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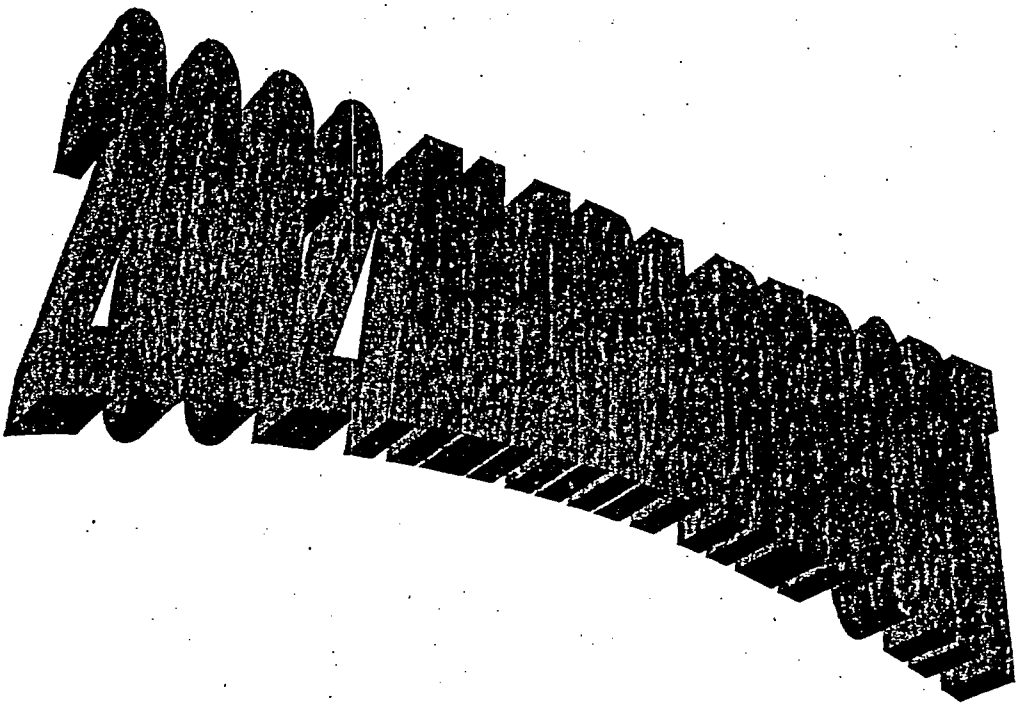

WESTINGHOUSE ELECTRIC COMPANY
NUCLEAR FUEL
COLUMBIA PLANT

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WESTINGHOUSE ELECTRIC COMPANY LLC

NUCLEAR FUEL

COLUMBIA PLANT ALARA REPORT

CALENDAR YEAR 2002

Coordinated by: _____ **Date:** 5/31/03

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Approved by: _____ **Date:** 6/16/03

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Environment, Health & Safety

PREFACE

The primary purpose of the ALARA Program is to maintain exposures of plant personnel and members of the public as far below the regulatory limits as is reasonably achievable. To this end, the Regulatory Compliance Committee (RCC), composed of technical staff managers and other cognizant personnel, directs the Columbia Site ALARA efforts. The Committee meets routinely to consider relevant subjects, such as airborne radioactivity concentrations, personnel exposures, effluent releases, self-assessment items and other regulatory requirements. The Columbia Plant ALARA Plan is included in this report to summarize the ALARA Program.

One vehicle for transmitting data to the RCC is the ALARA Report. The ALARA Report summarizes short- and long-term trends related to radiation exposure. The report draws attention to areas that are in need of improvement and summarizes recent ALARA efforts. The report also includes data and trends associated with chemical effluents, and NRC and internal compliance audits.

Throughout this report, trends are evaluated statistically in terms of "R^2". R^2 is a measure of how well the change in a category is related to time. (An R^2 of 0 indicates no time relationship, and an R^2 of 1 indicates a 1-to-1 correspondence between the change in that category and time.) In this report, trends where R^2 is less than 0.30 are not considered meaningful. An R^2 between 0.30 and 0.70 indicates that a relationship (or trend) may exist, but with statistically uncertain confidence. An R^2 greater than 0.70 indicates that the identified trend is characterized by the statistical model with a high level of confidence. Trends with R^2 greater than 0.70 are referred to in this report as "statistically significant". For each parameter evaluated, the change per time interval is also provided. It represents the slope of the straight line, which theoretically best fits the data.

In the attached graphs, the letters G, F and P represent trends with a high level of confidence ("statistically significant"), statistically uncertain confidence and not considered meaningful, respectively.

Beginning January 1, 1994, a revision to NRC Regulation 10CFR20, "Standards for Protection Against Radiation," became effective. This revised regulation and the revised NPDES Permit have resulted in the following changes to the Columbia Plant ALARA Report. In addition, certain parameters from the revised SNM-1107 license renewal application (which was approved during the fourth quarter of 1995) have been incorporated as follows:

1) Historic airborne radioactivity data have been adjusted to reflect the nontransportable Derived Air Concentration (DAC) value of 2 E-11 uCi/ml (see **Figure 1**, **Figure 1A**, and **Table 2**). The Internal Action Limit was raised to 100% DAC, consistent with approved procedures. This action limit applies to monthly sample averages, not individual samples collected over a particular shift.

2) The previous MPC-hour data were replaced with Committed Effective Dose Equivalent (CEDE) data, consistent with the revised 10CFR20 (see **Figures 2, 2A, and 2B**). The quarterly data reporting format was maintained to make internal data reporting consistent with the Deep-Dose Equivalent data, which is reported quarterly;

3) External radiation data is now reported as Deep-Dose Equivalent, consistent with the revised 10CFR20, and the graph limits have been revised accordingly (see **Figures 3, 3A, 3B, and 3C**). Also, IFBA data have replaced IDR data; beginning 1/1/97, Shallow-Dose Equivalent measurements were discontinued in accordance with prospective evaluations, because historical doses were consistently below 10% of the 10CFR20 limit;

4) The daily average limits for ammonia and fluorides have been adjusted to reflect the revised NPDES Permit, and the ammonia and fluoride graphs were modified to report annual averages rather than quarterly;

5) **Table 5A and Table 5B** summarizing gaseous discharges has been added;

6) The criteria in **Table 3** ("Candidate Locations for Corrective Action") have been adjusted to reflect the new 10CFR20 terminology;

7) A new Section IX, "Self-Assessment Items", has been added to reflect requirements in the revised SNM-1107 license;

8) The Summary section has been revised to add a new page entitled, "Summary--Radiation Protection Data"; and,

9) For 1999, parameters were added to reflect the BNFL Safety Index for conventional safety, radiological safety and environmental safety.

In late April 2002, the Nuclear Regulatory Commission (NRC) granted the Columbia Site authorization to use intake to dose conversion coefficients published in International Commission on Radiological Protection (ICRP) Publication No. 68. These coefficients were developed for use with a revised dosimetric model of the respiratory tract and more recent biological information related to the detriment associated with radiation exposure. The effect of implementing the new coefficients for calendar year (CY) 2002 was to effectively reduce the recorded internal doses calculated per activity unit of inhaled uranium by about a factor five. In order to facilitate trend analysis, historic internal exposure CEDE data and resultant Total Effective Dose Equivalent (TEDE) values were normalized for comparison against the CY 2002 data. This was achieved by re-calculating the CEDE and TEDE values using the ICRP 68 dose coefficients.

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I. SUMMARY

The following summarize statistically significant trends during 2002 (see **Table 1A**):

- The Pellet Area experienced a statistically significant upward trend over 5 years in airborne concentrations of 1.61% DAC per quarter.
- The Rod Area experienced a statistically significant upward trend over 5 years in airborne concentrations of 0.74% DAC per quarter.
- URRS experienced statistically significant upward trends over 5 years in airborne concentrations of 1.89% DAC per quarter.
- The Pellet Area experienced a statistically significant upward trend over 5 years in Committed Effective Dose Equivalent of 4.07 mrem per quarter.
- The Rod Manufacturing Area experienced a statistically significant upward trend over 5 years in Committed Effective Dose Equivalent of 3.44 mrem per quarter.
- URRS experienced a statistically significant upward trend over 5 years and 2 years in Committed Effective Dose Equivalent of 2.98 mrem and 4.34 mrem per quarter.
- Maintenance experienced a statistically significant upward trend over 5 years in Committed Effective Dose Equivalent of 3.3 mrem per quarter.

Comments:

- For all categories listed above, all averages remain below regulatory limits.
- ALARA data continues to be influenced by increases in enrichments that have occurred over the past ten years (see Table 7). In addition, the U-234 percentage has also increased because of additional reprocessed UF6 converted at the facility, which increases the specific activity of the uranium.
- Production throughput increased 8% between 2001 and 2002, thereby contributing to these upward trends.
- Stack ammonia emission levels continue to be less than 100 pounds per day, meeting EPA CERCLA continuous discharge limits.

SUMMARY--RADIATION PROTECTION DATA

	Actual	Goal
Airborne Radioactivity (2002)		
Number of work stations where the cumulative dose received by all operators at this work station for the reporting period exceeds 4 rem CEDE:	1	<10
Number of work stations where the dose rate received by individuals exceeds 2 mrem/hr CEDE:	1	<20

	Actual	Goal
Number of non-containment work locations with average airborne radioactivity air samples exceeding 100% DAC:	8	0
Number of non-containment work stations experiencing greater than 10 airborne spikes greater than 500% DAC during the reporting period:	5	0

Exposure Control (2002)

Number of personnel exceeding 4 rem TEDE (Westinghouse Columbia Administrative Limit)	0	0
Number of personnel exceeding 2 rem TEDE (ICRP Recommendation)	0	0
Number of personnel exceeding 1.5 rem TEDE	2	0
Percent of personnel exceeding 1.0 rem TEDE (BNFL Dose Index Parameter)	1/1/2001 - 12/31/2001 1/1/2002 - 12/31/2002	31% 6%
Maximum TEDE dose to a worker (rem)	1.57	<2
Average worker dose (rem)	0.382	<0.5
Collective dose (Person-REM)	279	<300

Effluents/Environmental (2002)

Total gaseous discharges in millicuries	0.56	<1.0*
Total liquid discharges in millicuries	65	<60*
Ammonia average liquid discharge in pounds per day	20	<50
Fluoride average liquid discharge in pounds per day	12	<25

*Investigation level

II. AIRBORNE CONCENTRATIONS AND INTERNAL PERSONNEL EXPOSURES

AIRBORNE RADIOACTIVITY (%DAC)

INTRODUCTION

Frequent observation of area air samples allows the employee to gain a measure of the airborne radioactivity levels he/she is exposed to. Abnormally discolored air samples may alert the employee to problems so that proper protective and corrective actions can be pursued.

An "Early Airborne Program" exists to alert the next shift to the problem. This is accomplished by counting all air samples soon after collection, and notifying Team Managers of any high samples. Timely investigations frequently lead to prompt corrective action.

Air samples are located at representative work stations where airborne radioactivity levels are likely to exceed 10% of established airborne radioactivity limits. Currently, air samples are changed primarily on a shift basis. Air sample locations are periodically checked to ensure that they are reasonably representative of the concentrations actually breathed by employees, and meet the criteria in NRC Regulatory Guide 8.25, "Air Sampling in the Workplace". Lapel air samples are used in areas where there are no representative air samples, and where there is potential for exposure (e.g., elevated locations).

DATA AND COMMENT

The IDR Area continues in a shutdown mode except for specific operations which are reviewed on a case-by-case basis; in-plant air samples are not routinely collected. All manufacturing operations use the ADU process.

Figure 1 shows annual average airborne radioactivity concentrations by department for each of the last two years. Note that all departments are averaging less than or equal to 65% DAC. The average airborne radioactivity during CY 2002 increased slightly in the Pellet Manufacturing, URRS and Erbia areas compared with the last reporting period (Pellet Mfg 45% DAC in 2002 versus 42% DAC in 2001; URRS 50% DAC in 2002 versus 43% DAC in 2001; and Erbia 13% DAC in 2002 versus 10% DAC in 2001).

The average airborne radioactivity during CY 2002 decreased slightly in the Conversion and Rod Manufacturing areas compared with the last reporting period (Conversion 64 % DAC in 2002 versus 62 % DAC in 2001: Rod Mfg. 20 % in 2002 and 21 % DAC in 2001.

Figure 1A provides airborne radioactivity concentration data for each department for the past five years. (All data were conservatively calculated assuming nontransportable uranium, with a

DAC of 2 E-11 μCi/ml.). **Figure 1A** shows that airborne radioactivity in the Conversion, Pellet Mfg. and URRS areas experienced discernable increases during the last couple of quarters of 2002. This trend has continued through the first quarter of CY 2003 up to the present. The increases are attributed to major maintenance activities, contractor upgrade projects that generated additional airborne radioactivity, additional work due to the increased production workload, and unusual events.

As noted in the summary section, there were three significant trends.

- The Pellet Area experienced a statistically significant upward trend over 5 years in airborne concentrations of 1.61% DAC per quarter.
- The Rod Area experienced a statistically significant upward trend over 5 years in airborne concentrations of 0.74% DAC per quarter.
- URRS experienced statistically significant upward trends over 5 years in airborne concentrations of 1.89% DAC per quarter.

There were eight non-containment air sample stations averaging greater than 100% DAC for 2002:

- Feeder Cover Hood, Bulk Blending Room 273% DAC
- 1 Remill Top, Bulk Blending Room 165% DAC
- 1 Remill Bottom, Bulk Blending Room 130% DAC
- 2 Remill Top, Bulk Blending Room 168% DAC
- Line 4 Weigh Table, Conversion Line 4 110% DAC
- Line 4 Product End Bottom Mill, Conversion Line 4 103% DAC
- Line 2 Weigh Table, Conversion Line 2 100% DAC

Due to persistent elevated airborne radioactivity in the Bulk Blending Room, respiratory protection is required for entry into the areas of the Remill stations and Feeder Cover Hood. A capital appropriations project has been in effect for this area to reduce airborne concentrations, with some success in reducing these airborne concentrations. The average airborne radioactivity was reduced at the following locations as indicated:

- Powder Dump Station 131% DAC to 61% DAC
- Bulk Blending Room Desk 113% DAC to 69% DAC

Additional equipment improvements resulting in reductions in airborne radioactivity are anticipated for CY 2003.

Table 2 lists the air sample monthly area % DAC averages for 2002 for work stations in the Chemical Area. Eight air sample stations exceeded 100% DAC for the year. See discussions above.

INTERNAL RADIATION EXPOSURES

INTRODUCTION

Daily uranium intake and internal Committed Effective Dose Equivalent (CEDE) values are calculated for individuals who are likely to receive more than 10% of the applicable Annual Limit of Intake (ALI), or 500 mrem CEDE for the year. These categories of workers are typically those that spend a significant portion of their time working in production areas where uranium other than that sealed in Fuel Rods is handled. Airborne radioactivity concentrations, stay-times and respirator usage are utilized in determining the amount of airborne radioactivity inhaled by workers. Dose conversion factors are then used to estimate the amount of radiation dose the individual will receive over the next fifty years due to internally deposited uranium. Airborne radioactivity exposures represent recent exposure to both transportable (UF_6, UO_2F_2) and non-transportable compounds (UO_2, U_3O_8) of uranium.

Figure 2 shows annual Committed Effective Dose Equivalent (CEDE) average totals by department for the last two years. Department averages increased during 2002 compared with 2001.

- Conversion: 401 mrem to 405 mrem
- Rod Area: 118 mrem to166 mrem
- Erbia Area: 18 mrem to 60 mrem
- Crystals Operations: 43 mrem to 197 mrem

Increases to both the Erbia and Crystal Operations departments are due to significant increases in activity during 2002 compared to 2001 as these newer processes were fully implemented at the site.

Department averages decreased during 2002 compared with 2001 for the following departments as indicated.

