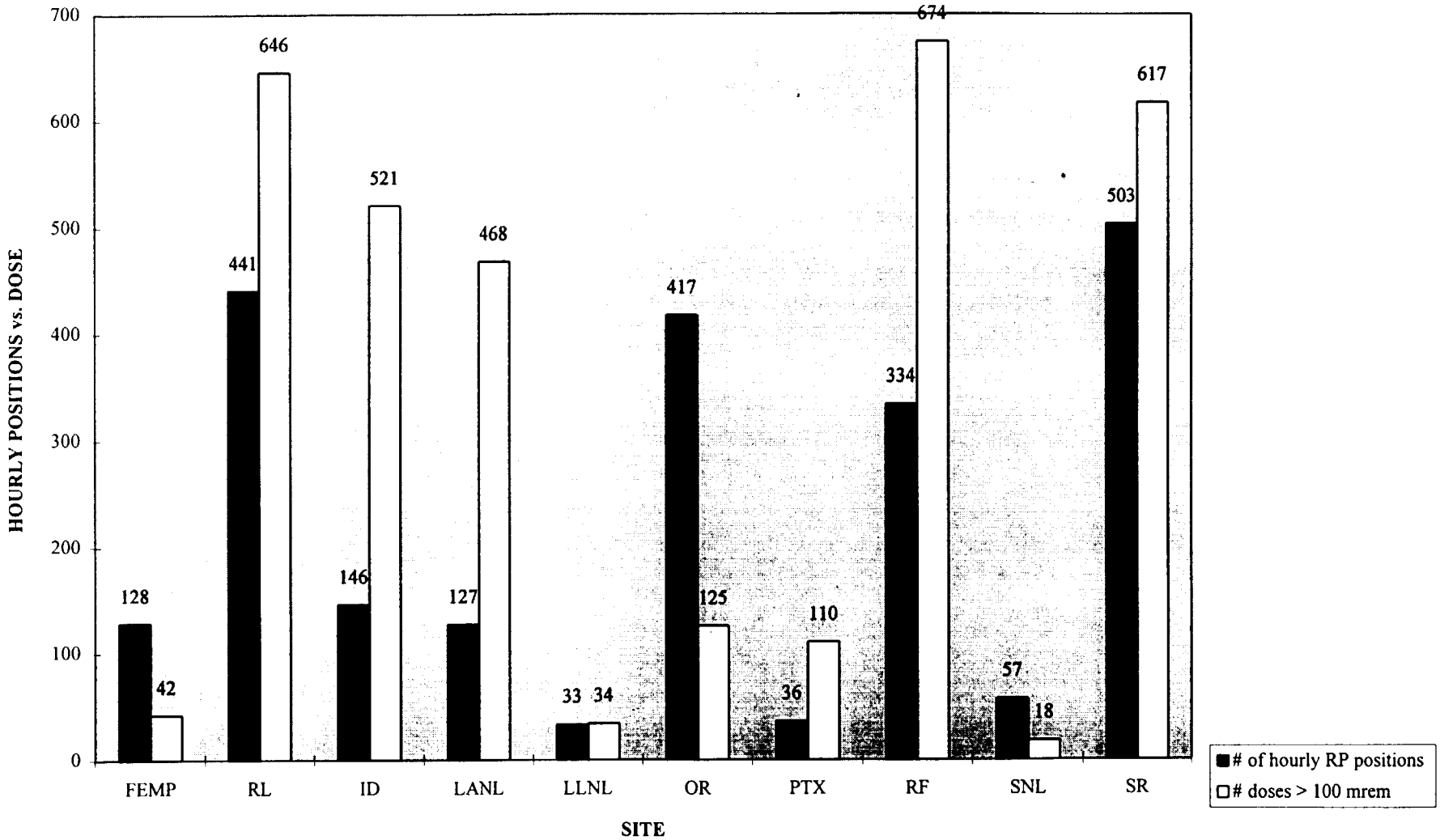
`1994-95 COMPARISON - NUMBER OF CONTRACTOR vs. DOE RADIOLOGICAL PROTECTION POSITIONS



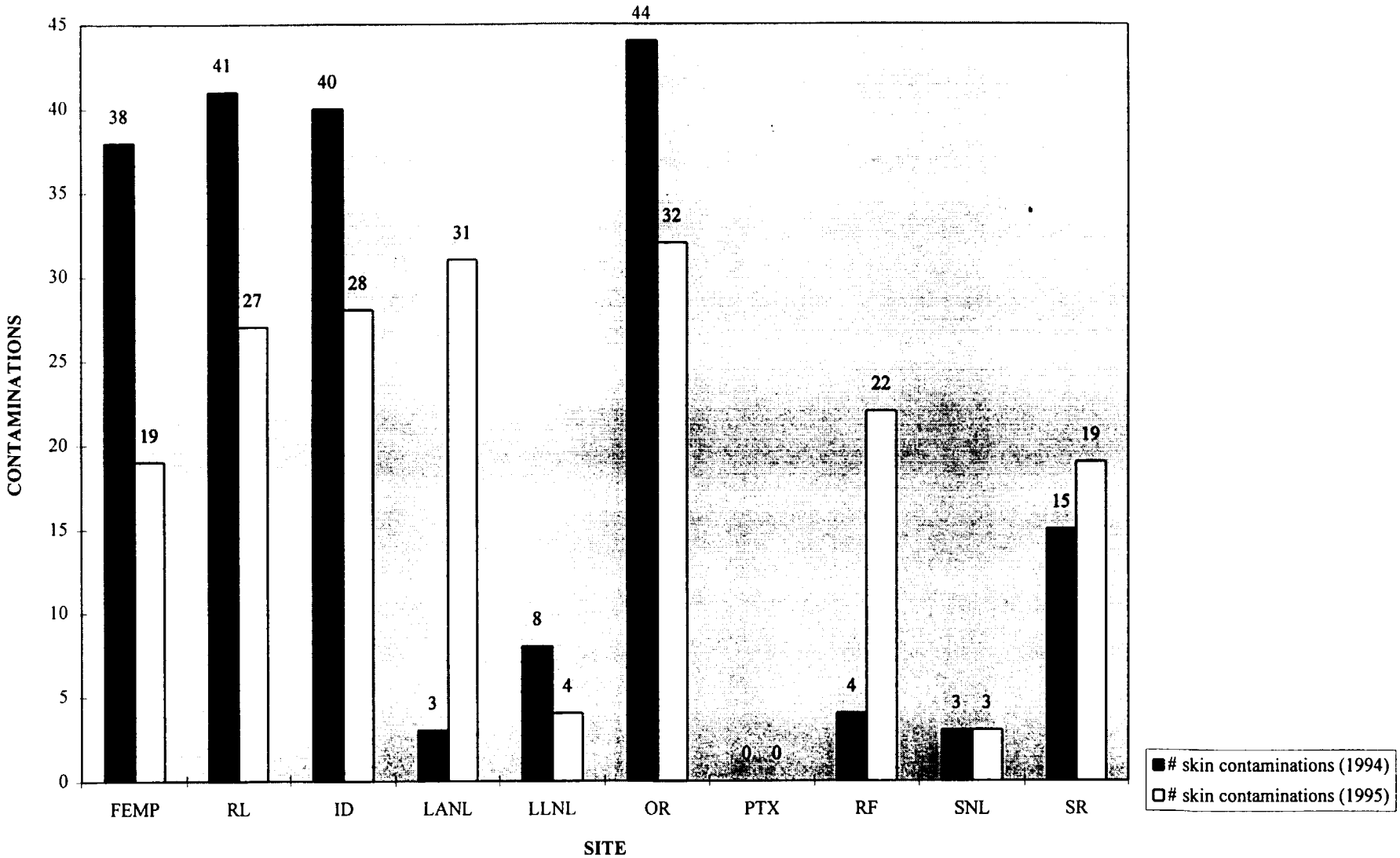
1995 COMPARISON OF CONTRACTOR RADIOLOGICAL PROTECTION POSITIONS TO THE NUMBER CERTIFIED BY ABHP OR REGISTERED BY NRRPT