- URRS: 167 mrem to 72 mrem
- Pellet Manufacturing: 281 mrem to 258 mrem
- Maintenance: 209 mrem to 200 mrem
- IFBA: 46 mrem to 32 mrem

Figure 2A and 2B present quarterly departmental CEDE averages over the last five years. There were five significant trends.

- The Pellet Area experienced a statistically significant upward trend over 5 years in Committed Effective Dose Equivalent of 4.07 mrem per quarter.
- The Rod Manufacturing Area experienced a statistically significant upward trend over 5 years in Committed Effective Dose Equivalent of 3.44 mrem per quarter.

- URRS experienced a statistically significant upward trend over 5 years and 2 years in Committed Effective Dose Equivalent of 2.98 mrem and 4.34 mrem per quarter respectively.
- Maintenance experienced a statistically significant upward trend over 5 years in Committed Effective Dose Equivalent of 3.3 mrem per quarter.

There were 59 individuals who exceeded 0.5 rem CEDE during 2002, compared with 37 during 2001. The majority of these doses are calculated from airborne radioactivity concentrations in the Chemical Area and personnel stay times at individual air sample stations, using the airborne radioactivity concentrations.

Authorization was obtained from the NRC in the form of a license amendment to base dose calculations on more realistic particle size distribution values and more current metabolic/dosimetric models. This methodology and corresponding dose coefficients from ICRP 68 were applied to the 2002 data used in dose calculations. Recorded doses were reduced substantially. The same methodology was applied to historical data to facilitate comparison and trend identification.

Table 3 summarizes those work locations that exceed certain criteria used to identify areas in need of improvement. The following is a brief description of the criteria and 2002 performance against the criteria. Note these criteria will be revised by the ALARA committee during CY 2003 to take into account utilization of the ICRP 60 dose coefficients and administrative dose limits.

Committed Effective Dose Equivalent (CEDE) > 4 rem. Work locations where the cumulative dose received by all operators working at this station exceeds 4 rem CEDE per year are included.

- One work location (SOLX Concentrator) fell into this category during this reporting period with cumulative CEDE for the year of 5.8 rem. The significant cumulative exposure at this location is explained by the fact that this station serves a dual purpose and operators working in the SOLX Control Room also use this location to log their stay time. Therefore, although the dose rate for the location is relatively low (0.1 mrem/hr of time logged) because multiple individuals log their time at the station, the cumulative dose registered is relatively high. The same phenomenon occurs at the Conversion Control Room work location. At this exposure rate, and continuously working at this location, an employee could accumulate a CEDE of 4 rem annually, although this is very unlikely.

Mrem/hr CEDE > 2 mrem/hr. Work locations where the total exposure divided by the number of hours spent in the location is greater than 2 mrem/hr.

- One work location (Erbia Pellet Transfer Hood – 3.911 mrem/hr) exceeded the criteria in 2002. The significant exposure rate recorded at this location is due to an unusual occurrence at this station resulting in an acute exposure to an individual in a relatively short period of time while the individual was cleaning pellet trays improperly.

DAC >100% - This represents the number of work locations with average annual airborne radioactivity concentrations exceeding 100% DAC for the reporting period.

- Eight air sample stations exceeded this criterion. Eight also exceeded this criterion for the previous reporting period. To protect personnel working in the Mill area of the Bulk Blending Room, respiratory protection is required.

Spikes > 10 exceeding 500% DAC

- Five air sample stations had more than 10 spikes greater than 500% DAC, compared with ten for the previous reporting period. This exceeds the ALARA goal of zero for the reporting period.

These data are routinely reported to Manufacturing in an ALARA effort to continuously keep them informed of air sample stations that require additional attention.

BIOASSAY

INTRODUCTION

Personnel are monitored for exposure to uranium compounds by the measurement programs that identify causes or work locations that may be in need of ALARA actions. Additionally, each program contains protective action levels for investigative purposes to reduce future exposure, and for restricting individuals from further exposure.

Invivo Results

Invivo counts are performed routinely for personnel who work with unencapsulated uranium. Invivo count frequencies are established for the routine invivo program for categories of workers based on airborne radioactivity levels in areas where they work, historical exposure data, and the type of material present in the various work areas. Administrative count intervals that, if exceeded, required individuals to be restricted from the Chemical Areas of the Plant, were established to ensure that intervals defined in SNM-1107 would not be exceeded.

Urinalysis Results

The primary concern with exposure to transportable uranium compounds is chemical damage to the kidney when the chemical toxicity threshold is exceeded. For this reason, monthly urine samples are submitted by personnel routinely exposed to transportable uranium compounds.

Transportable uranium is also a radiological hazard to the bone. Hence, exposure to such compounds should be kept ALARA.

Personnel routinely exposed to nontransportable compounds submit urine samples annually.

DATA AND COMMENT

Invivo Results

Beginning in the third quarter of 1999, there were software changes which resulted in the documentation of data as "<MDA" for counts less than approximately 125 micrograms U-235 (the typical MDA calculated by the software algorithms). Previously, data below the MDA were documented as well. Therefore, invivo data are no longer presented in chart form.

There were 641 invivo counts performed in 2002 compared to 865 performed in 2001. The decrease is due to fewer baseline and termination counts being performed as the turnover at the site decreased in 2002 and fewer individuals being counted quarterly because fewer employees registered lung count results above the MDA of the system. There were 7 individuals with measurable lung burdens above the MDA during 2002, compared with 11 individuals with measurable lung burdens above the MDA during 2001. Reviews of the 2002 count data did not reveal anyone with confirmed statistically significant increases in their U-235 lung burdens that were of radiological concern.

There are currently no individuals on invivo restriction, i.e., that have a confirmed lung burden exceeding 110 µg U-235 from previous invivo counts.

URINALYSIS RESULTS:

During 2002, approximately 3500 routine urine samples were processed. Personnel working in departments that are required to provide samples on a monthly frequency submitted the majority of samples. The 2002 routine urine sample results distribution and comparison to 2001 data is summarized below:

Routine Urine Sample Results	2002	2001
Total # Submitted:	3481	4470
# Samples >2 µgrams/l Uranium	171	307
# Samples >= 5 <= 10 µgrams/l Uranium	10	41
# Samples > 10 µgrams/l Uranium	9	8

Personnel Work Restrictions

Personnel work restrictions are defined as removal of personnel from their routine work location for the purpose of immediately eliminating any new exposure. Restrictions are ended once causative conditions have returned to acceptable levels and diagnostic bioassay data have been collected. Elevated bioassay or air sampling results can result in restriction issuance.

During 2002, there were 30 restrictions, compared with 43 restrictions during 2001, 48 during 2000, 34 during 1999, 30 during 1998, and 33 during 1997. 28 of the restrictions were due to high airborne radioactivity or unusual incidents. Two were due to elevated invivo results. Fifteen (15) involved Conversion personnel, ten (10) involved Pellet personnel, four (4) involved Maintenance personnel, and one (1) involved ERBIA personnel.

There were a total of 296 person days of restriction in 2002 compared with 397 person-days of restriction in 2001, 362 person-days of restriction in 2000, 225 person-days in 1999, 189 person-days in 1998 and 243 person-days in 1997. Of the 296 person-days, 140 were in Conversion, 119 in Pelleting, 28 in Maintenance, and 9 in ERBIA. There were 84 person-days of restriction on first shift, 80 on second shift and 132 on third shift.

There was a decrease in the number of restrictions in 2002 as compared with 2001. The number of person-days of restriction also decreased.

Note: Restrictions resulting from failure to submit timely bioassay samples, or restrictions voided soon after issuance were not included in the above.

III. EXTERNAL PERSONNEL EXPOSURES

INTRODUCTION

Personnel dosimeters (Thermoluminescent TLDs or Optically Stimulated Luminescent OSL dosimeters) are supplied to those individuals who may be exposed to greater than 10% of the Deep-Dose Equivalent external radiation dose limits. Personnel dosimeters are also distributed, upon request or at the discretion of Environment Health & Safety to those individuals who would not normally be monitored. Badges are provided for over 500 individuals and are changed and evaluated quarterly for men and women. Beginning with the third quarter of 1999, the vendor for supplying personnel dosimetry services was changed from Eberline to Landauer. During the fourth quarter of 2001 Landauer began using a new calibration technique determined using a uranium slab source to calculate the doses from their Luxel optically stimulated luminescent badges. This was in response to a concern regarding potential over response to lower energy photons of the Luxel badges compared to TLD style dosimeters. The newer calibration has had the effect of reducing the reported DDE values and increasing the SDE values for most workers who directly handle non-containerized or unclad uranium.

The ALARA Program to minimize external personnel exposures consists of the following:

- Routine surveillance of radioactive material areas for external radiation
- Personnel and area dosimetry
- Reviews of surveillance and dosemetry results
- Investigations of unusually high exposures
- Evaluations of trends in area and personnel external radiation doses

DATA AND COMMENTS

Figure 3 shows annual Deep-Dose Equivalents (DDE) averages by department for the last two years. Quarterly average Deep-Dose Equivalents (DDE) by job function for the last five years are summarized in **Figures 3A, 3B and 3C.**

All departmental Deep-Dose Equivalent averages are below 20% of the annual NRC maximum permissible Deep-Dose Equivalent limit of 5,000 mrem (average of 1,250 mrem/Qtr.). There were no statistically significant trends.

There were discernable reductions in the annual average DDE from 2001 to 2002 for the following areas:

- Conversion 463 mrem – 405 mrem
- Pellet Mfg. 528 mrem – 264 mrem
- Rod Mfg. 175 mrem – 117 mrem
- Maintenance 201 mrem – 180 mrem

- IFBA ZrB_2 257 mrem – 169 mrem
- Final Assembly 447 mrem – 385 mrem

There were notable increases in the annual average DDE from 2001 to 2002 for the following areas:

- Erbia 59 mrem –192 mrem
- Crystal Ops. 147 mrem - 198 mrem
- Packing 261 mrem - 297 mrem
- QC Rod Mfg. 187 mrem - 289 mrem

Figure 4 shows annual Shallow Dose Equivalents (SDE) averages by department for the last two years.

Due to the change in calibration of the dosimeters, those areas where employees handle unclad uranium experienced the most significant increases in the reported SDE.

Extremity dosimeters were provided for those individuals who routinely handle pellets with their hands, namely pellet inspectors and pellet operators. Pellet operators have taken over most of the pellet inspections. Dosimeters are normally worn as finger "rings" to monitor the dose at the second joint of the highest exposed finger. Ratios are then determined between the "ring" position and the finger tip which would normally represent the highest dose potential. "Ring" position doses are then corrected by multiplying them by these ratios to assess the finger tip doses.

The Pellet Area average annual extremity dose was 3.7 rem in 2002 compared to the average extremity dose for 2001 of 2.3 rem, which is consistent with the potential for extremity personnel exposures in this area.

The Maximum Permissible Annual Extremity Dose is 50 rem. There were no doses exceeding the Maximum Permissible Annual Extremity Dose. The highest Pellet operator dose to the finger tip for 2002 was 18.7 rem compared to 10.31 rem for 2001.

IV. TOTAL EFFECTIVE DOSE EQUIVALENT

INTRODUCTION

Total Effective Dose Equivalent (TEDE) is determined by adding the Deep-Dose Equivalent to the internal dose. The internal dose is the amount of radioactive material taken into the body over time (microcuries uranium inhaled and/or bioassay data) multiplied by conversion factors to arrive at the dose delivered to the whole body from this material over 50 years. As previously discussed in the report, authorization was obtained from the NRC in the form of a license amendment to base dose calculations on more realistic particle size distribution values and more current metabolic/dosimetric models. This methodology and corresponding dose coefficients from ICRP 68 were applied to the 2002 and reduced recorded doses substantially. The same methodology was applied to historical data to facilitate comparison and trend identification.

Total Effective Dose Equivalent trends and graphs were obtained by adding departmental averages for quarterly Deep-Dose Equivalents to internal departmental average doses derived from exposure estimates based upon the Personnel Exposure Log data and/or bioassay data.

DATA & COMMENTS

As seen in **Figures 5, 5A and 5B**, the departmental averages are well below the 1,250 mrem/Qtr. average necessary to exceed the annual NRC limit of 5,000 mrem. Most area averages decreased slightly in 2002 compared with 2001 averages. No significant trends were identified.

The highest annual TEDE of 1.573 recorded for 2002 was assigned to a Conversion Area employee. Two employees exceeded the recently adopted Westinghouse Electric Company annual TEDE administrative limit of 1.5 rem.

Table 6 summarizes the range of individual Total Effective Dose Equivalents (TEDE's) for each budget category recorded for 2002. Reductions in the recorded CEDE component of the TEDE due to use of the ICRP 68 dose coefficients have had the effect of making the DDE component contribute to the majority of the TEDE dose. As indicated in **Table 6**, the DDE component makes up 74 % on average of the Columbia Site TEDE dose.

Figure 6 shows annual Columbia Site Collective Dose for all persons at the Columbia Plant for the past several years (e.g., the sum of all TEDEs). Note that the site collective dose was 279 person-rem in 2002 compared to 315 person-rem for 2001, where both were calculated using the dose coefficients in ICRP 68.

V. EFFLUENT AND ENVIRONMENTAL

INTRODUCTION

Effluent releases from the Columbia Plant occur via two typical pathways - gaseous and liquid streams. Gaseous streams from the Chemical Area are appropriately treated to remove radioactive particulates prior to discharge to the environment. This may include preliminary filtration, contact with high efficiency liquid scrubbers, and/or final discharge through HEPA filters. Liquids are treated to remove both chemical and radioactive constituents and discharged to the Congaree River. Prior to discharge to the external Wastewater Treatment Facility, most uranium is removed from the liquid streams in the main plant by filtration, pH adjustment and use of settling tanks. At the external Wastewater Treatment Facility, an advanced wastewater treatment process is used to remove uranium to as low as reasonably achievable (ALARA) outside the facility.

Following uranium removal, the chemicals used in the process are removed by reaction of the wastewater with slaked lime, distillation and recycle of ammonia, and precipitation of the fluoride as calcium fluoride in settling lagoons. By-product calcium fluoride is recycled as non-radioactive material in accordance with license requirements.

All effluents are routinely sampled and analyzed to ensure that they are below applicable regulatory limits.

DATA AND COMMENT

Gaseous Effluents

The total gaseous radioactivity discharged during 2002 was 556 microcuries of uranium, compared with 558 microcuries during 2001, indicating a 0.3 % decrease over the past year. **Figure 7A** depicts the cumulative trends since 1998. There were no significant trends. Additional new stacks that exhaust from the Erbia processing area were included for the entire 2002 calendar year.

Gaseous effluents at the point of discharge from the stacks represent an average discharge concentration of 1.71E-13 μCi/ml. This concentration equals 286% of the NRC Unrestricted Release Limit (URL) for "Y" material. This concentration would be substantially diluted by a minimum factor of 1000 at the site boundary using ground level diffusion calculations.

Compliance with the previous NRC 10CFR20 regulations had been documented by assurance that the old Appendix "B" unrestricted levels, 4.0 E-12 μCi/ml, were met on an annual basis. The revised Appendix "B" levels were reduced by a factor of 66 to 6.0 E-14 μCi/ml; however,

compliance as prescribed in the new NRC 10CFR20.1301 and 1302 regulations can now be demonstrated by using the EPA "Comply" code, and NRC Regulatory Guide 1.109, and assuring that the off-site Total Effective Dose Equivalent (TEDE) to an individual "likely" to receive the highest dose from the licensed operation does not exceed 10% of the annual dose limit, or 10 mREM/year, or the EPA 40CFR190 limit of 25 mREM annually. The critical pathway for offsite dose is derived from inhalation of airborne effluents and the resultant lung dose. Therefore, the stack particulate and gaseous effluents will account for greater than 99% of the offsite Total Effective Dose Equivalent as calculated from previous modeling.

In 1996, Regulation 10CFR20 was revised, requiring the reporting of doses to members of the public which exceed the "dose constraint" of 10 mREM per year. No reportable doses have been documented since this requirement was legislated.