1995 HOURLY CONTRACTOR RADIOLOGICAL PROTECTION POSITIONS vs. NUMBER OF PERSONS WITH DEEP DOSE > 100 mrem



1994-95 COMPARISON - SKIN CONTAMINATIONS



ATTACHMENT C

INDIVIDUAL SITE RADIOLOGICAL PROTECTION PROGRAM PROFILES

Fernald Environmental Management Project
Idaho National Engineering Laboratory
Lawrence Livermore National Laboratory
Los Alamos National Laboratory
Oak Ridge
Pantex Plant
Hanford
Rocky Flats
Sandia National Laboratory
Savannah River

RADIOLOGICAL PROTECTION SITE PROFILE
FOR
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

A. General Site Overview

The Fernald Environmental Management Project (FEMP), formerly a major nuclear weapons material processing facility started in the late 1940s, is currently engaged in decontamination and decommissioning activities. FEMP facilities are managed by the Fernald Environmental Restoration Management Corporation (FERMCO), a subsidiary of Fluor-Daniel, for the U.S.Department of Energy (DOE) Fernald Area Office (FAO), with funding from the Office of Environmental Management (EM). There are currently 12 nuclear and 5 radiological facilities at the site. The most significant radiological hazards include various forms of enriched, natural, and depleted uranium; thorium; and substantial quantities of radon-emitting residual feed material. X-ray producing machines are also present on site.

B. Radiological Protection Organization

The FAO has one designated radiological protection position and one support contractor. Both of the individuals in these positions are registered by the National Registry of Radiation Protection Technologists (NRRPT), and one has passed Part I of the American Board of Health Physics (ABHP) certification exam. FERMCO currently has 206 non-hourly designated radiological protection positions, of which 128 are radiological control technicians. Of these, two are ABHP certified and 25 are registered by the NRRPT.

C. Personnel Dosimetry

During 1995, the contractor issued personnel dosimeters to 2,726 individuals. Forty-two individuals received > 100 mrem deep dose equivalent, and none received > 100 mrem committed effective dose equivalent (CEDE) in 1995. The 1995 collective total effective dose equivalent (TEDE) was 30 person-rem. The site has a formal technical basis document on file for its internal dosimetry/bioassay program. The external dosimetry program is DOE Laboratory Accreditation Program (DOELAP) approved. The internal dosimetry program includes an in-house quality assurance program to confirm the adequacy of its ability to detect uptakes of radioactive material. Adequate procedures and personnel are in place to effect compliance with the dose requirements of 10 CFR 835. In 1995, FERMCO replaced the bioassay contractor for possible falsification of records. Currently, the site bioassay program routinely monitors about 1,600 individuals.

D. Technical Qualification Program

DOE radiological protection personnel (those whose work impacts radiological protection program development, management, implementation, oversight or assessment) are required by DOE Order 360.1 and by the Department's implementation plan in response to Defense Nuclear Facilities Safety Board Recommendation 93-3 to participate in the Department's technical qualification program. At the Fernald site, participants in the program have been identified, qualification standards have been issued, professional qualifications have been reviewed against the technical standard, and individual development plans have been created to correct qualification deficiencies. Qualification status for individual DOE radiological protection professionals is maintained on the technical qualifications record system. At the site, the DOE radiological protection individual has fully qualified in the program. The contractor support individual is not required to participate in the technical qualification program.

Management and operating contractor participation in a technical qualification program depends upon the specific contract provisions and requirements established by the DOE contracting office. DOE contractor qualifications for technical personnel are currently addressed by DOE Order 5480.20A.

The site requires implementation of DOE Order 5480.20A, which requires submission of a Training Implementation Matrix (TIM). The contractor's TIM has been approved by DOE and includes key contractor radiological protection positions. DOE has evaluated the contractor's program within the last three years. Implementation of the contractor's technical qualification program was evaluated through a sample of key radiological protection personnel. Of the sample, all of the participants were identified in the program, qualification standards were issued, professional qualifications were reviewed against the technical standard, and mechanisms have been established to correct qualification deficiencies. All of the individuals sampled had completed all of their qualifications.

E. Performance Conclusion

The FEMP radiological protection program has matured significantly in the past few years. FAO radiological protection personnel are technically competent and continuously demonstrate a willingness to ensure that the foundation of this sound program is maintained and improvements implemented where needed. The conduct of radiological protection operations in the field have improved greatly, and the aggressive, well documented appraisal program implemented by FAO over the past year has resulted in identifying and resolving longstanding problems in radiological protection operations. Isolated performance problems continue, but their frequency is not outside the norms of the complex.

RADIOLOGICAL PROTECTION SITE PROFILE
FOR
IDAHO NATIONAL ENGINEERING LABORATORY

A. General Site Overview

The Idaho National Engineering Laboratory (INEL), formerly a major nuclear reactor technology development and test site started in the early 1950s, is currently engaged in energy research, basic science, non-nuclear defense activities, hazardous waste management and research, and environmental remediation. INEL facilities are managed by Lockheed Idaho Technologies Company (LITCO) for the Idaho Operations Office (ID). Most of ID-funding is provided by the Office of Environmental Management (EM), supplemented with funding from the Offices of Energy Research (ER) and Nuclear Energy (NE). There are 35 nuclear and 9 radiological facilities at the site. The most significant radiological hazards include various forms of natural, depleted, and enriched uranium; thorium; and mixed fission and activation products. Additional radiation sources include x-ray machines and sealed radiography sources.

B. Radiological Protection Organization

ID currently has 2 full time and one part time designated radiological protection positions. One of the individuals in these positions is certified by the American Board of Health Physics (ABHP). LITCO has 63 professional radiological protection positions and 146 radiological control technicians. Of these, seven are certified by the ABHP and 14 are registered by the National Registry of Radiation Protection Technologists (NRRPT).

C. Personnel Dosimetry

In 1995, the contractor issued personnel dosimeters to 6550 individuals, approximately 8 percent fewer than in 1994. The contractor reported that 521 individuals received > 100 mrem deep dose and none received > 100 mrem committed effective dose equivalent (CEDE). The 1995 collective total effective dose equivalent (TEDE) was 286 person-rem.

The site has a formal technical basis document on file for its internal dosimetry/bioassay program, and the external dosimetry program is DOE Laboratory Accreditation Program (DOELAP) approved. The internal dosimetry program includes participation in the DOE inter-comparison program and the performance of routine quality control checks to confirm its ability to detect uptakes of radioactive material. Currently, the site bioassay program routinely monitors about 5,900 individuals. LITCO has adequate people and procedures in place to effect compliance with the dose requirements of 10 CFR 835.

D. Technical Qualification Program

DOE radiological protection personnel (those whose work directly impacts radiological protection program development, management, implementation, oversight or assessment) are required by DOE Order 360.1 and by the Department's implementation plan in response to Defense Nuclear Facilities Safety Board Recommendation 93-3 to participate in the Department's technical qualification program. At the Idaho site, participants in the program have been identified, qualification standards have been issued, professional qualifications have been reviewed against the technical standard, and individual development plans have been created to correct qualification deficiencies. Qualification status for individual DOE radiological protection professionals is maintained on individual qualification cards. Since completion of the technical qualification requirements is not required until 1998, individuals are in various stages of qualification. At the Idaho site, the DOE radiological protection individuals have completed about 10 percent of the requirements of the program.

Contractor participation in a technical qualification program depends upon the specific contract provisions and requirements established by the DOE contracting office. DOE contractor qualifications for technical personnel are currently addressed by DOE Order 5480.20A.

The Idaho site requires implementation of DOE Order 5480.20A, which requires submission of a Training Implementation Matrix (TIM). The contractor's TIM has been approved by the DOE. However, key contractor radiological protection positions are not included. Also, DOE has not evaluated the contractor's program within the last three years.

E. Performance Conclusion

ID and LITCO are structured to support an adequate radiological protection program. Efforts to improve radiological control performance are evidenced by initiatives to better track, trend, and prioritize issues, upgrade radiological performance indicators, and streamline operations using automated ALARA planning and exposure control systems. Notable successes include a 20 percent reduction in clothing and skin contaminations since 1994 and a decrease in airborne radioactive material release events from 6 in 1994 to 0 in 1995.

RADIOLOGICAL PROTECTION SITE PROFILE FOR LAWRENCE LIVERMORE NATIONAL LABORATORY

A. General Site Overview

Lawrence Livermore National Laboratory (LLNL) is a nuclear weapons design laboratory started in the 1950s. LLNL is currently engaged in weapons research, arms control, energy research, basic science, biomedicine, non-nuclear defense activities, fusion research, uranium enrichment, and environmental remediation. LLNL is managed by the University of California for the DOE Oakland Operations Office and is primarily funded by the Office of Defense Programs (DP). There are currently eight nuclear and 66 radiological facilities on the site. The most significant radiological hazards include various forms of natural, depleted, and enriched uranium; plutonium; thorium; mixed fission products; and tritium. Accelerators, x-ray producing machines, and sealed radiography sources are also operated on site.

B. Radiological Protection Organization

The Oakland Operations Office currently has five designated radiological protection positions. One is assigned full time to LLNL, and the remainder provide matrix support when requested by the DOE Site Management organization. The Site position is filled by an individual who is neither certified by the American Board of Health Physics (ABHP) nor registered by the National Registry of Radiation Protection Technologists (NRRPT). One ABHP Certified Health Physicist joined the DOE Oakland staff in 1995 and spent about 20 days at LLNL during the year. The DOE contractor currently has 22 professional and 33 radiological protection technician positions. Of this group, ten are ABHP certified and eight are registered by the NRRPT.

C. Personnel Dosimetry

During 1995, the contractor issued personnel dosimeters to 8,613 individuals. In 1995, 34 individuals received > 100 mrem deep dose and one received > 100 mrem CEDE. The 1995 collective total effective dose equivalent (TEDE) was 13 person-rem (of this, 3.1 person-rem were incurred by LLNL personnel working at Pantex) and has consistently trended down from about 30 person-rem in 1992. The site has not yet completed a formal technical basis document for its internal dosimetry program. The external dosimetry program is DOE Laboratory Accreditation Program (DOELAP) approved. The internal dosimetry program includes participation in the DOE intercomparison program and the performance of routine quality control checks to confirm its ability to detect uptakes of radioactive material. LLNL has adequate people

and procedures in place to effect compliance with the dose requirements of 10 CFR 835. Currently, the site bioassay program routinely monitors about 500 individuals.

D. Technical Qualification Program

DOE radiological protection personnel (those whose work directly impacts radiological protection program development, management, implementation, oversight or assessment) are required by DOE Order 360.1 and by the Department's implementation plan in response to Defense Nuclear Facilities Safety Board Recommendation 93-3 to participate in the Department's technical qualification program. At LLNL, DOE participants in the program have been identified, qualification standards have been issued, and professional qualifications have been reviewed against the technical standard; however, individual development plans have not been created to correct qualification deficiencies. Qualification cards have been established for individual DOE radiological protection professionals. Since completion of the technical qualification requirements is not required until 1998, individuals are in various stages of qualification. The DOE radiological protection personnel assigned to, or available for the LLNL site radiological protection program range from 78 to 96 percent completion of the required qualifications.

Contractor participation in a technical qualification program depends upon the specific contract provisions and requirements established by the DOE contracting office. DOE contractor qualifications for technical personnel are currently addressed by DOE Order 5480.20A.

LLNL submitted three of eight required Training Implementation Matrices (TIMs) to DOE for approval. All three have been approved by the DOE. None of the TIMs include professional radiological protection personnel. The DOE has not evaluated LLNL's program within the last three years. LLNL hires only those individuals with the equivalent of a Masters Degree in Health Physics for its professional radiological protection positions. Most of these individuals are assigned to one of four ES&H Field Teams and receive training necessary for access to the facilities they support. While they may be requested by facility management to participate in some TIM courses, they are not formally included in the facility's TIM since the facilities assume that the Hazards Control Department will provide the ES&H Field Team's training. The professional radiological protection personnel are encouraged by the Hazards Control Department to become Certified Health Physicists. Certification is rewarded in the performance appraisal process, and course work to achieve certification is frequently included in performance appraisal plans. These actions, although not formalized, accomplish the intent of DOE Order 5480.20A.

Although the Laboratory Health Physicists do not participate in the formal training or retraining programs detailed in DOE Order 5840.20A, the level of health physics competence is high and increasing. LLNL currently has ten ABHP Certified Health

Physicists and eight Registered Radiation Protection Technologists. The Oakland Operations Office increased the depth of its health physics competency during 1995 by adding one Certified Health Physicist.

E. Performance Conclusion

LLNL is a research oriented facility that has effectively controlled the wide range of radiation hazards present. The DOE Oakland Operations Office has focused its line management responsibilities in this area by effective use of contract performance measures, a pilot appraisal program, and routine management involvement in assuring the quality of protection provided through observations made by its Facility Representatives and Radiation Specialists. The laboratory uses a matrix management approach to accomplish its mission. Health Physicists and Health and Safety Technicians are assigned to one of four teams that directly serve project needs. The teams are provided dosimetry, bioassay, instrument calibration, technical support services, and radiation safety training from the Hazards Control Department. This technique drives safety responsibility to project line management and is working well in the radiological protection area.

Radiological protection requirements are clearly stated in the contract, the LLNL Health and Safety Manual, the Radiation Protection Plan, Facility Safety Procedures, and Operational Safety Procedures. The bioassay and laboratory equipment are state-of-the-art; procedures and technical base documentation have improved but still need to be completed. Bioassay sample turnaround time is slow but improving. Oakland has been critical of LLNL's perceived lack of attention to requirement verification in its self-assessment process. LLNL is planning to review implementation of the requirements expressed in 10 CFR 835 during 1996.

Overall, DOE and the University of California provided excellent control of the radiation hazards associated with its mission during 1995 at LLNL.

RADIOLOGICAL PROTECTION SITE PROFILE
FOR
LOS ALAMOS NATIONAL LABORATORY

A. General Site Overview

Los Alamos National Laboratory (LANL) is a nuclear weapons design laboratory started in the early 1940s. LANL is managed and operated by the University of California for the Los Alamos Area Office (LAAO) of the Albuquerque Operations Office. The Laboratory's current mission is in the areas of nuclear weapons research and development, with special emphasis on nuclear weapons nonproliferation, space project research and development, energy research projects, and biomedical research. LANL is primarily funded by the Office of Defense Programs (DP) and receives additional funding from the Offices of Environmental Management (EM), Energy Research (ER), and Nuclear Energy (NE); the Department of Defense (DoD); and others.