The total stack discharge of 556 microcuries uranium during 2002 corresponds to an annual TEDE dose of less than 0.4 mrem to an exposed individual living at the site boundary (using the EPA "Comply" meteorological code). This dose is less than the ALARA goal in NRC Regulatory Guide 8.37 and the SC-DHEC Licensing Guide, "ALARA Levels for Effluents from Materials Facilities" (10 mREM/year); less than the "dose constraint" level in 10CFR20.1101(d), and less than the investigation level in Environment Health and Safety (EH&S) Procedures RA-401 and RA-219 (1 mREM/year).

During 2002, the Decon Room exhaust system was the highest single contributor to gaseous effluent activity for the year (64.8 microcuries out of the total of 556 microcuries yearly total.) Maintenance actions and HEPA filter changes were routinely performed on this filter house to minimize discharges.

See Table 5 and Table 5B for a detailed listing of gaseous effluent discharges.

Liquid Radiological Effluents

During 2002, approximately 65 millicuries of uranium were discharged to the Congaree River compared with approximately 63 millicuries during 2001, indicating an approximate 3.2 % increase over the past year's level.

Modification of NRC 10CFR20 regulations effective January 1, 1994, revised the requirements for discharge of liquid effluents. Previously, compliance had to be assured by meeting the old Appendix "B" unrestricted area discharge limit of 3.0 E-05 µCi/ml, averaged annually.

The 1994 revised NRC 10CFR20 liquid Unrestricted Release Limit (URL) was reduced by a factor of 100 to 3.0 E-07 µCi/ml; however, compliance as prescribed in NRC 10CFR20.1301 and 1302 can be demonstrated by assuring that the Total Effective Dose Equivalent (TEDE) to the individual likely to receive the highest dose from licensed operation does not exceed 10% (Regulatory Guide 8.37) of the annual dose limit of 100 mREM (i.e., 10 mREM), or the EPA

40CFR190 limit of 25 mREM. Based on using the TEDE compliance option, the contribution of dose from the liquid discharges will be negligible at the present liquid discharge levels (less than approximately 0.0003 mREM/year). Control of liquid discharges is based on adherence with ALARA principles and compliance with Procedure RA-401 and NRC Regulatory Guide 8.37. Also, any liquid effluent discharged from the Columbia plant would be further substantially diluted by mixing in the Congaree River.

Liquid Chemical Effluents

The current Westinghouse SC-DHEC/EPA National Pollutant Discharge Elimination System (NPDES) liquid effluent chemical discharge permit was reissued effective May 1999, and discharges for all controlled permit parameters are typically in compliance with all NPDES limitations. This permit implements the criteria specified in the Federal Water Pollution Control Act of 1972 (and as amended by the Clean Water Act of 1977) which assures that all point source discharges to navigable streams are regulated and limited by technology-based effluent standards.

Non-radiological effluents of ammonia and fluorides are shown in **Figures 7C and 7D**. During 2002, ammonia discharges averaged approximately 20.5 pounds per day, which is well within the limit of the NPDES Permit of 50 pounds per day (#/d). Fluoride effluents averaged approximately 11.7 pounds per day, which is substantially less than the NPDES Permit limit of 25 pounds per day. There were no significant trends.

All controlled parameters are analyzed with a routine frequency to meet permit requirements. All analyzed results were within permit limits during calendar year 2002 with the exception of (1) BOD5 monthly average in June (26.9 #/d BOD5); (2) the BOD5 results for September 19, 2002 (94.0 #/d); and (3) BOD5 monthly results for September (34.5 #/d).

The BOD5 daily average results for 2002 averaged 19.0 pounds BOD5/day. This was within the permit parameter. Following installation of the effluent diffuser, biological toxicity testing of the liquid effluent is not required. (See **Figure 8D**)

The nitrates graph is included to demonstrate nitrate discharges to Congaree River. This parameter is not currently regulated by the NPDES permit. (See **Figure 8E**)

Chemical Stack Emissions

In November 2002, stack sampling for ammonia indicated that total gaseous emission discharges of ammonia were again less than 100 pounds per day, meeting the EPA CERCLA continuous discharge limit.

Environmental Activity

Ambient environmental airborne radioactivity concentrations are sampled continuously to verify that plant effluents are ALARA. Ambient air concentrations at the site boundaries average approximately 2.51 E-15 microcuries per ml or 4.2 % of the 10CFR20 Unrestricted Release Limit.

Figures 8A, 8B, and 8C provide vegetation, soil, fish and Congaree River sediment historical data to the present for summed isotopic uranium alpha activity. Results for these environmental samples demonstrate near background levels of uranium activity in the environment.

Groundwater Monitoring

Chlorinated Solvents:

Westinghouse continued with implementation of the chlorinated solvent remediation project by assuring continuous operation (with the exception of power outages) of the air sparge soil vapor extraction system in calendar year 2002. This process should effectively operate to remove volatile organic compounds (VOCs) and perchloroethylene contamination in the shallow surficial aquifer identified west-southwest of the oil house.

Radiological Analysis:

Well water radiological analysis is required as a NRC license commitment on ten surficial aquifer wells. In 2002, two identified NRC sampling well sites exceeded the 50 pCi/l Gross Beta investigation limit. Well 7 averaged 349 pCi/l Gross Beta, and Well 32 averaged 1618 pCi/l Gross Beta. These values are within the previously detected sample range. Four other adjacent wells that are not on the NRC sampling list also exceeded the 50 pCi/l limit.

An investigation was previously initiated in 1998 to review the problems with elevated analysis in these wells. This elevated Gross Beta content was identified and confirmed as Tc-99. The investigation evaluated potential causes from lagoon leaks, K-40 natural contamination, sampling errors, the cylinder recertification building, and adjacent surface water contamination from the concrete pad. The cylinder recertification building liquid from the hydrostatic test process appeared to have the highest potential of being a major contributor since this liquid (from remnants of activity in the cleaned cylinders) could contain elevated uranium daughter beta, Tc-99 beta, and low alpha concentrations. Furthermore, a potential source was identified when a crack was noted in the cylinder recertification building floor sump in August 1998. This situation could have resulted in small volumes of liquid leakage. Corrective actions were immediately implemented in September 1998 to eliminate the sump and minimize the possibility of water leakage. The repair of this sump appears to have corrected the problem. Monitoring of these wells on a routine basis will continue.

ISO 14001 Essential Conformance

An action plan was developed in 1999 to implement a "nearly compliant" ISO 14001 Plan. The plan was developed to assure essential conformance with this international standard and develop a process for continuous improvement with environmental issues.

VI. UNUSUAL OCCURRENCES

- On January 6, water was noted on the Erbia Blending Area floor. The leak originated from the roof around defective flashing, and ran down a structural I-beam onto the floor in Erbia. Action was initiated to terminate the leak, make repairs to the roof to preclude a recurrence, and to inspect other areas of the roof for similar deterioration that might cause a future problem. (CAPS Issue 02-000047, Data Pack N02-02)

- On January 27, a powder spill in the Erbia Area resulted in approximately 113 Kgs of UO_2 being discharged into the Erbia granulator hood. Nuclear Criticality Safety engineers were notified, and following their review, the powder was removed and normal operations resumed. Operator error was the root cause of the incident. (CAPS Issue 02-000833, Data Pack N02-03)

- On Feburary 2, it was discovered that a proximity switch was activated by the use of a file, thus keeping a valve from the Clean Dissolvers in the open position. The valve remained open even when the catch pot was not in place, potentially allowing material to fill a non-favorable geometry hood. (CAPS Issue 02-000647, Data Pack R02-04; Root cause conducted.)

- On February 26, it was discovered that a PIF that had been issued did not include all of the criticality controls (pH and U235 concentration) for pump out of acid wash from the C4 dissolvers. (CAPS Issue 02-000847, Data Pack N02-05; Root Cause conducted.)

- On June 5, thirteen packs of material were found to have been taken into the Erbia Moderation Controlled area via a freight elevator, bypassing the bar code scanning interlock. The packs did not have moisture analysis results completed and posted. The packs were immediately removed from the area, the Nuclear Criticality Safety function was notified, and the Erbia blending operation was stopped. The material in question was oxidized U_3O_8, visually dry. (CAPS Issue 02-02-002828, Data Pack N02-07; Root Cause conducted.)

- On June 24, moisture was detected in the Dissolver Torit. Double contingency protection for the ventilation ductwork, filters and filter housing is based on moderation control. Criticality in the ductwork and filters was determined to be "not credible" based on a bounding assumption of less than 10 weight percent water. Criticality safety limits for the filter housing were based on the same bounding assumption. After assessing the ductwork, filters, and filter housing, it was determined that this was an unanticipated event and therefore the

incident required a 4 hour notification in accordance with the Westinghouse Operating License. (CAPS Issue 02-003358, Data Park N02-08; Root Cause conducted.)

- On August 6, an operator in the Erbia area noticed water dripping from an electrical junction box in the Moderation Controlled area near the blender at ceiling level. An electrician removed a screw from the bottom cover of the junction box and approximately one gallon of water ran from the hole onto the floor near the bulk containers. (CAPS Issue 02-003870, Data Pack R02-09; Root Cause Conducted.)

- During the period 7/30-8/2/2002, problems were encountered with liquid effluent samples exceeding the process control limit of 0.7 mg/l chlorine. The NPDES regulatory requirement is 1.0 mg/l TRC (total residual chlorine), and the process interlock was conservatively set to avoid problems. On August 2, a procedure was written to respond to the elevated chlorine condition by writing an SOI-U-096. Various problems were encountered with implementation of the SOI including using authorized chlorine tablets rather than sodium thiosulphate. Cross contamination was noted in the on-line analyzer, but no NPDES samples were noted to exceed the 1.0 mg/l total residual chlorine limit during discharge. (CAPS issue 02-004154, Data Pack R02-10).

- On September 4, a uranium sludge accumulation was found in the 8A scrubbing system. This sludge was discovered while investigating the cause of a contamination event. The discovery of the sludge accumulation was a criticality safety issue and reported to the NRC. (CAPS Issue 02-269-C001, Data pack N02-11; Root Cause conducted.)

- On September 23, it was discovered that sections of duct were removed from the Chemical Processing area and were being stored with significant quantities of contamination in them. This occurred in violation of procedures and RCWP's which had been issued for the job. (CAPS Issue 02-267-C014, Data Pack N02-12; Root Cause conducted.)

- On September 23, it was discovered that a safety significant control had been intentionally bypassed at Pellet line 4. The control was the "container in place" switch (PELPREP 910) that indicates that the bulk container is in place. (CAPS Issue 02-267-C015, Data Pack R02-13; Root Cause conducted.)

- During normal operations, UN is pumped from the dissolvers and solvent extraction systems to the Bulk Storage tanks. Prior to the pumping operation, the solution is sampled for U-235 concentration, pH, and percent free acid. On October 25, a pump out occurred based on a sample result indicating 25% free acid. However, this result had been questioned and a reanalysis indicated 3% free acid. This is below the SSC requirement. Criticality Safety engineers were notified, all pump outs were halted, and the Bulk Storage Tanks were tested to ensure that safety was not compromised. (CAPS Issue 02-308-C008, Data Pack R02-14; Root Cause conducted.)

- A special vibration test was scheduled to be conducted on four enriched IFBA rods in the Product Engineering Lab. A special routing was to allow each rod to be brought into the lab, one at a time, provided the rod ID, incoming time and date, outgoing time and date, and initials, were logged. Nuclear Criticality Safety was also to have been notified to witness. However, on November 4, an enriched IFBA rod was found in the PE lab with no man-readable bar code, no special routing, and NCS had not been notified. (CAPS issue 02-308-C015, Data Pack R02-15; Root Cause conducted.)

VII EQUIPMENT

During the 2002 plant shutdowns, maintenance and preventive maintenance were performed in several areas, including IFBA, Rod Manufacturing, URRS, ADU Conversion, ADU Pelleting and Mechanical Manufacturing. Several of these projects were related to airborne/exposure reductions, including work in the Bulk Blending area.

Respiratory protection equipment is utilized when there is a potential for high airborne radioactivity concentrations of uranium. The usage of respiratory protection for the past several years is summarized below.

Respiratory Protection Equipment Usage Summary

Year	Total Hrs. In Chemical Area	All Types		Filter Masks		Supplied Air *	
		Hrs. Usage	% of Time	Hrs. Usage	% of Time	Hrs. Usage	% of Time
2002	413704	31276	7.56	27256	6.58	4020	0.97
2001	416215	32881	7.90	28378	6.82	4503	1.08
2000	369367	33726	9.13	29180	7.90	4546	1.20
1999	200038	18846	9.42	15803	6.80	3043	1.30
1998	173127	16893	9.76	13677	6.20	3216	1.50

** Includes Bubble Hoods, SCBAs*

The ADU conversion area accounted for 55% of the total hours of respirator usage for the Columbia site in 2002 while Pellet Mfg. and URRS accounted for 31% and 12% respectively.

The decreased use of supplied air respirators is not consistent with minimizing exposures. Supplied air respirators should be the respirator of choice unless safety considerations dictate otherwise.

VIII AUDITS

INTRODUCTION

Ten NRC inspections were conducted during 2002 involving approximately 96 inspection person-days, compared with eleven NRC inspections and approximately 149 person-days during 2001. The inspections were conducted in the areas of radiation protection, material control and accountability, effluents/environmental, nuclear criticality safety (including safety controls), training, transportation, emergency preparedness, waste management, chemical safety, operations, management controls and maintenance. There were three Severity IV violations, compared with eight Severity Level IV violations and two Severity Level III violations during 2001. One violation was the result of failure to suspend measurements when a standard fell outside the control limits, one was the result of inadequate spacing between cream cans in Erbia, and one was the result of inadequate storage of duct being removed from the ceiling.

Environment Health & Safety inspections were performed in accordance with NRC License SNM-1107 and EH&S Procedure RA-102. Inspection reports including inspection findings and recommendations were documented and reported to the Plant Manager, Manufacturing Manager and responsible managers of other areas inspected.

During 2002, there were 90 items officially reported from EH&S inspections, compared with 133 during 2001, 61 involving safety, 8 in the area of radiation protection, 11 related to nuclear criticality safety, 3 involving safeguards, and 7 related to general housekeeping.

In the area of safety, identified items included poor housekeeping and combustible accumulations, damaged equipment, tripping hazards, improper use of eye protection, improper equipment grounding, deficient Material Safety Data Sheets training, pressure relief device problems, labeling problems, fire extinguisher problems, fire protection issues (including flammable liquid storage), leaking equipment, safety shower problems, material storage problems, equipment guard problems, improper equipment lockout/tagout, blocked electrical equipment, and housekeeping problems. Radiation protection items included leaks or evidence of leaks, improper storage of used respirators, improper storage of gloves and trash, excessive contamination, pellets on floor, and housekeeping. Nuclear criticality safety items included unauthorized storage of trash in NFG containers, criticality signs, spacing, and improper use of moderating materials. Safeguards findings included unlocked doors and improper labeling. There was a decrease in the number of violations identified during 2002 compared with 2001 (90 versus 133). Of the 90 items, two thirds were in the area of safety. In the future, additional emphasis should be placed in the areas of radiation protection and nuclear criticality safety.

Items identified during 2002 were closed or entered into CAPs.

IX. SELF-ASSESSMENT ITEMS

The purpose of the self-assessment program is to provide a means to assure that deficiencies in regulatory performance are identified and corrected to Westinghouse management standards. As described in Section 3.6.2 of License SNM-1107, a set of 15 performance indicators are summarized and trended by EH&S: (1) A summary of items documented in the performance-based reporting process (Redbook items); (2) A summary of upsets and inadequacies documented in performance-based internal audit reports (monthly inspections); (3) Facility Collective Dose Equivalent; (4) Facility average Total Effective Dose Equivalent; (5) Top 10 facility workers' Total Effective Dose Equivalents; (6) Overexposures; (7) Regulatory agency notifications; (8) Ratio of Recordable Incidence Rate to SIC code average; (9) Lost time accidents per production hour; (10) Results of Special Nuclear Material Physical Inventory (annual); (11) Emergency response team activations; (12) Radioactive emissions in gaseous effluents; (13) Radioactive emissions in liquid effluents; (14) Radioactive material transportation incidents; and (15) Regulatory agency violations. An additional item was added (not a license requirement) involving the review of Root Cause Analysis Causal Factors generated during the calendar year.