LANL currently consists of 42 active Technical Areas. These Technical Areas include an inactive nuclear reactor; criticality experiment areas; particle, neutron, and ion accelerators; sealed source and x-ray radiography facilities; research laboratories; depleted uranium and explosive test facilities; radioactive waste and mixed waste storage facilities; radiologically contaminated environmental areas in various stages of remediation; and decontamination and decommissioning projects. The laboratory has 20 nuclear facilities and 53 radiological facilities.

B. Radiological Protection Organization

The DOE line organization currently has three assigned radiological protection positions and one full time radiological protection support contractor. None of these individuals is certified by the American Board of Health Physics (ABHP) or registered by the National Registry of Radiation Protection Technologists (NRRPT), although one individual has passed Part I of the ABHP certification exam. The laboratory currently has 68 professional and 127 radiological control technician positions. Of this group, 12 are ABHP certified and 30 are registered by the NRRPT.

C. Personnel Dosimetry

During 1995, the laboratory issued personnel dosimeters to 7,968 individuals. For 1995, the laboratory reported that 468 personnel received > 100 mrem deep dose equivalent, and two received > 100 mrem committed effective dose equivalent (CEDE). The 1995 collective total effective dose equivalent (TEDE) was 236 person-rem.

The laboratory has technical basis documents on file for both their external dosimetry and internal dosimetry/bioassay programs. Both programs include quality assurance measures to confirm the ability to monitor personnel for exposure to radiation and to detect intakes of radionuclides. The laboratory has adequate staff and sufficient procedures in place to effect compliance with the radiation exposure requirements of 10 CFR 835. Currently, the laboratory bioassay program routinely monitors 1,333 individuals, approximately 55 percent fewer than in 1994.

D. Technical Qualification Program

DOE radiological protection personnel (those whose work directly impacts radiological protection program development, management, implementation, oversight or assessment) are required by DOE Order 360.1 and by the Department's implementation plan in response to Defense Nuclear Facilities Safety Board Recommendation 93-3 to participate in the Department's technical qualification program. At LAOO, DOE participants in the program have been identified, qualification standards have been issued, professional qualifications have been reviewed against the technical standard, and individual development plans (IDPs) have been created. However, the radiological protection personnel IDPs are not designed to satisfy program requirements. Qualification cards have been established for individual DOE radiological protection professionals. Since completion of the technical qualification requirements is not required until 1998, individuals are in various stages of qualification. At LANL, the DOE radiological protection personnel assigned have just begun their qualification program. One individual has about 40 percent of the qualifications completed. The contractor support individual is not required to participate in the technical qualification program.

Management and operating contractor participation in a technical qualification program depends upon the specific contract provisions and requirements established by the DOE contracting office. DOE contractor qualifications for technical personnel are currently addressed by DOE Order 5480.20A.

LANL is required to implement DOE Order 5480.20A, which requires submission of a Training Implementation Matrix (TIM). The contractor's TIM has been approved by DOE and includes key contractor radiological protection positions. DOE has evaluated the contractor's program within the last three years. Implementation of the contractor's technical qualification program was evaluated through a sample of key radiological protection personnel. Of the sample, all participants were identified in the program, qualification standards were issued, professional qualifications were reviewed against the technical standard, and mechanisms have been established to correct qualification deficiencies. All individuals sampled had completed all of their qualifications.

E. Performance Conclusion

The contractor implemented an adequate radiological protection program during 1995. The need for additional contractor management involvement continues to be indicated by recurring deficiencies, declining building status, mission changes, and work force restructuring. The strength of the radiological protection program is vested in the high level of expertise of the professional staff. The internal and external dosimetry programs continue to be recognized as strong, and the ALARA program has shown improvement. Radiological control performance deficiencies, such as glove box glove failures, skin and clothing contaminations, poor area and personnel contamination monitoring practices, inadequate personnel self frisking, and violations of radiological work procedures, continue to challenge the LANL staff. The significant increase in the number of skin contaminations from 3 in 1994 to 31 in 1995 indicates that additional efforts in these areas are warranted.

Weaknesses in implementation of radiological controls are due, in part, to a continued lack of ownership by line management and a lack of involvement by staff health physicists. Followup and correction of identified deficiencies continue to be weak. Weaknesses were also identified in the instrument calibration program.

LAAO is minimally involved in assuring the quality of the contractor's radiological protection program. In 1995, LAAO increased the radiological protection staff by 50 percent through reassignment of LAOO staff. However, this increase has not significantly increased the DOE radiological protection field presence or produced programmatic improvements. LAAO's involvement in tracking and closure of radiological protection issues continues to be marginal.

RADIOLOGICAL PROTECTION SITE PROFILE
FOR
OAK RIDGE

A. General Site Overview

The Oak Ridge complex is currently engaged in weapons dismantlement, energy research, basic science, biomedicine, non-nuclear defense activities, hazardous waste research and management, uranium enrichment, and environmental remediation. For the purpose of this review, only the defense nuclear facilities reporting to the Oak Ridge Operations Office (OR) were considered. Therefore, the facilities addressed in this review include the Y-12 Plant, the Oak Ridge National Laboratory (ORNL), and the K-25 Plant. Oak Ridge complex facilities are managed by Lockheed Martin Energy Systems (LMES) for OR. In addition, MK Ferguson-Oak Ridge Company (MKF) serves as the construction management contractor for the Oak Ridge complex. Funding for Oak Ridge is predominantly from the Office of Environmental Management (EM), but funding is also provided by the Offices of Defense Programs (DP) and Energy Research (ER). There are currently 74 nuclear and 203 radiological facilities at the site. The most significant radiological hazards include various forms of natural, depleted, and enriched uranium; plutonium; thorium; mixed fission and activation products; and tritium. Nuclear reactors, accelerators, x-ray producing machines, and sealed radiography sources are also used at the site.

B. Radiological Protection Organization

OR currently has ten designated radiological protection positions and one support contractor. Three of the individuals currently filling these positions are certified by the American Board of Health Physics (ABHP), one has passed Part I of the ABHP certification exam, and none are registered by the National Registry of Radiation Protection Technologists (NRRPT). Oak Ridge contractors currently have 527 radiological protection positions of which 110 are professionals and 417 are radiological control technicians. Of this group, 11 are ABHP certified and 51 are registered by the NRRPT.

C. Personnel Dosimetry

During 1995, Oak Ridge contractors issued personnel dosimeters to 16,006 individuals, approximately 25 percent fewer than in 1994. One hundred twenty-five individuals received > 100 mrem deep dose equivalent, and seven received > 100 mrem committed effective dose equivalent (CEDE). In 1994, only one individual received a CEDE > 100 mrem. The 1995 collective total effective dose equivalent (TEDE) was 52 person-rem. The site has a formal technical basis document for its internal dosimetry/bioassay program, and the external dosimetry program is DOE

Laboratory Accreditation Program (DOELAP) approved. The internal dosimetry program includes contractor participation in the DOE inter-comparison program and the performance of routine quality control checks to confirm its ability to detect uptakes of radioactive material. Adequate procedures and personnel are in place to effect compliance with the dose requirements of 10 CFR 835. Currently, the site bioassay programs routinely monitor about 4,753 individuals.

D. Technical Qualification Program

DOE radiological protection personnel (those whose work directly impacts radiological protection program development, management, implementation, oversight or assessment) are required by DOE Order 360.1 and by the Department's implementation plan in response to Defense Nuclear Facilities Safety Board Recommendation 93-3 to participate in the Department's technical qualification program. At the Oak Ridge sites, participants in the program have been identified, qualification standards have been issued, professional qualifications have been reviewed against the technical standard, and individual development plans have been created to correct qualification deficiencies. Qualification status for individual DOE radiological protection professionals is maintained on the technical qualifications record system. At the site, the DOE radiological protection personnel have, on the average, completed 80 percent of the qualifications in the program. The contractor directly supporting the DOE radiological protection staff at the Y-12 site is not required to participate in the technical qualification program.

Management and operating contractor participation in a technical qualification program depends upon the specific contract provisions and requirements established by the DOE contracting office. DOE contractor qualifications for technical personnel are currently addressed by DOE Order 5480.20A.

The sites require implementation of DOE Order 5480.20A, which requires submission of a Training Implementation Matrix (TIM) for the Y-12, K-25, and ORNL sites. The contractor's TIMs have been approved by DOE for the Y-12 and ORNL sites. These TIMs include key contractor radiological protection positions. DOE has evaluated the contractor's technical qualification program for the K-25 site (but not for Y-12 or ORNL) within the last three years. Implementation of the contractor's technical qualification program was evaluated through a sample of key radiological protection personnel. Of the sample, all participants were identified in the program, qualification standards were issued, professional qualifications were reviewed against the technical standard, and mechanisms have been established to correct qualification deficiencies. All individuals sampled had completed about 80 percent of their qualifications.

E. Performance Conclusion

The radiological protection programs for each of the three major sites at Oak Ridge (ORNL, Y-12, and K-25) appear to be adequate to protect the health and safety of workers, the public, and the environment. Strengths were noted in the control of external exposures, continued contractor management involvement in assuring quality and emphasis on radiological protection, and timely development of programs to meet 10 CFR 835 requirements. Although contractor radiological protection staffing at all three sites is adequate to meet current mission needs and objectives, staffing adequacy should continue to be assessed in light of organizational downsizing and increased construction, renovation, and D&D activities. Opportunities for improvement exist in the reduction of surface contamination areas, waste management, and work planning.

Areas of radiological protection weakness continue to be observed within Oak Ridge's Environmental Management organizations. Current organizational alignments essentially preclude oversight and control of site-level EM activities by DOE line management.

RADIOLOGICAL PROTECTION SITE PROFILE
FOR
PANTEX PLANT

A. General Site Overview

The Pantex Plant is the primary facility in the U.S. for the assembly, disassembly, and stockpile maintenance of war reserve nuclear weapons. The Pantex Plant is managed by Mason & Hanger-Silas Mason for the Amarillo Area Office (AA0) of the Albuquerque Operations Office (AL) and is primarily funded by the Office of Defense Programs (DP). There are currently 19 nuclear and 36 radiological facilities on the site. The most significant radiological hazards include various forms of natural, depleted, and enriched uranium; plutonium; thorium; and tritium. Machines that produce x-rays and neutrons, as well as a cobalt-60 radiography source, are also used on site.

B. Radiological Protection Organization

The DOE line organization currently has one designated radiological protection position and one contractor support position. Neither individual is certified by the American Board of Health Physics (ABHP) or registered by the National Registry of Radiation Protection Technologists (NRRPT). The principal contractor currently has 26 professional and 36 radiological control technician positions. Of this group, five are ABHP certified and 16 are registered by NRRPT.

C. Personnel Dosimetry

During 1995, the contractor issued personnel dosimeters to 2,985 individuals. One hundred ten received > 100 mrem deep dose equivalent, and none received > 100 mrem committed effective dose equivalent (CEDE). The 1995 collective total effective dose equivalent (TEDE) was 37 person-rem. The TEDE for 1995 exceeded that for 1994 by 8 person-rem due to a 3-month shutdown in 1994 as well as W48 program work in 1995. The site has a technical basis document for its internal dosimetry/bioassay program. The program includes quality assurance measures to confirm its ability to detect intakes of radioactive material. The program has adequate people and procedures in place to effect compliance with the dose requirements of 10 CFR 835. In 1995, the site bioassay program monitored approximately 986 individuals.

D. Technical Qualification Program

DOE radiological protection personnel (those whose work directly impacts radiological protection program development, management, implementation, oversight or

assessment) are required by DOE Order 360.1 and by the Department's implementation plan in response to Defense Nuclear Facilities Safety Board Recommendation 93-3 to participate in the Department's technical qualification program. At the Pantex site, participants in the program have been identified, qualification standards have been issued, professional qualifications have been reviewed against the technical standard, and individual development plans have been created to correct qualification deficiencies. Qualification cards have been established for individual DOE radiological protection professionals. Since completion of the technical qualification requirements is not required until 1998, individuals are in various stages of qualification. At the Pantex site, the DOE radiological protection individual has completed 21 percent of the required qualifications, and the support contractor is not required by the local DOE to participate in the technical qualification program.

Management and operating contractor participation in a technical qualification program depends upon the specific contract provisions and requirements established by the DOE contracting office. DOE contractor qualifications for technical personnel are currently addressed by DOE Order 5480.20A.

The site requires implementation of DOE Order 5480.20A, which requires submission of a Training Implementation Matrix (TIM). The contractor's TIM has been approved by the DOE and includes key contractor radiological protection positions. DOE has evaluated the contractor's program within the last three years.

Implementation of the contractor's technical qualification program was evaluated through a sample of key radiological protection personnel. Of the sample, all of the participants were identified in the program. However, qualification standards have not been issued, and a technical qualification program has not been fully implemented.

E. Performance Conclusion

The contractor has established an adequate radiological protection program for handling and storing radioactive materials. Difficulties related to contamination control work practices, improper use of protective equipment, and control of radioactive material continue to occur. As indicated in a previous profile for last year, the work planning process still does not fully integrate radiological engineering and radiological protection decisions at an early enough stage. Although some improvements have been made in radiological control engineering, several of these were driven by concerns submitted by employees. Additionally, Pantex has not fully established line management ownership of radiological controls.

RADIOLOGICAL PROTECTION PROGRAM PROFILE
FOR
HANFORD

A. General Overview

Hanford, formerly a major nuclear weapons materials production and processing site started in the early 1940s, is now primarily an Office of Environmental Management (EM) program site involved in decontamination, decommissioning, and environmental restoration of DOE facilities. The primary management and operating contractor, Westinghouse Hanford Corporation (WHC), manages the site for the Richland Operations Office (RL). There are currently 22 nuclear and 389 radiological facilities at Hanford. The most significant radiological hazards include various forms of natural, depleted, and enriched uranium; mixed fission products; plutonium; thorium; and tritium. The site also has neutron and x-ray producing machines.

B. Radiological Protection Organization

The DOE line organization currently has six individuals and one support service contractor performing radiological protection duties full time, and three additional personnel performing such duties part time. None of these individuals is certified by the American Board of Health Physics (ABHP); however, two have passed Part I of the ABHP certification exam, and one is registered by the National Registry of Radiation Protection Technologists (NRRPT). The three main contractors on site have 174 professional health physicists and 441 radiological control technicians. Of these, 14 are ABHP certified and 80 are registered by NRRPT.

C. Personnel Dosimetry

During 1995, the contractors issued personnel dosimeters to 11,001 individuals. In 1995, 646 persons received > 100 mrem deep dose equivalent, and two received > 100 mrem committed effective dose equivalent (CEDE). The 1995 collective total effective dose equivalent (TEDE) was 273 person-rem. The site maintains a formal technical basis document for its internal dosimetry/bioassay program, and the external dosimetry program is DOE Laboratory Accreditation Program (DOELAP) approved. The internal dosimetry program includes quality assurance measures to confirm its ability to detect uptakes of radioactive material. Adequate people and procedures are in place to effect compliance with the dose requirements of 10 CFR 835. Currently, the site bioassay program monitors about 2,550 individuals, almost 75 percent fewer than in 1994.