SUMMARY OF ITEMS DOCUMENTED IN THE PERFORMANCE-BASED REPORTING PROCESS (REDBOOK ITEMS)

A formal system (Redbooks) is maintained to enable employees to report process upsets and procedure inadequacies to their First Level Managers for follow-up action. Process upsets and procedure inadequacies are documented in the appropriate Redbook. A Redbook is located in appropriate functional areas. The cognizant Process Engineer is responsible for addressing the items and closing them out.

During 2002, there were 273 Redbook items reported: 106 in Conversion, 94 in URRS, 35 in Pelleting, 7 in the Maintenance and Mechanical Area, and 31 in IFBA and Erbia. This compares with 193 Redbook items reported during 2001: 107 in Conversion, 52 in URRS, 18 in Pelleting, 5 in IFBA and Erbia, 2 in the Chem Lab, and 7 by Maintenance and Mechanical Area personnel. The increase in 2002 is attributed to the additional item control items identified in the Chemical Area.

One of the Redbook items was elevated to a Datapack in accordance with Procedure RA-107, "Corrective Action Program for Regulatory Events": Conversion Item 1172 regarding a leak of UN/HF in the UF6 Bay which migrated outside the building (Datapack EH&S 01-02).

In Conversion, the reported items can be grouped into the following categories: item control (22), computer-related problems, e.g., PLC's (28), bulk blending problems (1), airborne events (3), procedure problems (4), powder accumulation (7), UF6 cylinder problems (9), equipment leaks (9), and equipment pressurization/plugging problems (23).

In the Pelleting Area, the reported items can be grouped into the following categories: item control (19), electrical interlocks (11), powder accumulation (1) nuclear criticality safety concerns (1), equipment malfunction (1), fire (1), and operator error (1).

In URRS, the reported items can be grouped into the following categories: equipment malfunction (6), equipment leaks (7), nuclear criticality safety concerns (13), item control (38), computer-related problems (16),airborne (1), powder accumulation (4), and equipment pressurization/plugging (9).

The items reported in Maintenance and Mechanical were related to: criticality alarm (2), equipment problems (3), and operators' errors (2). The items reported in IFBA were related to: equipment/operator (9), water leak (8), equipment (5), nuclear criticality safety concerns (7), and procedure problems (2).

It is noted that during 2002, there was an increase in the number of Redbook items. This is due to continuing emphasis on safety and quality. The continuing emphasis by cognizant engineers to safety issues such as identification and documentation of Safety Significant Controls, complete re-writing of hundreds of operating procedures, quality issues, and routine training has been significant. During 2003, implementation of an electronic Redbook system will further the cause of identifying problems and correcting them.

SUMMARY OF UPSETS AND INADEQUACIES DOCUMENTED IN PERFORMANCE-BASED INTERNAL AUDIT REPORTS (MONTHLY INSPECTIONS)

See Section VIII of this report for a summary of internal inspections performed during 2002.

FACILITY COLLECTIVE DOSE EQUIVALENT

Figure 6 shows annual Columbia Site Collective Dose for all persons at the Columbia Plant for the past several years (e.g., the sum of all TEDEs). Note that the site collective dose was 279 person-rem in 2002 compared to 315 person-rem for 2001 where both were calculated using the dose coefficients in ICRP 68.

FACILITY AVERAGE TOTAL EFFECTIVE DOSE EQUIVALENT

Figure 6 also depicts the average Total Effective Dose Equivalent for the past several years. The Site average TEDE was 0.382 rem in 2002 compared with 0.394 mrem for 2001, where both are calculated using the dose coefficients in ICRP 68. Note that the values in **Figure 6** for years prior to 2001 were not converted using the ICRP 68 methodology. See Section IV of this report for additional details.

TOP 10 FACILITY WORKERS' TOTAL EFFECTIVE DOSE EQUIVALENTS

Doses for the 10 highest assigned TEDE values in 2002 are summarized below:

2002 Ten Highest TEDE Doses		SDE					
Department	**DDE**	**SDE**	**MAX EXTR**	**CEDE**	**TEDE**	**%DDE**	**%CEDE**
CONVERSION	0.918	1.029		0.655	1.573	58	42
PELLET MFG	0.84	1.964	4.974	0.684	1.524	55	45
PELLET MFG	1.025	2.664	6.259	0.471	1.496	69	31
CONVERSION	0.691	0.751	0.147	0.726	1.417	49	51
CONVERSION	0.786	0.857	0.424	0.601	1.387	57	43
PELLET MFG	0.784	0.855	4.663	0.585	1.369	57	43
CONVERSION	0.673	0.744		0.694	1.367	49	51
PELLET MFG	0.598	1.561	3.944	0.766	1.364	44	56
CONVERSION	0.608	0.661		0.725	1.333	46	54
PELLET MFG	0.562	2.603	8.28	0.761	1.323	42	58

The maximum recorded exposure for each category of radiation dose for each department is summarized below:

2002 Maximum Assigned Annual Doses		SDE			
Department	**DDE**	**SDE**	**MAX EXTR**	**CEDE**	**TEDE**
CHEM ROD MFG	0.456	2.143	1.353	0.283	0.662
CONVERSION	0.918	2.919	2.037	0.771	1.573
CRYSTAL OPS	0.539	1.238	0.717	0.297	0.836
ELECTRICIANS	0.198	0.63	0	0.423	0.541
ERBIA	0.702	1.938	6.064	0.494	1.189
FINAL ASSEMBLY	0.877	0.87	0.635	0	0.877
IFBA ZrB2	0.637	3.719	2.757	0.149	0.637
INSTRUMENTS	0.096	0.15	0	0.168	0.255
LABS/QC	0.431	0.816	1.956	0.092	0.523
MAINTENANCE	0.524	2.36	4.89	0.437	0.893
OTHER	0.526	0.712	0	0.166	0.526
REFURB/PACKING Max	0.666	0.659	0.212	0	0.666
PELLET MFG Max	1.025	7.042	18.729	0.766	1.524
PLANNING	0.131	0.129	0	0	0.131

2002 Maximum Assigned Annual Doses			SDE		
Department	DDE	SDE	MAX EXTR	CEDE	TEDE
URRS Max	0.486	1.294	1.353	0.627	1.082
CONTRACTORS Max	0.588	1.215	1.158	0.31	0.588
Columbia Site Max	**1.025**	**7.042**	**18.729**	**0.771**	**1.573**

OVEREXPOSURES

During 2002, there were no personnel overexposures in the areas of Deep-Dose Equivalent, Extremity doses, Committed Effective Dose Equivalent, or Total Effective Dose Equivalent. However, two individuals exceeded the recently established Westinghouse Electric Company administrative limit of 2 rem TEDE per year.

REGULATORY AGENCY NOTIFICATIONS

See Root/Specific Causal Factors/Datapacks/Notifications below for discussion of notifications.

RATIO OF RECORDABLE INCIDENCE RATE TO SIC CODE AVERAGE
LOST TIME ACCIDENTS PER PRODUCTION HOUR

The Incidence Rate is the number of recordable injuries per 100 man-years of operation. During Fiscal Year 2002, the total Incidence Rate (for all recordables) was 1.09, compared with the Incidence Rate objective of 1.22. There were a total of 13 recordable injuries during Fiscal Year 2002.

RESULTS OF SPECIAL NUCLEAR MATERIAL INVENTORY (ANNUAL)

The 2002 Physical Inventory was completed as planned on Saturday April 27th. UF6 Cylinder item control locations (COLUMN) were released by 9:00 a.m. There were 844 items. The Final Assembly item control location was released at 11:45 a.m. There were 234 items. CHAMPS item control locations were released at 12:30 p.m. There were 11,726 items. The rod item locations were released at 2:00 p.m. There were 31,244 items (878 channels and loose rods).

Results of the inventory are summarized in **Table 8** (Summary Report) and **Table 8A** (SNM Physical Inventory Material Distribution) covering the period 1998-2002.

EMERGENCY RESPONSE TEAM ACTIVATIONS

There was one event during this reporting period that resulted in Site Emergency Plan activation:

- On August 8, it was discovered that caustic soda was leaking from a tanker truck at the tank farm. The Emergency Response Team assembled and cleaned up a small quantity of caustic soda that had spilled onto the driveway in front of the tank truck. (Local event)

RADIOACTIVE EMISSIONS IN GASEOUS EFFLUENTS

Radioactive emissions in gaseous effluents are summarized in Section V of this report, and trends over the past 5 years are summarized in **Figure 7A** of this report. There were no significant trends in gaseous effluents during this reporting period. See Section V for details.

RADIOACTIVE EMISSIONS IN LIQUID EFFLUENTS

Radioactive emissions in liquid effluents are summarized in Section V of this report, and trends over the past 5 years are summarized in **Figure 7B** of this report. There were no significant trends in liquid effluents during this reporting period. See Section V for details.

RADIOACTIVE MATERIAL TRANSPORTATION INCIDENTS

There were no reported transportation incidents during 2001.

The Columbia Plant Nuclear Fuel Transport Group continues to monitor our carriers to assure that we deliver our products and services to our customers error-free and on-time. The parameters monitored include complaints received, late site delivery, late arrival to load, equipment inspection failure, law enforcement citations, satellite tracking inoperable, and breakdown en route.

During 2002, our carriers continued to perform in an efficient manner. Program highlights include:

- Zero transportation incidents (accidents)
- Zero customer complaints
- 100% on-time departures
- 99.6% on-time site deliveries except for weather-related late deliveries
- 100% equipment acceptance
- 100% operable satellite tracking

REGULATORY AGENCY VIOLATIONS

Regulatory agency violations for 2002 are summarized in Section VIII of this report, and trends and inspection details over the past seven years are summarized in **Table 4** of this report. There were three violations during 2002, compared with ten during 2001.

ROOT/SPECIFIC CAUSAL FACTORS / DATAPACKS/NOTIFICATIONS:

See Section Six. Sixteen Data Packs were generated during 2002, ten of which required Root Causes to be performed. These are identified and described in Section Six, along with the CAPS identification. Each of the incidents described resulted in either a formal notification to regulatory agencies or a courtesy notification.

X. ALARA PROGRAM SUMMARY

INTRODUCTION

Management's commitment to the "As-Low-As-Reasonably-Achievable" (ALARA) principle continues to be a high priority. The overall ALARA Program is directed by the Regulatory Compliance Committee (RCC) which establishes plant policies and procedures, and monitors the progress of implementing groups. Airborne radioactivity and personnel exposure data include average airborne radioactivity levels, frequency of spike samples, Committed Effective Dose Equivalent (CEDE) and dose rates. Based upon these, priority target locations in need of improvement are selected.

DATA AND COMMENTS

Mini-ALARA

During this reporting period, the Mini-ALARA Program was continued, which provides for more frequent data reviews and the tracking of additional ALARA parameters. Mini-ALARA meetings are conducted during each ALARA reporting period to review and track data to observe trends. The number of parameters was increased and now includes airborne radioactivity concentrations and spikes, internal exposures, contamination control, external exposures, bioassay, respiratory protection, effluents, and new operations.

During 2002, four Mini-ALARA meetings were held to review short-term trends and identify corrective actions for items from the ALARA Report, airborne radioactivity and contamination controls, external exposure controls, personnel restrictions, and effluent and environmental controls. There were extensive discussions in the areas of reducing the increasing airborne trends, minimizing contamination throughout the Chemical Area, and minimizing exposures.

XI. COLUMBIA PLANT ALARA PLAN

INTRODUCTION

The purpose of the Columbia Plant ALARA Plan is to define the elements necessary to maintain personnel exposures, and releases of radioactive materials and chemicals to the environment, "As Low As Reasonably Achievable" (ALARA).

ALARA PHILOSOPHY

Columbia Plant policy embraces the ALARA philosophy as an approach to hazard and risk management by which exposures (both individual and collective, to the work force and to the general public), and releases of radioactive and hazardous materials to the environment, are managed and controlled to levels that are within regulatory limits, and are "As Low As Reasonably Achievable." The ALARA philosophy is based on the premise that any exposure to ionizing radiation incurs some degree of risk. Under this assumption, every reasonable attempt should be made to minimize dose and subsequent potential risk. The objective of the ALARA process does not target attainment of a particular exposure level, but rather targets the attainment of the lowest practicable exposure level -- after taking into account social, technical, economic, practical, and public policy considerations. It is emphasized that this is a flexible process; and, the effort must be proportional to the potential benefits (i.e., cost-effective).

MANAGEMENT OVERSIGHT AND CONTROL

ALARA responsibility and authority are vested with Line Management, with assistance from Upper Management and service groups such as Environment Health and Safety (EH&S). The Regulatory Compliance Committee (RCC) identifies and provides to Line Management ALARA policies, goals and expectations. Specific ALARA recommendations and requirements are generated by EH&S in the form of policies and procedures, and selected ALARA criteria and guidance are also incorporated into operating procedures when applicable.

DATA REVIEWS AND ANALYSES

A. Annual ALARA Reports

Annual ALARA Reports are generated which summarize short and long-term trends related to personnel exposures and releases of radioactive materials and chemicals to the environment. The reports also include data and trends associated with ALARA initiatives, NRC and internal compliance audits, and self-assessment items. The reports draw attention to areas that are in need of improvement and summarize recent ALARA efforts. Significant results from the reports are transmitted to the Regulatory Compliance Committee for review.

B. Mini-ALARA Reviews

Mini-ALARA reviews are conducted at least quarterly to provide for more frequent data reviews and trend analyses during an ALARA reporting period; and, particularly for the tracking of topical ALARA parameter results such as:

- contamination surveys
- airborne radioactivity concentrations
- personnel exposures (internal and external)
- bioassay
- unusual incidents
- effluents and environmental impacts

These data reviews and trend analyses are used as the basis for taking corrective actions as appropriate.

SUMMARY

The Columbia Plant ALARA Program is the formal mechanism established by Plant Management for minimizing personnel exposures and releases of radioactive materials and chemicals to the environment in accordance with recognized ALARA principles.

XII. GLOSSARY

ALARA: A concept whereby radiation doses are kept "As-Low-As-Reasonably-Achievable" taking economic factors into account.

ANNUAL LIMIT OF INTAKE (ALI): The amount of radioactive material taken into the body of an adult worker by inhalation or ingestion of a derived limit in a year.

COMMITTED EFFECTIVE DOSE EQUIVALENT(CEDE): The dose equivalent to organs or tissues that will be received from an intake of radioactive material by an individual during the 50 year period following the intake.

DEEP-DOSE EQUIVALENT: The external whole-body exposure, or the dose equivalent at a tissue depth of 1 centimeter (1,000 mg/cm^2).

DERIVED AIR CONCENTRATION (DAC): The concentration of a given radionuclide in air which if breathed by the reference man for a working year of 2,000 hours under conditions of light work (inhalant rate of 1.2 cubic meters of air per hour), results in an intake of one Annual Limit of Intake (ALI).

DOSE: A quantity used in radiation protection. It expresses all radiation exposure on a common scale (mrem).

EXTERNAL DOSE: The dose received from radioactive sources outside the body.

INTERNAL DOSE: The dose received from radioactive sources residing inside the body.

INVIVO: A measurement of the quantity of radioactive material residing inside the body (lungs).

LUNG BURDEN: The amount of U-235 residing in the lungs.

DAC-Hrs: The product of the airborne concentration of contaminants expressed as a fraction of DAC, stay time, and protection factors to take into account the use of respiratory protection. The latter term equals 1 when a respirator is not worn.

mrem: Millirem - The actual unit dose is measured in.

PERSON-REM: The dose per capita times the number of people.

XII. GLOSSARY (cont'd)

SHALLOW-DOSE EQUIVALENT: The external exposure of the skin or an extremity, which is taken as the dose equivalent at a tissue depth of 0.007 centimeter (7 mg/cm^2) averaged over an area of 1 square centimeter.