D. Technical Qualification Program

DOE radiological protection personnel (those whose work directly impacts radiological protection program development, management, implementation, oversight or assessment) are required by DOE Order 360.1 and by the Department's implementation plan in response to Defense Nuclear Facilities Safety Board Recommendation 93-3 to participate in the Department's technical qualification program. At the Hanford site, participants in the program have been identified, qualification standards have been issued, professional qualifications have been reviewed against the technical standard, and individual development plans have been created to correct qualification deficiencies. Qualification cards have been established for individual DOE radiological protection professionals. Since completion of the technical qualification requirements is not required until 1998, individuals are in various stages of qualification. At the Richland site, four of the DOE radiological protection personnel range from 78 to 96 percent completion of their qualifications. The remaining five have completed less than 5 percent of their qualifications. The contractor support personnel are not required by the local DOE to participate in the technical qualification program.

Management and operating contractor participation in a technical qualification program depends upon the specific contract provisions and requirements established by the DOE contracting office. DOE contractor qualifications for technical personnel are currently addressed by DOE Order 5480.20A.

The site requires implementation of DOE Order 5480.20A, which requires Pacific Northwest National Laboratory (PNNL) and WHC to submit Training Implementation Matrices (TIMs). The TIMs have been approved by DOE and include key contractor radiological protection positions. DOE has evaluated the contractors' programs within the last three years. Implementation of the contractors' technical qualification programs was evaluated through a sample of key radiological protection personnel. Of the sample, all participants were identified in the program, qualification standards were issued, and professional qualifications were reviewed against the technical standard. Mechanisms have been established to correct qualification deficiencies within WHC, but not within PNNL. Of the individuals sampled, those employed by PNNL had completed, on the average, about 77 percent of their qualifications. Those employed by WHC had completed, on the average, about 96 percent of their qualifications.

E. Performance Conclusion

Hanford's 1995 dose data indicate that the radiological protection program has been implemented in a reasonable manner. The small increase in collective dose during 1995 reflects the increased work scope at Hanford. There are other indicators, however, that demonstrate a need for program strengthening. Additional DOE line

management involvement is needed to correct previously identified issues and recurring problems. Although RL management has made some progress on improving its oversight of contractor radiological operations, much remains to be done. There was limited use or development of objective radiological performance indicators, and RL management was not consistent in specifying technical qualifications for personnel responsible for radiological protection oversight or program/project management. Additional development of applicable and meaningful performance indicators is critical. At the field level, contamination and personnel exposure controls continued to be a problem. There were instances of poor radiological work practices, poor radiological surveys, and poor posting and access control. In addition, a very large number of personnel dosimeters were issued and bioassays performed at the site. An analysis of the dosimetry and bioassay data indicates that only 6 percent of individuals assigned a dosimeter received a deep dose equivalent in excess of 100 mrem, and, despite a significant drop in the number of bioassays performed, only 0.1 percent of the personnel bioassayed received greater than 100 mrem committed effective dose equivalent.

Some areas exhibited strengths during 1995. For example, improvement plans and programs that may ultimately improve the RL radiological protection program were developed, RL contractors revised and upgraded large numbers of procedures, implementation plans for 10 CFR 835 were completed and approved on schedule, corrective action tracking systems were improved to allow information to be obtained more readily, and the number of skin contaminations decreased in 1995 as a result of management emphasis in this area.

RADIOLOGICAL PROTECTION SITE PROFILE
FOR
ROCKY FLATS

A. General Site Overview

Rocky Flats' original mission was to manufacture nuclear weapons components and recover plutonium scrap and residues. The site is currently engaged in plutonium stabilization and interim storage, decontamination and decommissioning, and environmental restoration.

During 1995, Rocky Flats Environmental Technology Site (RFETS) transitioned from the former management and operating contractor to a new Integrating Management Contractor (IMC), Kaiser-Hill (KH). The current contractor structure includes the IMC and four top-tier subcontractors: Rocky Mountain Remediation Services, Dyncorp, Safe Sites of Colorado, and Wackenhut Services. Various lower-tier subcontractors operate on site, contracted directly through the top-tiers.

The site radiological protection organization, KH, provides radiological protection and dosimetry services to the site subcontractors. Instrument calibration support is provided by the Alpha Corporation, a private company spin-off from the radiological protection organization. Manufacturing Sciences Corporation (MSC) performs radiological work in several RFETS buildings under a privatization agreement; MSC has its own radiological control technicians (RCTs) to control work, but utilizes KH RCTs for routine "building safety envelope" surveys. Contractor radiological protection staffing levels reported for this study are for the IMC only.

There are currently 28 nuclear and 14 radiological facilities on the site. The most significant radiological hazards include various forms of plutonium and natural, depleted, and enriched uranium.

B. Radiological Protection Organization

The DOE line organization currently has four designated radiological protection positions, two of which provide part time support, and four contractor positions. One of the eight is certified by the American Board of Health Physics (ABHP), and none are registered by the National Registry of Radiation Protection Technologists (NRRPT). The contractor currently has 136 non-hourly and 334 hourly radiological protection positions. Of this group, four are ABHP certified, 47 are registered by the NRRPT, and 3 by the State of Colorado.

C. Personnel Dosimetry

During 1995, the contractor issued routine personnel dosimeters to 4,988 individuals. Six hundred seventy-four individuals received > 100 mrem deep dose equivalent, and none received > 100 mrem committed effective dose equivalent (CEDE) in 1995. The 1995 collective total effective dose equivalent (TEDE) was 259 person-rem, approximately 26 percent greater than in 1994. This increase is largely due to increased radiological work activities in 1995. The site has a formal technical basis document on file for its internal dosimetry/bioassay program. The external dosimetry program is DOE Laboratory Accreditation Program (DOELAP) approved. The internal dosimetry program includes audits and routine quality control checks to confirm its ability to detect uptakes of radioactive material. Adequate people and procedures are in place to effect compliance with the dose requirements of 10 CFR 835. Currently, the site bioassay program routinely monitors about 2,954 individuals.

D. Technical Qualification Program

DOE radiological protection personnel (those whose work directly impacts radiological protection program development, management, implementation, oversight or assessment) are required by DOE Order 360.1 and by the Department's implementation plan in response to Defense Nuclear Facilities Safety Board Recommendation 93-3 to participate in the Department's technical qualification program. At the Rocky Flats site, participants in the program have been identified, qualification standards have been issued, professional qualifications have been reviewed against the technical standard, and individual development plans have been created to correct qualification deficiencies. Qualification cards have been established for individual DOE radiological protection professionals. Since completion of the technical qualification program requirements is not required until 1998, individuals are in various stages of qualification. The DOE radiological protection personnel at the Rocky Flats Field Office (RFFO) have, on the average, completed less than 10 percent of their required qualifications. The contractor personnel directly supporting DOE are not required by the RFFO to participate in the technical qualification program.

Integrating management contractor participation in a technical qualification program depends upon the specific contract provisions and requirements established by the DOE contracting office. DOE contractor qualifications for technical personnel are currently addressed by DOE Order 5480.20A.