SPIKE SAMPLES: Those samples which average over 500% DAC during a shift, i.e., 8 hours.

TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE): The sum of the deep-dose equivalent (for external exposures) and the Committed Effective Dose Equivalent (for internal exposures).

UNRESTRICTED RELEASE LIMIT (URL) : Effluent concentrations in 10 CFR20, Appendix B, Table 2, Columns 1 and 2, which are maximum concentrations for control of the dose to the public and conservatively ensure a Total Effective Dose Equivalent of less than 50 mrem if the concentration were inhaled or ingested.

UNUSUAL OCCURRENCE: An event in which a government agency is notified, either by choice or mandated by regulation, or an event deemed to have had significant potential consequences.

Airborne Radioactivity

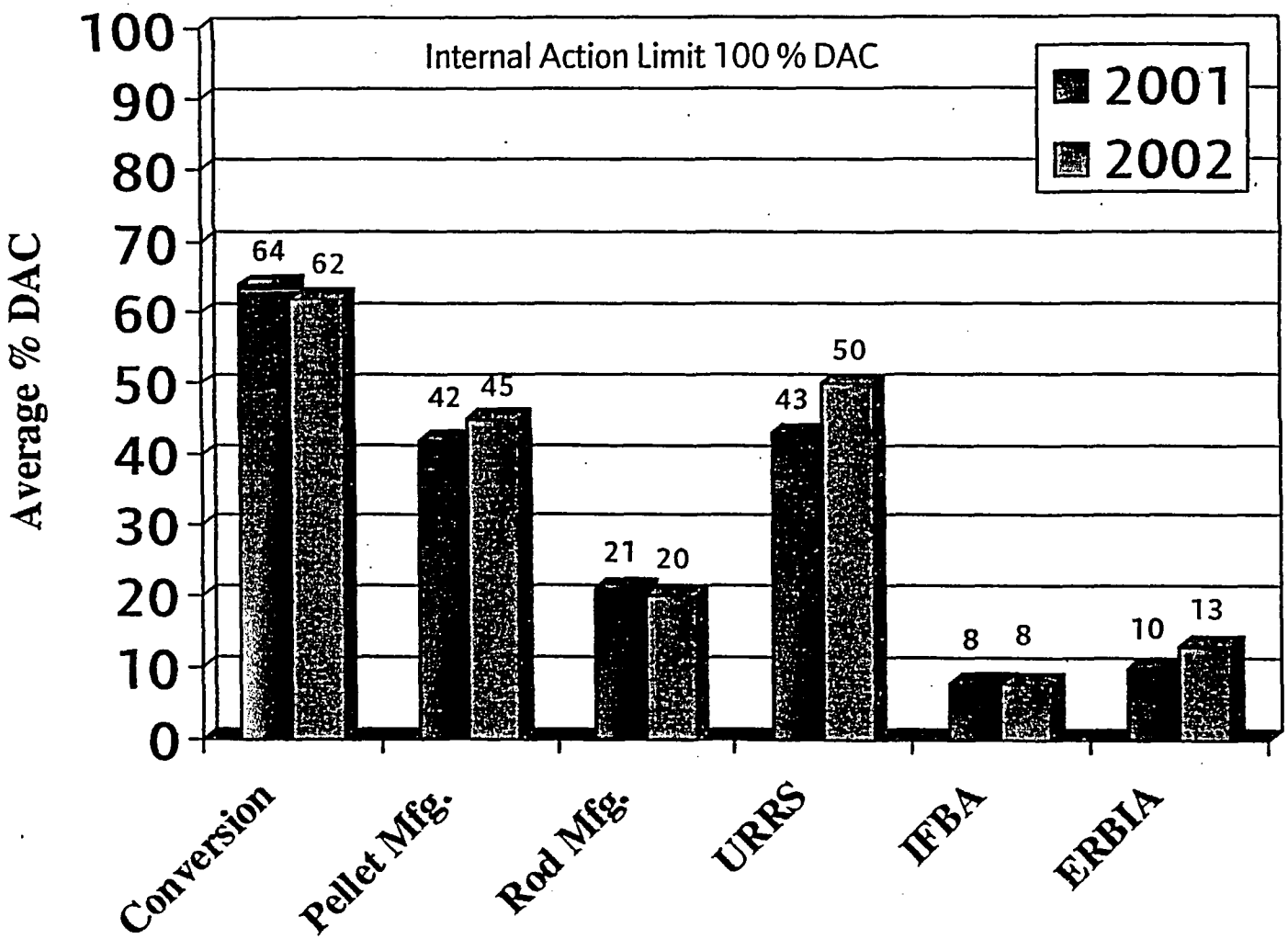
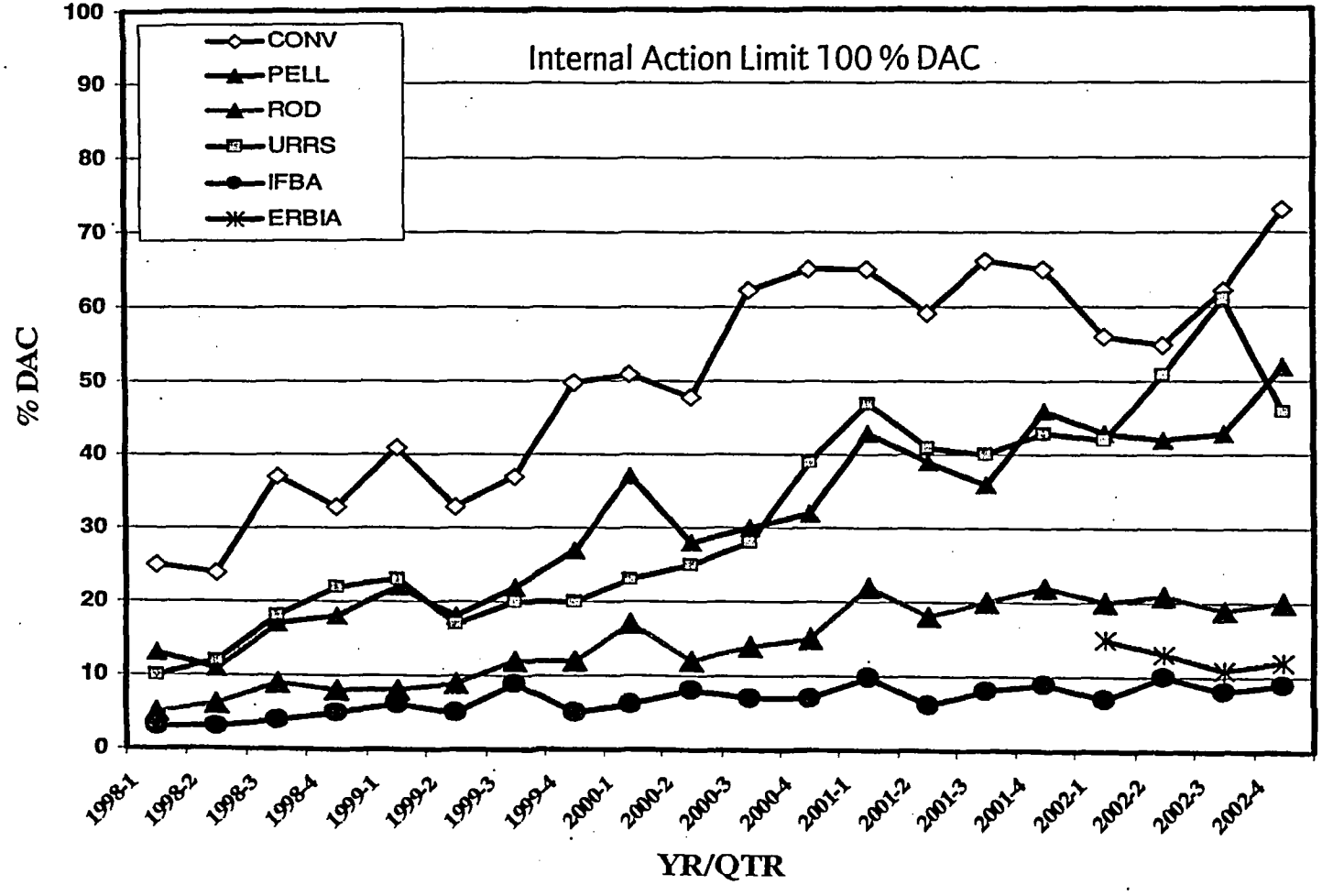


Figure 1

Airborne Radioactivity



	Trends - % DAC/Qtr 5 YR	R2	2 YR	R2
CONV	1.82	0.68	0.35	0.02
ERBIA	n/a	n/a	n/a	n/a
IFBA	0.23	0.55	0.11	0.04
PELLET	1.61	0.78	1.17	0.37
RODS	0.74	0.75	-0.10	0.03
URRS	1.89	0.76	1.49	0.27

Figure 1A

Committed Effective Dose Equivalent (CEDE)

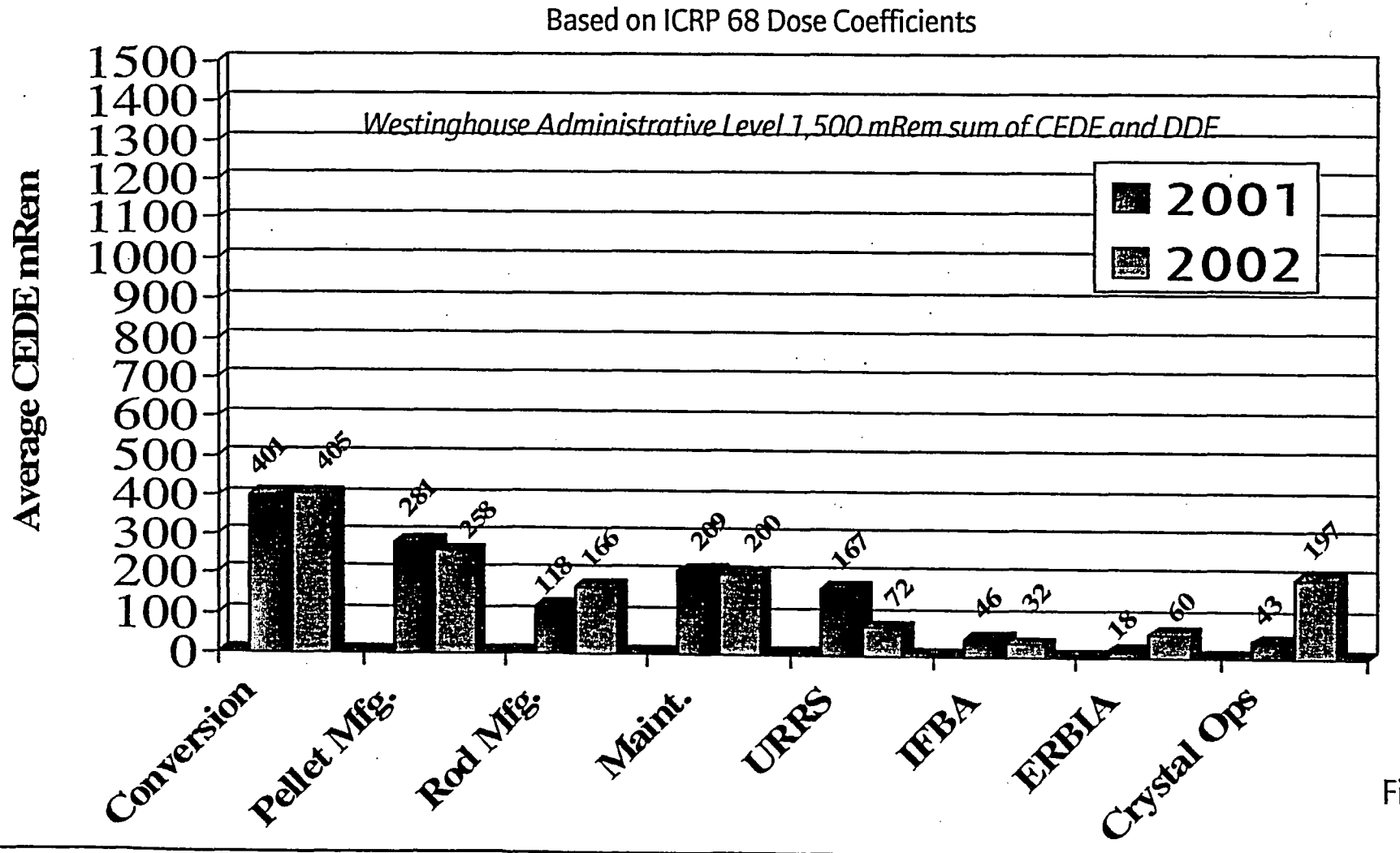


Figure 2

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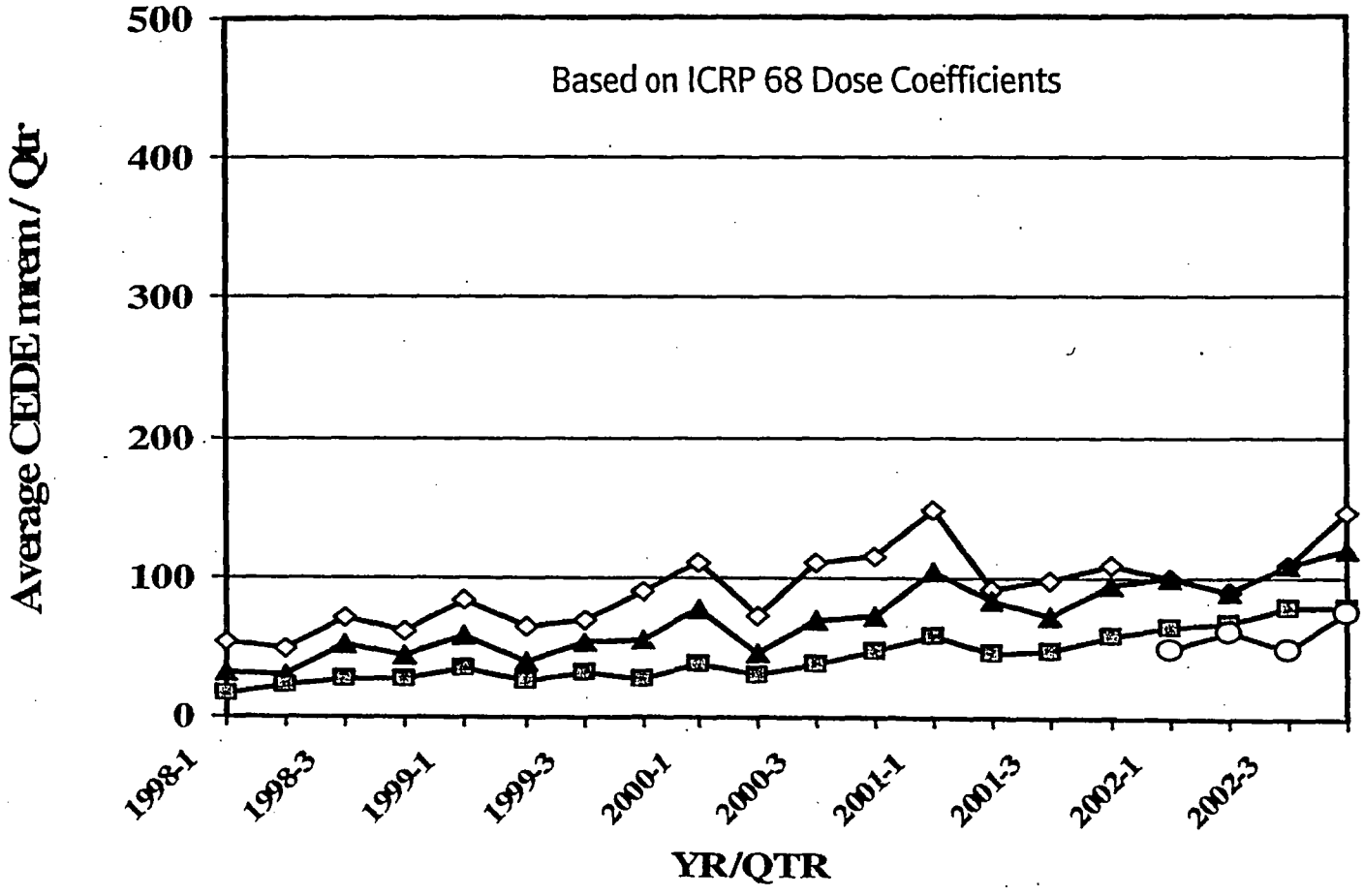
Committed Effective Dose Equivalent (CEDE)