The site requires implementation of DOE Order 5480.20A, which requires submission of a Training Implementation Matrix (TIM). The contractor's TIM has been approved by DOE. The TIM does not specifically identify key contractor radiological protection positions; however, the contractor has developed a formal procedure that addresses qualification and training of radiological protection professionals, reflecting DOE Order

5480.20A and Radiological Control Manual requirements. DOE has evaluated the contractor's program within the last three years. Implementation of the contractor's technical qualification program was evaluated through a sample of key radiological protection personnel. Of the sample, all positions were identified in the procedure, qualification requirements were established, professional qualifications were reviewed against the technical standard, and mechanisms have been established to correct qualification deficiencies. All individuals sampled met DOE Order 5480.20A and qualification procedure requirements.

E. Performance Conclusion

The radiological protection program infrastructure is in place, and the organization's management staff is generally well qualified. Adequate policies and procedures are in place to control program activities.

Radiological work activities generally showed an increase in 1995 compared to 1994. RFETS implemented new radiological area posting, layered clothing, and automated personnel exit monitoring in 1995. Radiological performance indicators reflect increasing dose and a significant increase in personnel contaminations during 1995 as compared to 1994 (from 4 to 22). Many of these contaminations are attributed to natural radioactivity and increased monitoring sensitivity. Implementation deficiencies in the areas of procedural compliance, adherence to Radiation Work Permits, and radiological area access control continue to persist and appear to be on the increase during late 1995 - early 1996.

RADIOLOGICAL PROTECTION SITE PROFILE
FOR
SANDIA NATIONAL LABORATORY

A. General Site Overview

The Sandia National Laboratory (SNL) is a diverse laboratory complex with facilities in Albuquerque, New Mexico; Livermore, California; and near Tonopah, Nevada. For the purpose of this profile, only the Albuquerque site is discussed. The primary mission of SNL was the development of the non-nuclear portions of nuclear weapons systems. SNL conducts research and development of strategic weapons defense systems, arms control, basic energy research, basic science, non-nuclear defense activities, fusion research, and environmental remediation. SNL is managed by Lockheed Martin Energy Systems (LMES) for the DOE Albuquerque Operations Office and is primarily funded by the Office of Defense Programs (DP). There are currently 10 nuclear and 100 radiological facilities on site. The most significant radiological hazards include various forms of natural, depleted, and enriched uranium; plutonium; thorium; mixed fission products; and tritium. Accelerators, x-ray producing machines, and nuclear reactors are also operated on site.

B. Radiological Protection Organization

The DOE line organization currently has one designated radiological protection position. The individual currently filling this position is certified by the American Board of Health Physics (ABHP). The contractor has 19 professional and 57 radiological control technician positions. Of this group, six are ABHP certified, and 11 are registered by the National Registry of Radiation Protection Technologists (NRRPT).

C. Personnel Dosimetry

During 1995, the contractor issued personnel dosimeters to 3,260 individuals. Eighteen individuals received > 100 mrem deep dose equivalent, and none received > 100 mrem committed effective dose equivalent (CEDE). The 1995 collective total effective dose equivalent (TEDE) was 10 person-rem. The site has a formal technical basis document on file for its internal dosimetry/bioassay program. The external dosimetry program is DOE Laboratory Accreditation Program (DOELAP) approved. The internal dosimetry program includes the use of blind spikes and the performance of routine quality control checks to confirm its ability to detect uptakes of radioactive material. SNL has adequate people and procedures in place to effect compliance with the dose requirements of 10 CFR 835. Currently, the site bioassay program routinely monitors about 50 individuals.

D. Technical Qualification Program

DOE radiological protection personnel (those whose work directly impacts radiological protection program development, management, implementation, oversight or assessment) are required by DOE Order 360.1 and by the Department's implementation plan in response to Defense Nuclear Facilities Safety Board Recommendation 93-3 to participate in the Department's technical qualification program. At the Sandia-New Mexico site, participants in the program have been identified, qualification standards have been issued, professional qualifications have been reviewed against the technical standard, and individual development plans have been created to correct qualification deficiencies. Qualification cards have been established for individual DOE radiological protection professionals. Since completion of the technical qualification program requirements is not required until 1998, individuals are in various stages of qualification. The DOE radiological protection individual at the Sandia - New Mexico site has completed about 90 percent of his required qualifications.

Contractor participation in a technical qualification program depends upon the specific contract provisions and requirements established by the DOE contracting office. DOE contractor qualifications for technical personnel are currently addressed by DOE Order 5480.20A.

Implementation of DOE Order 5480.20A at the Sandia - New Mexico site is required only for Technical Area V. The contractor has submitted its Training Implementation Matrix (TIM) for this Area, and it has been approved by the DOE. The TIM does not specifically identify key contractor radiological protection positions. The DOE has not evaluated the contractor's technical qualification program within the last three years. Current implementation of the contractor's technical qualification program was evaluated through a sample of key radiological protection personnel. Of the sample, all the key participants were identified in the program. However, for these positions, qualification standards have not been issued, and a qualification program for the key radiological protection personnel has not been established.

E. Performance Conclusion

The implementation of an effective radiological protection program at Sandia-New Mexico is improving but continues to be hampered by a lack of adequate management attention and direction. Increased DOE radiological protection presence accounts for some of the overall program improvement, but Sandia-New-Mexico continues to be challenged by radiological protection occurrences and there is room for program improvement.

RADIOLOGICAL PROTECTION SITE PROFILE
FOR
SAVANNAH RIVER

A. General Site Overview

The Savannah River Site (SRS), formerly a major nuclear weapons materials production and processing site starting in the late 1940s, is primarily an Office of Environmental Management (EM) site currently engaged in high-level waste management, energy research, basic science, biomedicine, non-nuclear defense activities, hazardous waste management, and environmental remediation. SRS facilities are managed by the Westinghouse Savannah River Company (WSRC) for the DOE Savannah River Operations Office (SR). SRS funding is predominantly from EM, but funding is also provided by the Offices of Defense Programs (DP) and Energy Research (ER). There are currently 179 nuclear and 13 radiological facilities at the site. The most significant radiological hazards include various forms of plutonium; natural, depleted, and enriched uranium; thorium; mixed fission and activation products; and tritium. Reactors, x-ray producing machines, and sealed radiography sources are also operated on site.

B. Radiological Protection Organization

The DOE line organization (SR) has nine designated radiological protection positions and ten contractor positions that routinely support the radiological protection staff. None of the nine are certified by the American Board of Health Physics (ABHP) or registered by the National Registry of Radiation Protection Technologists (NRRPT), although two of the individuals have passed part I of the ABHP certification exam and two of the support contractors are certified. WSRC currently has 185 non-hourly and 503 hourly designated radiological protection positions. Of these, 10 are ABHP certified and 17 are registered by NRRPT.

C. Personnel Dosimetry

During 1995, the contractor issued personnel dosimeters to approximately 12,500 individuals. Six hundred seventeen individuals received > 100 mrem deep dose equivalent, and two received > 100 mrem committed effective dose equivalent (CEDE). The 1995 collective total effective dose equivalent (TEDE) was 252 person-rem. The site has a formal technical basis document on file for its internal dosimetry/bioassay program. The external dosimetry program is DOE Laboratory Accreditation Program (DOELAP) approved. The internal dosimetry program includes blind spike samples and quality assurance audits to confirm its ability to detect uptakes of radioactive material. Adequate procedures and personnel are in place to

effect compliance with the dose requirements of 10 CFR 835. Currently, the site bioassay program routinely monitors about 12,000 individuals.