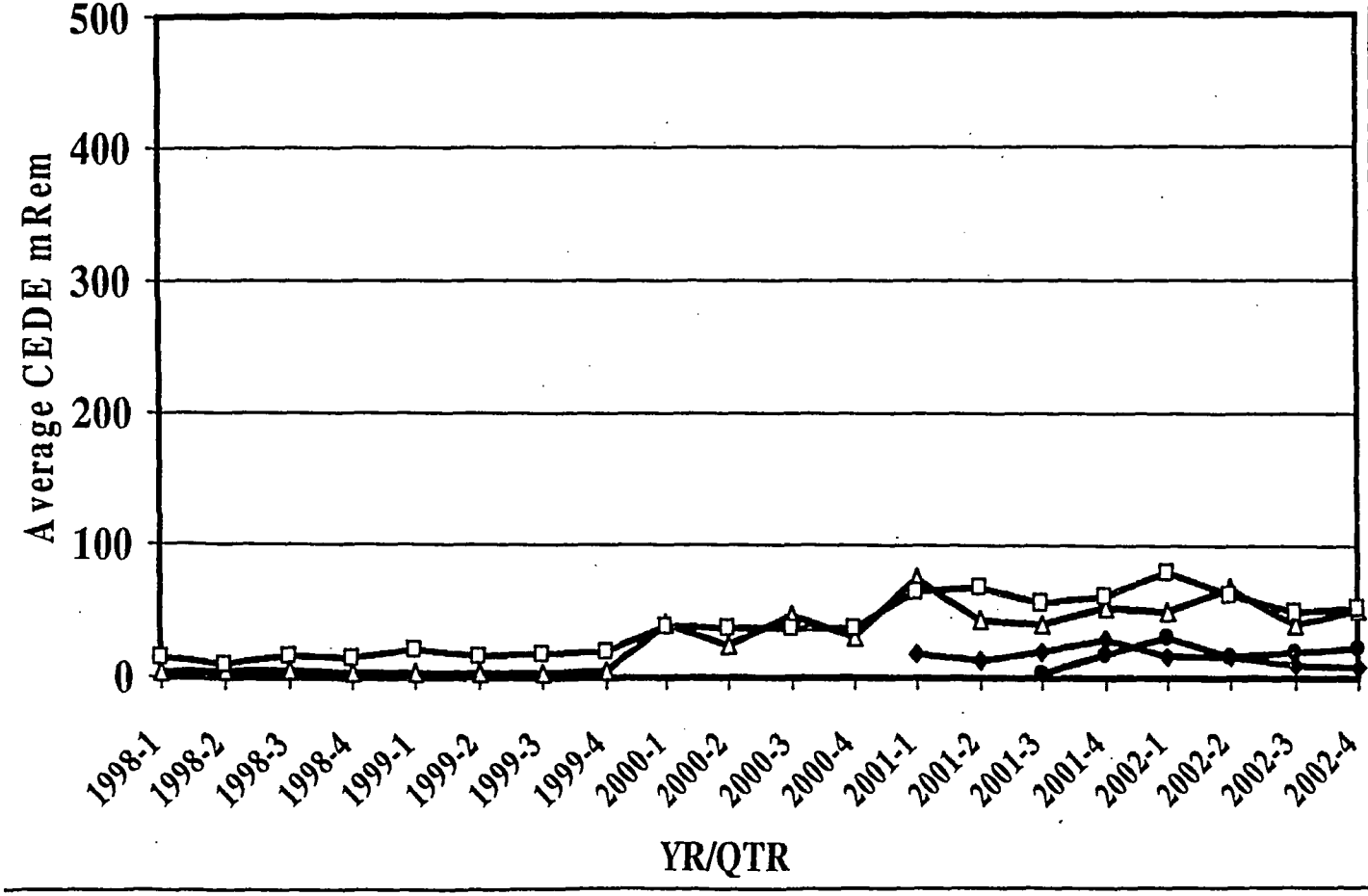
Trends - CEDE (mRem/QTR)	5 YR	R2	2 YR	R2
CONV	3.44	0.55	0.5	0
PELL	4.07	0.83	3.59	0.35
URRS	2.98	0.89	4.34	0.75
CRYSTAL OPS	n/a	n/a	n/a	n/a

CONV
PELL
URRS
CRYSTAL OPS

Figure 2A

Committed Effective Dose Equivalent (CEDE)

Based on ICRP 68 Dose Coefficients



Trends - CEDE (mRem/QTR)	5 YR	R2	2 YR	R2
ROD	3.44	0.70	-1.12	0.05
MAINT	3.30	0.79	-1.59	0.19
ERBIA	n/a	n/a	n/a	n/a
IFBA	n/a	n/a	-1.26	0.23

Figure 2B

Deep Dose Equivalent (DDE)

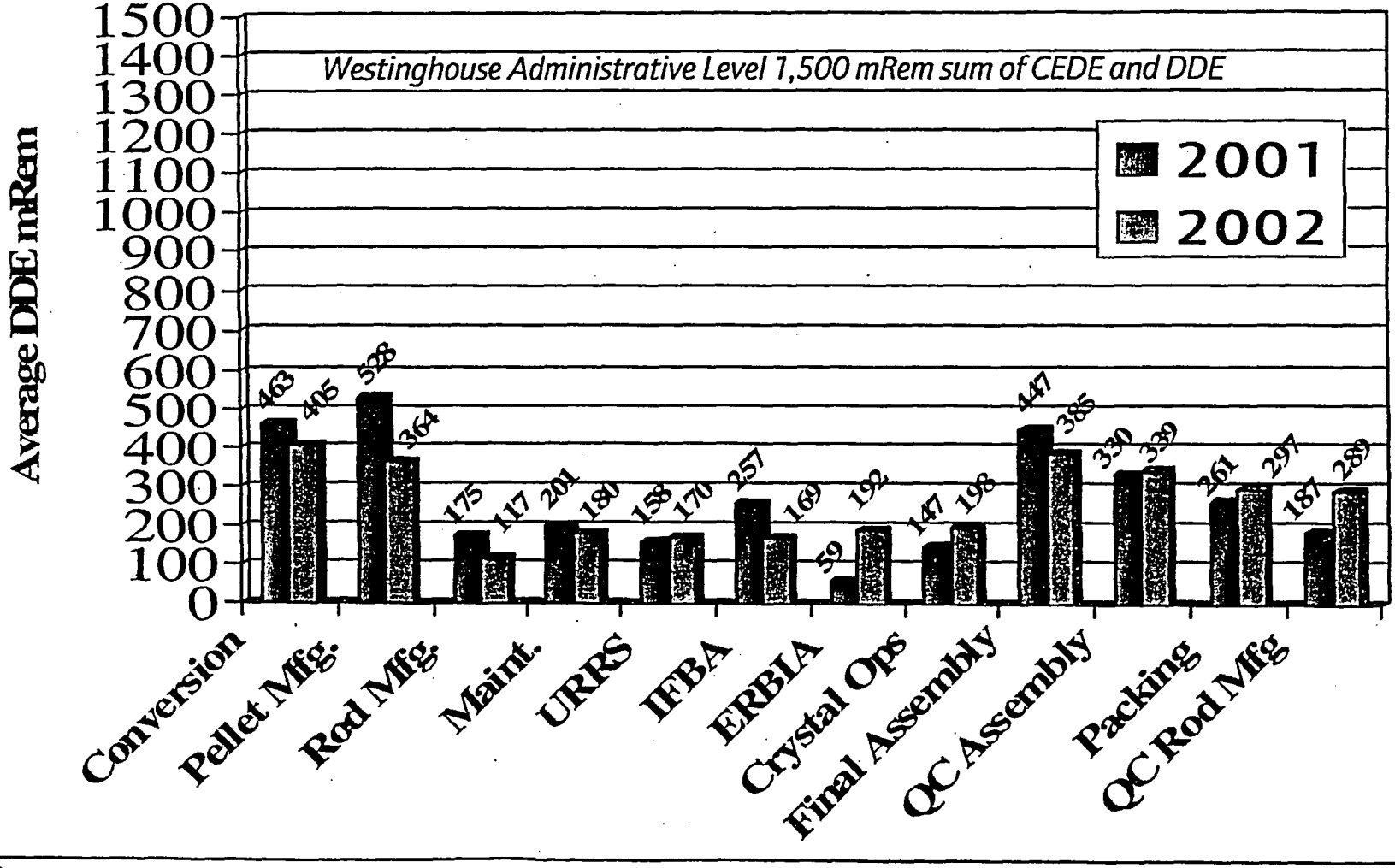
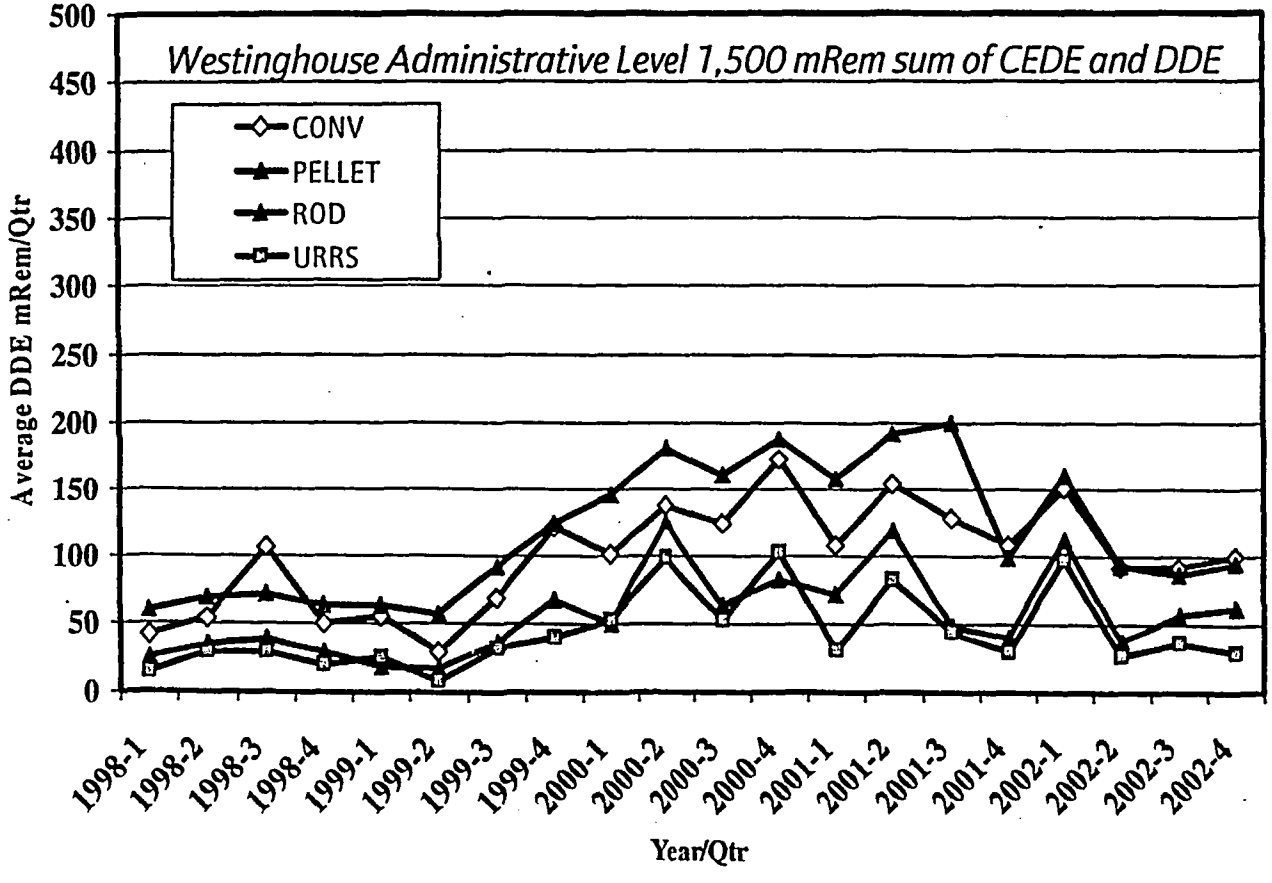


Figure 3

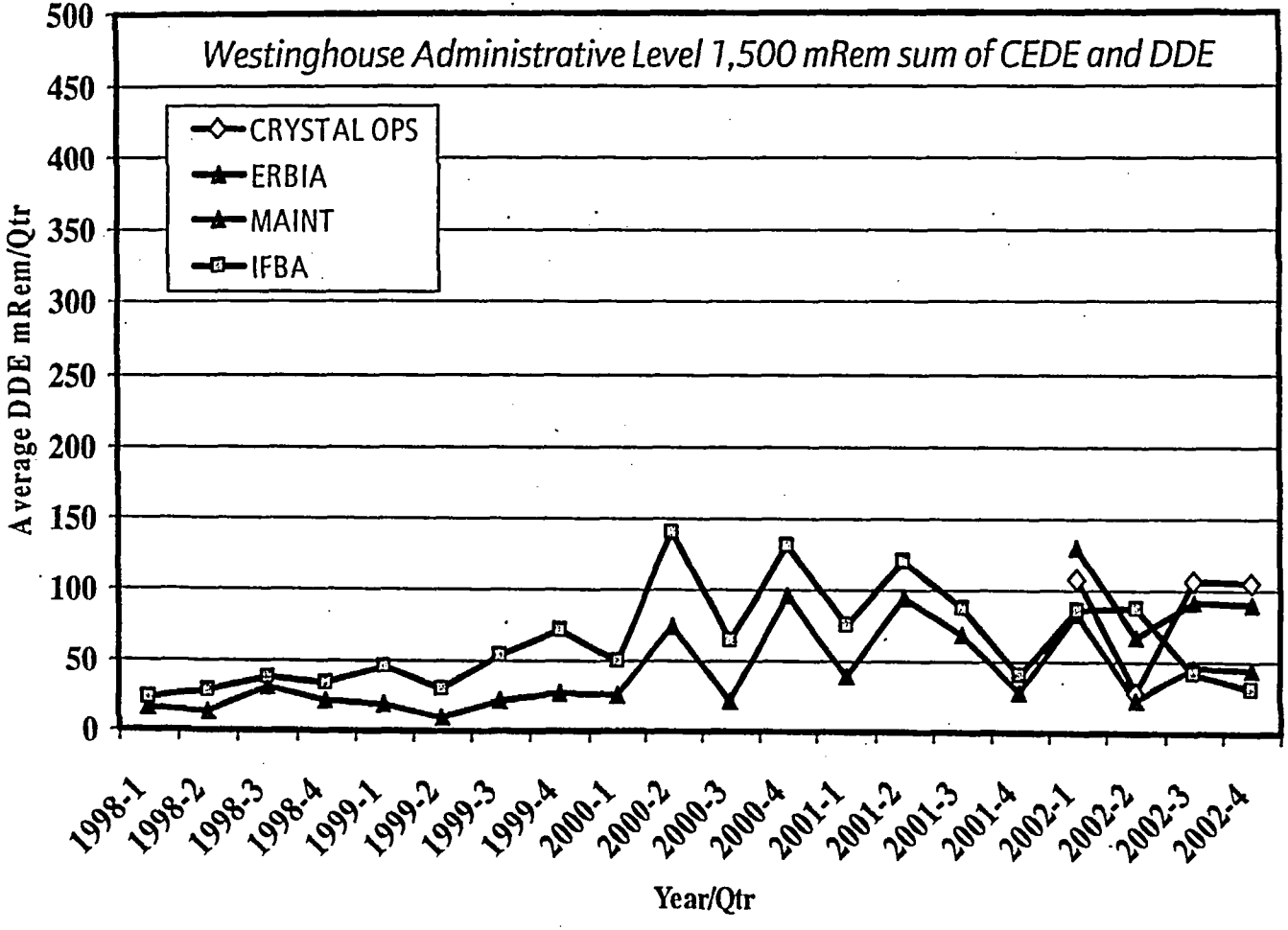
Deep Dose Equivalent (DDE)



	Trends mRem/Qtr			
	5 YR	R2	2YR	R2
CONV	3.78	0.32	-5.10	0.25
PELLET	3.90	0.21	-14.60	0.57
ROD	2.43	0.20	-3.80	0.09
URRS	1.56	0.11	-2.70	0.06

Figure 3A

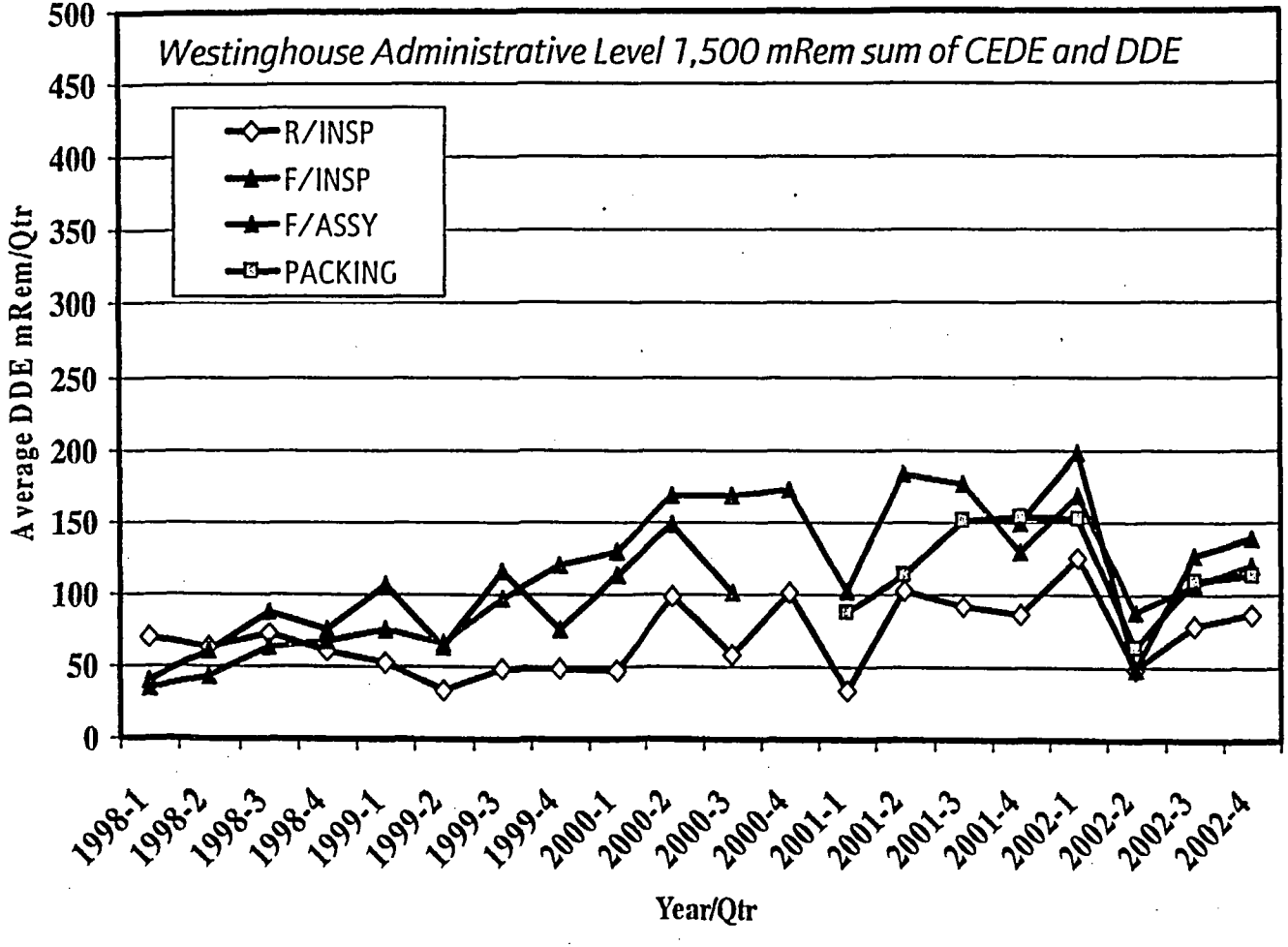
Deep Dose Equivalent (DDE)



Trends mRem/Qtr	5 YR	R2	2YR	R2
CRYSTAL OPS	n/a	n/a	n/a	n/a
ERBIA	n/a	n/a	n/a	n/a
MAINT	2.37	0.25	-3.40	0.10
IFBA	2.20	0.14	-7.80	0.38

Figure 3B

Deep Dose Equivalent (DDE)



Trends mRem/Qtr	5 YR	R2	2YR	R2
R/INSP	1.76	0.17	1.70	0.02
F/INSP	3.54	0.21	-9.30	0.07
F/ASSY	4.95	0.39	-5.80	0.15
PACKING	n/a	n/a	-1.20	0.01

Figure 3C

Shallow Dose Equivalent (SDE)

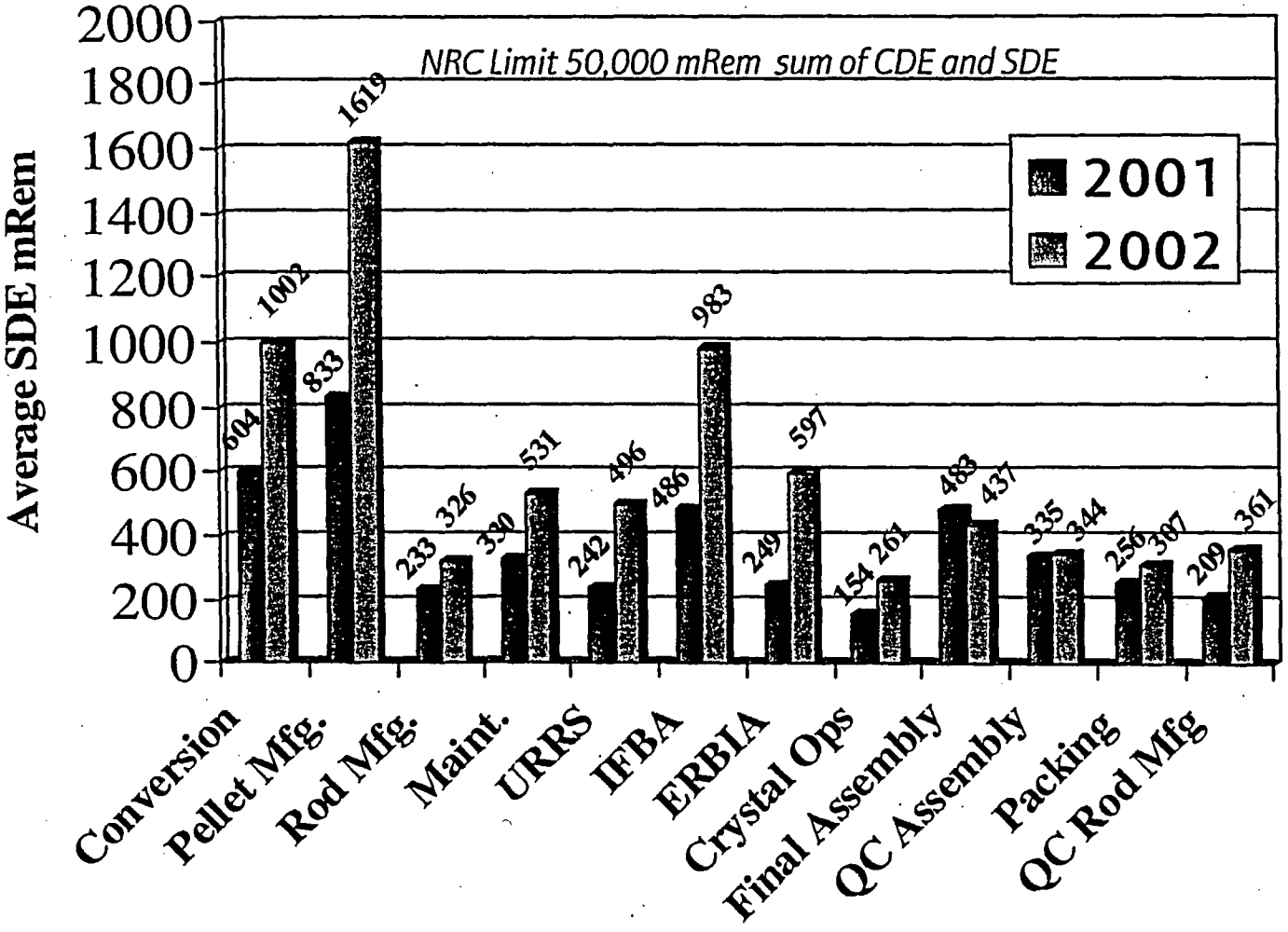


Figure 4

Total Effective Dose Equivalent (TEDE)

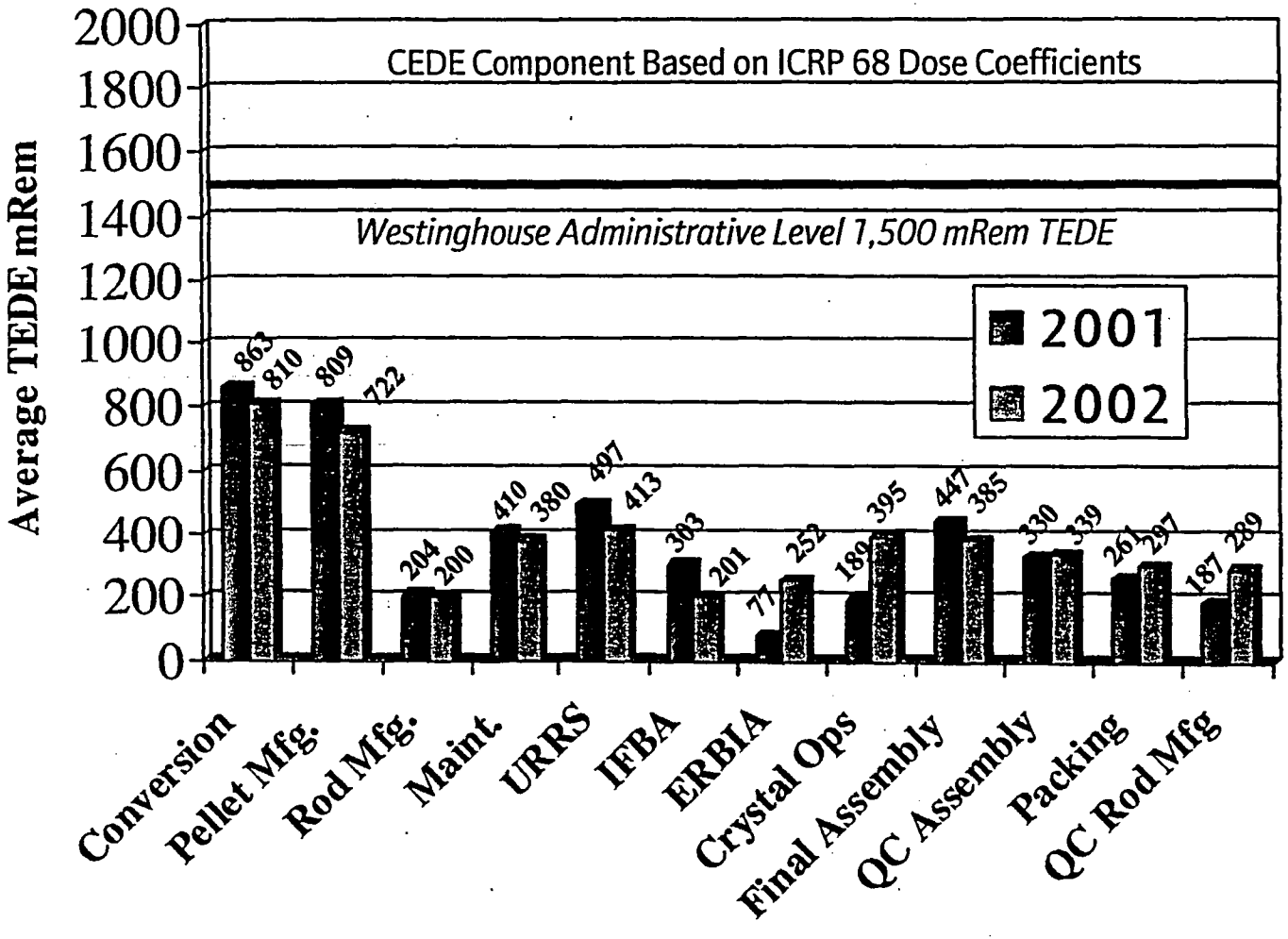
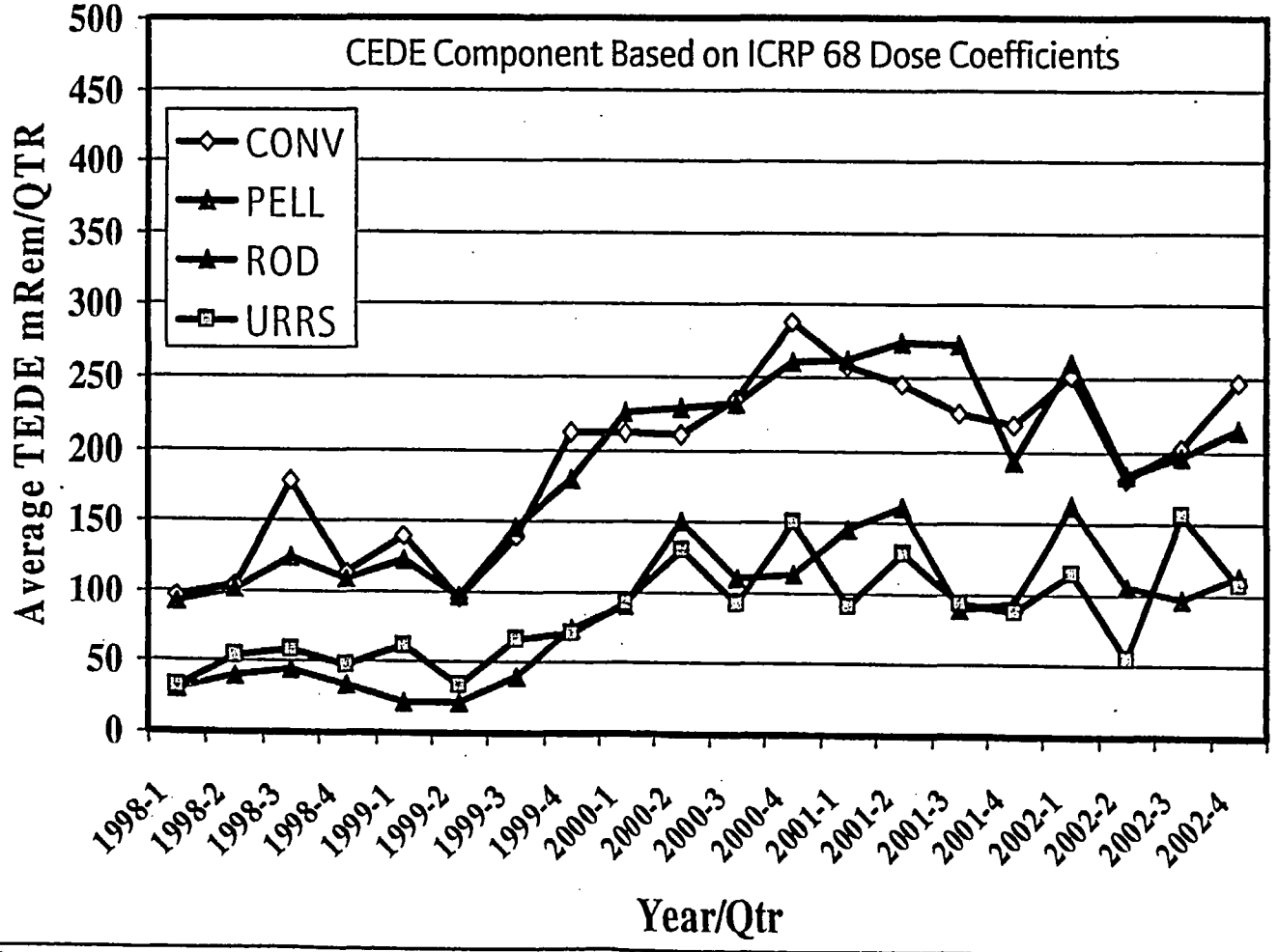