D. Technical Qualification Program

DOE radiological protection personnel (those whose work directly impacts radiological protection program development, management, implementation, oversight or assessment) are required by DOE Order 360.1 and by the Department's implementation plan in response to Defense Nuclear Facilities Safety Board Recommendation 93-3 to participate in the Department's technical qualification program. At SRS, participants in the program have been identified, qualification standards have been issued, professional qualifications have been reviewed against the technical standard, and individual development plans have been created to correct qualification deficiencies. Qualification cards have been established for individual DOE radiological protection professionals. Since completion of the technical qualification program requirements is not required until 1998, individuals are in various stages of qualification. The DOE radiological protection personnel at the Savannah River site have, on the average, completed about 60 percent of their required qualifications. The contractor personnel directly supporting DOE are not required by SR to participate in the technical qualification program.

Management and operating contractor participation in a technical qualification program depends upon the specific contract provisions and requirements established by the DOE contracting office. DOE contractor qualifications for technical personnel are currently addressed by DOE Order 5480.20A.

SRS is required to implement of DOE Order 5480.20A, which requires submission of a Training Implementation Matrix (TIM). The contractor's TIM has been approved by DOE. DOE has evaluated the contractor's program within the last three years.

E. Performance Conclusion

The radiological protection program at SR is sound. Management in both DOE and WSRC have clear policies, procedures, and goals; responsibilities are well defined; and project resource management systems are in place. Managers are held accountable for overall performance of the program.

As stated in the 1994 radiological protection profile, the SR radiological protection program strength still remains with its DOE and WSRC personnel and their willingness to take responsibility and accept new challenges. The transition to 10 CFR 835 and efforts to reduce the size of radiologically contaminated areas have been well coordinated and documented by both the facility and program managers.

Conduct of operations still represents the major weakness. There have been improvements in procedural compliance, but contamination control practices have taken a negative trend, as evidenced by an increase in the number of personnel contaminations in 1995. Both DOE and WSRC are directing attention to resolve this issue.

ATTACHMENT D

1995 DATA SUMMARY QUESTIONNAIRE

1995 DATA SUMMARY QUESTIONNAIRE

The following EH Residents collected the information listed below:

Fernald - Bill Harrison
Idaho - Tammy Hobbes
LANL, SNL - Rick Johnson
LLNL - Greg Yuhas
Oak Ridge - David Rohrer and Brenda Holder
Pantex - Robie Monroe
Richland - Jeanie Polehn
Rocky Flats - Tony Weadock
Savannah River - Brenda Pope

FOR CONTRACTORS -

1. TEDE Person-rem:

2. Number of permanently assigned personnel dosimeters:

3. Number of personnel doses greater than 100 mrem:

4. Number of personnel with CEDE greater than 100 mrem:

5. Number of non-hourly radiological protection positions:

6. Number of ABHP-certified health physicists:

7. Number of hourly radiological protection positions:

8. Number of personnel certified by NRRPT or state X-ray certification:

9. Number of personnel skin contaminations greater than the levels stated in Article 221, Table 2-2 of the RCM:

10. Number of square feet of inside areas with surface contamination greater than the levels specified in Article 222, Table 2-2, as of December 31, 1995:

11. Cubic feet of radioactive waste shipped for disposal in 1995:

12. Cubic feet of radioactive waste stored on site as of December 31, 1995:

13. Cubic feet of mixed waste stored on site as of December 31, 1995:

14. Number of nuclear facilities (DOE 5480.5 definition):

15. Number of radiological facilities exclusive of facilities counted in #14:

16. Number of ORPS unusual radiological occurrence reports in 1995:

17. Number of ORPS emergency radiological occurrence reports in 1995:

18.	Plutonium handled?	18a.	Dispersable?
19.	Enriched Uranium handled?	19a.	Dispersable?
20.	Natural Uranium or Thorium?	20a.	Dispersable?
21.	Depleted Uranium handled?	21a.	Dispersable?
22.	Mixed fission/activation products?	22a.	Dispersable?
23.	Tritium?	23a.	Dispersable?
24.	X-ray machines?	24a.	Sealed source radiography?

25. Accelerators?

26. Reactors?

27. Radiation areas?

28. High radiation areas?

29. Very high radiation areas?

30. Airborne radioactivity areas?

31. High contamination areas?

32. Airborne radioactive effluents?

33. Liquid radioactive effluents?

FOR DOE AT THE SITES -

34. Planned special exposures in 1995?

35. Number of individuals provided with permanently assigned whole body dosimetry:

36. Number with 1995 deep dose greater than 100 mrem:

37. Number with CEDE greater than 100 mrem:

38. Number of DOE staff in radiological protection positions with NRRPT certification:

39. Number of ABHP-certified health physicists:

40. Number of radiological protection positions with NRRPT certification:

41. In 1995, how many total person-days does DOE state that each radiological protection position spent at the site conducting radiological assignments, or interfacing with the contractor?

42. Does the site have a technical basis document on file for the internal dosimetry/bioassay program? (Ref: RCM 522.1)

43. What quality assurance has been performed to confirm the continuing ability of the bioassay programs to detect DILs for the radioisotopes present at the site? (Ref: 10 CFR 835.402(d))

44. How many people require bioassay monitoring? (Ref: RCM 522.2 and 522.5)

45. Does the site have in place adequate people and procedures to determine compliance with the dose requirements of 10 CFR 835 and/or DOE 5480.11? (Ref: G-10 CFR 835/C1, Rev. 1, Internal Dosimetry)

46. Did any personnel exposures exceed the limits specified in 10 CFR 835.202?

47. What is the status of implementation of DOE 360.1 and the Radiation Protection Qualification Standard for Defense Nuclear Facilities Technical Personnel? (The DOE 93-2 Implementation Plan committed to initial implementation by December 1, 1995.) This was to include:

    a. Identification of appropriate participants.

b. Issuance of qualification standards.

c. A review of professional qualifications against the technical standard.

d. Creation of Individual Development Plans to correct qualification deficiencies.

In additional to determining whether the above activities have occurred:

e. Have qualification cards been established for all affected DOE personnel?

f. What percentage of the required qualifications identified have been met by each affected individual?

Additional Information on Contractors:

48. On a sampling basis of only the key contractor radiological protection personnel, determine the status of the contractor's implementation of the Radiation Protection Technical Qualification Program.

a. Have participants been identified?

b. Have qualification standards been issued?

c. Have professional qualifications been reviewed against the technical standard?

d. Have mechanisms been established to correct qualification deficiencies?

e. What percentage of the required qualifications identified have been met by the individuals in the chosen sample?

49. What is the status of implementation of DOE Order 5480.20A?

a. Does the site contract required implementation of DOE Order 5480.20A?

b. Did the contractor submit the Training Implementation Matrix (TIM) required by DOE 5480.20A, Chapter 1, Paragraph 7.a.(1)?

c. Has DOE approved the contractors TIM?

d. Does the TIM include key radiological protection positions; for example, Radiological Protection Manager, Dosimetry Manager, Instrument Calibration Manager, Radiological Controls Technician Manager?

e. Has DOE documented an evaluation of implementation of the contractor's program in the last three years?

f. If the answers to a-e above are "No," has the contractor established and implemented a formal (written, reviewed, and approved) program assuring that only qualified individuals are selected for key radiological protection positions and that they complete training necessary to successfully execute the responsibilities and authorities of their positions?

ATTACHMENT E

TEAM COMPOSITION

Appendix E
Team Composition

Deputy Assistant Secretary, Oversight:	Glenn S. Podonsky
Associate Deputy Assistant Secretary:	Neal Goldenberg
Task Team Members:	Oliver D.T. Lynch, Jr., Task Leader Lacynda J. Foreman Jerome B. Martin Kathyrn P. McCarty Anthony A. Weadock Gregory P. Yuhas