Figure 5

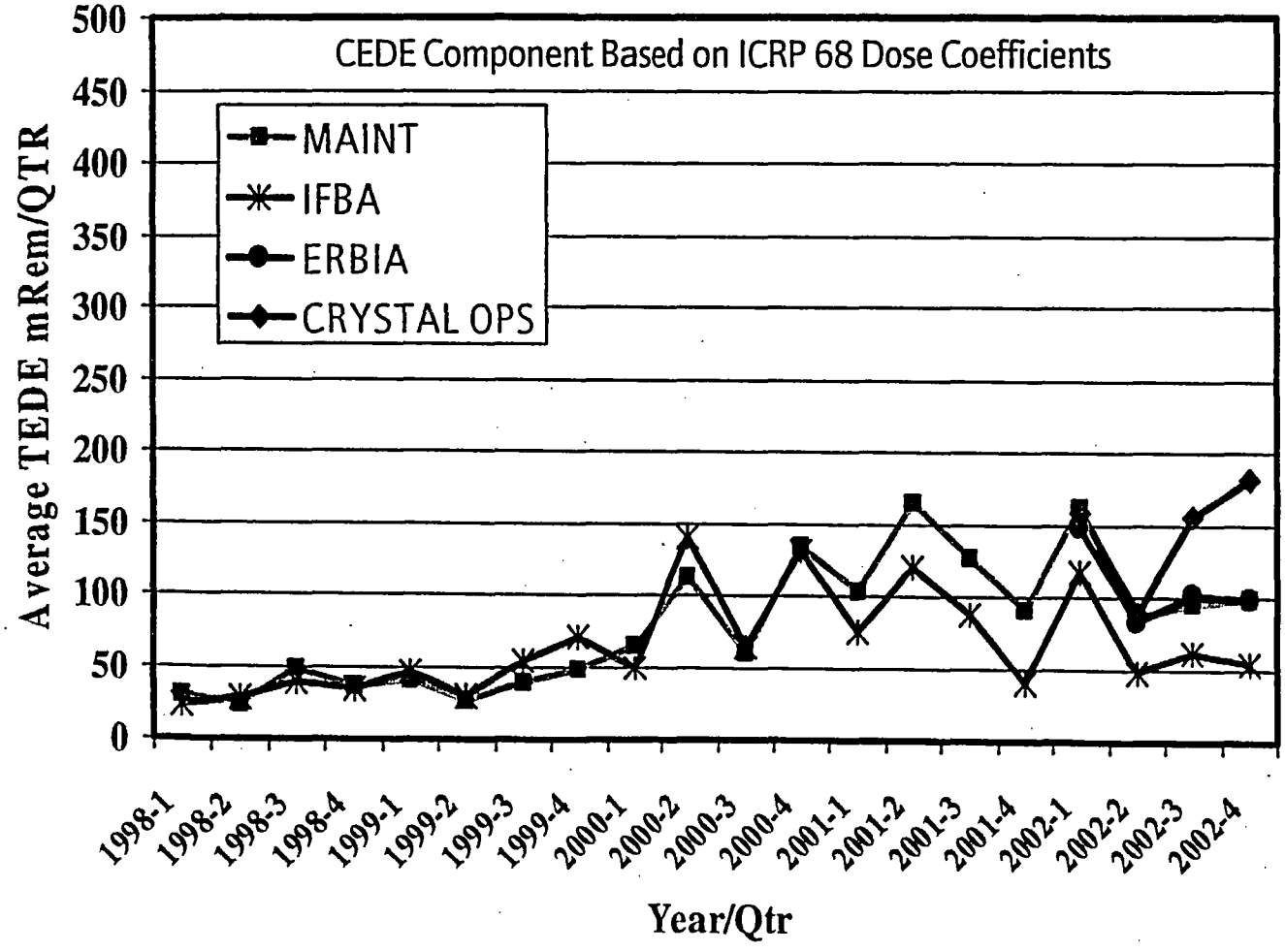
Total Effective Dose Equivalent (TEDE)



	Trends mRem/Qtr			
	5 YR	R2	2YR	R2
CONV	7.23	0.53	-4.57	0.18
PELL	7.99	0.54	-11.70	0.48
ROD	5.87	0.54	-5.02	0.16
URRS	4.15	0.45	2.00	0.03

Figure 5A

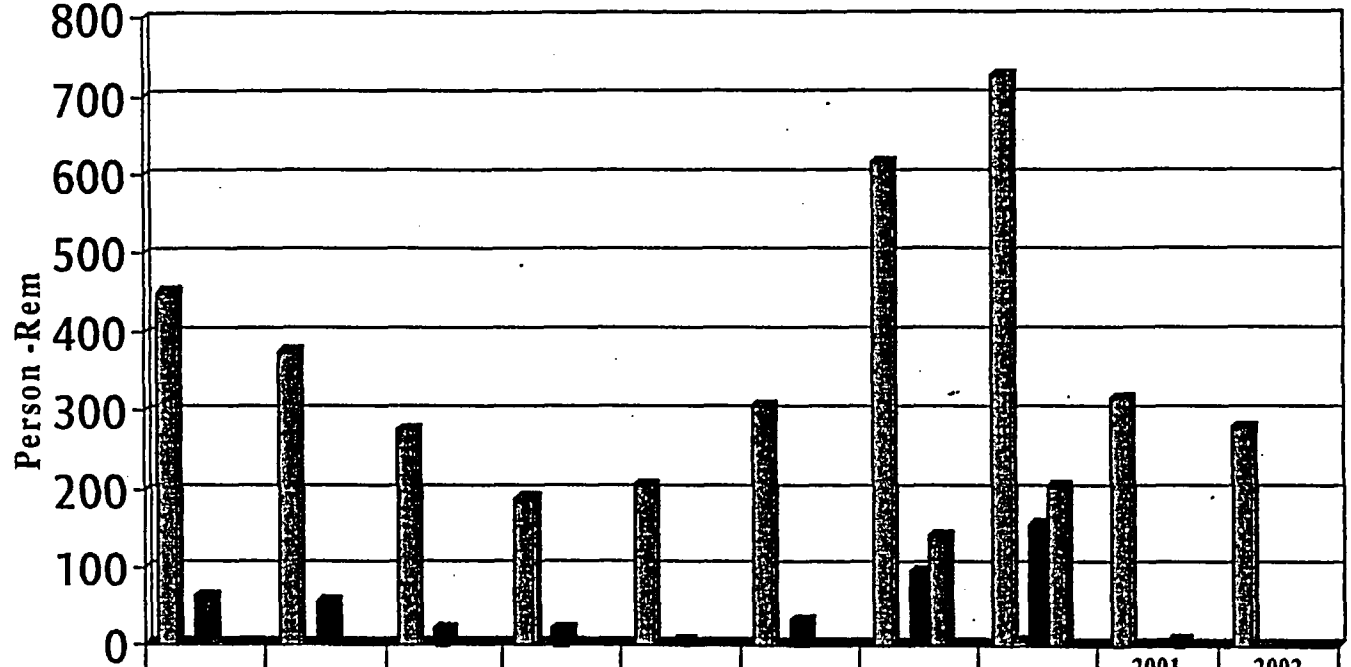
Total Effective Dose Equivalent (TEDE)



Trends mRem/Qtr	5 YR	R2	2YR	R2
MAINT	5.68	0.57	-5.07	0.15
IFBA	2.62	0.19	-5.79	0.21
ERBIA	n/a	n/a	n/a	n/a
CRYSTAL OPS	n/a	n/a	n/a	n/a

Figure 5B

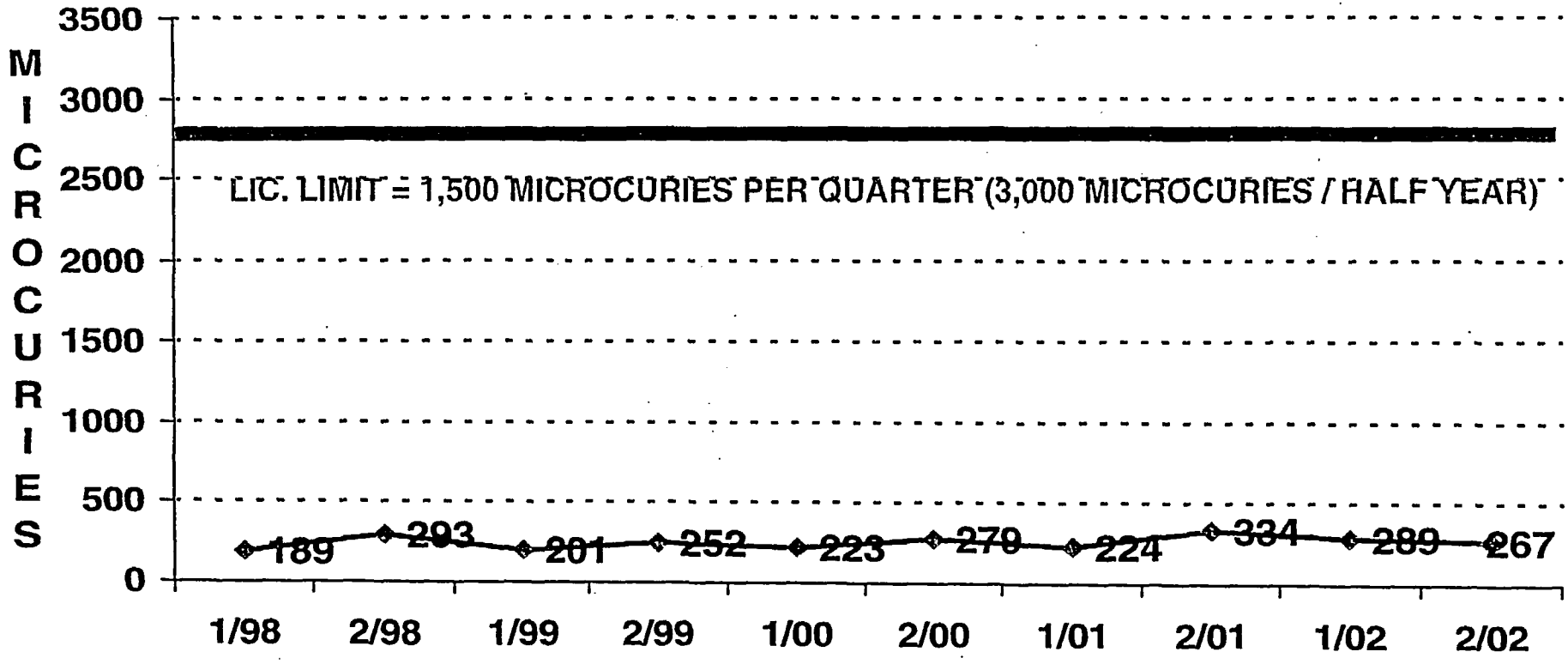
Site Collective TEDE (Person-Rem)



	1994	1995	1996	1997	1998	1999	2000	2001	2001 ICRP 68	2002 ICRP 68
Collective Dose (Rem)	450	374	276	188	206	305	616	725	315	279
# > 4 Rem TEDE							2	4	0	0
# > 2 Rem TEDE	62	54	19	19	3	32	96	155	0	0
# > 1.5 Rem TEDE							141	204	6	2
AVG Rem	0.716	0.528	0.447	0.406	0.436	0.52	0.862	0.908	0.394	0.382

Figure 6

Gaseous Effluents Semi Annual Totals



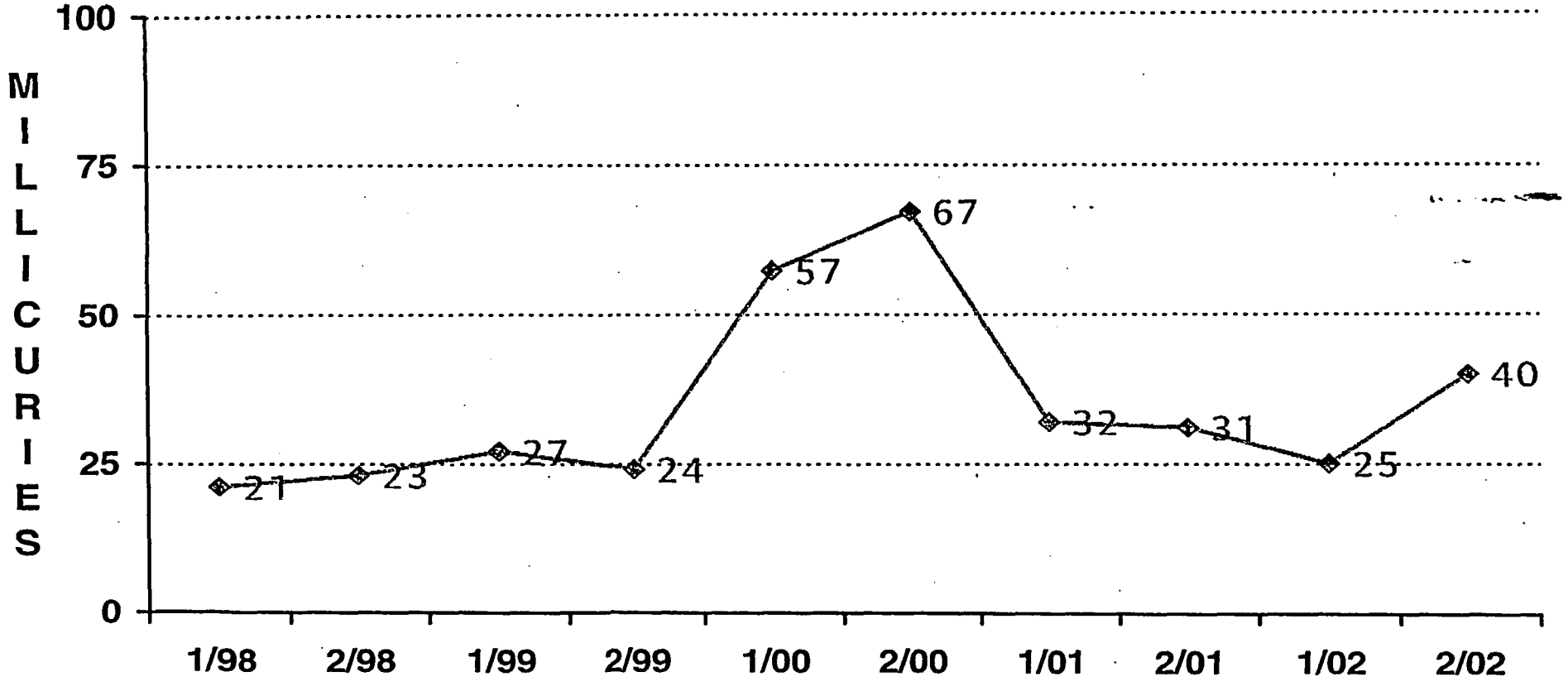
(Trends in microCuries per half year)

5 YR TREND: +7.95 ; R(2): 0.28 P

2 YR TREND: +8.40 : R(2): 0.06 P

Figure 7A

Liquid Effluents Semi Annual Totals



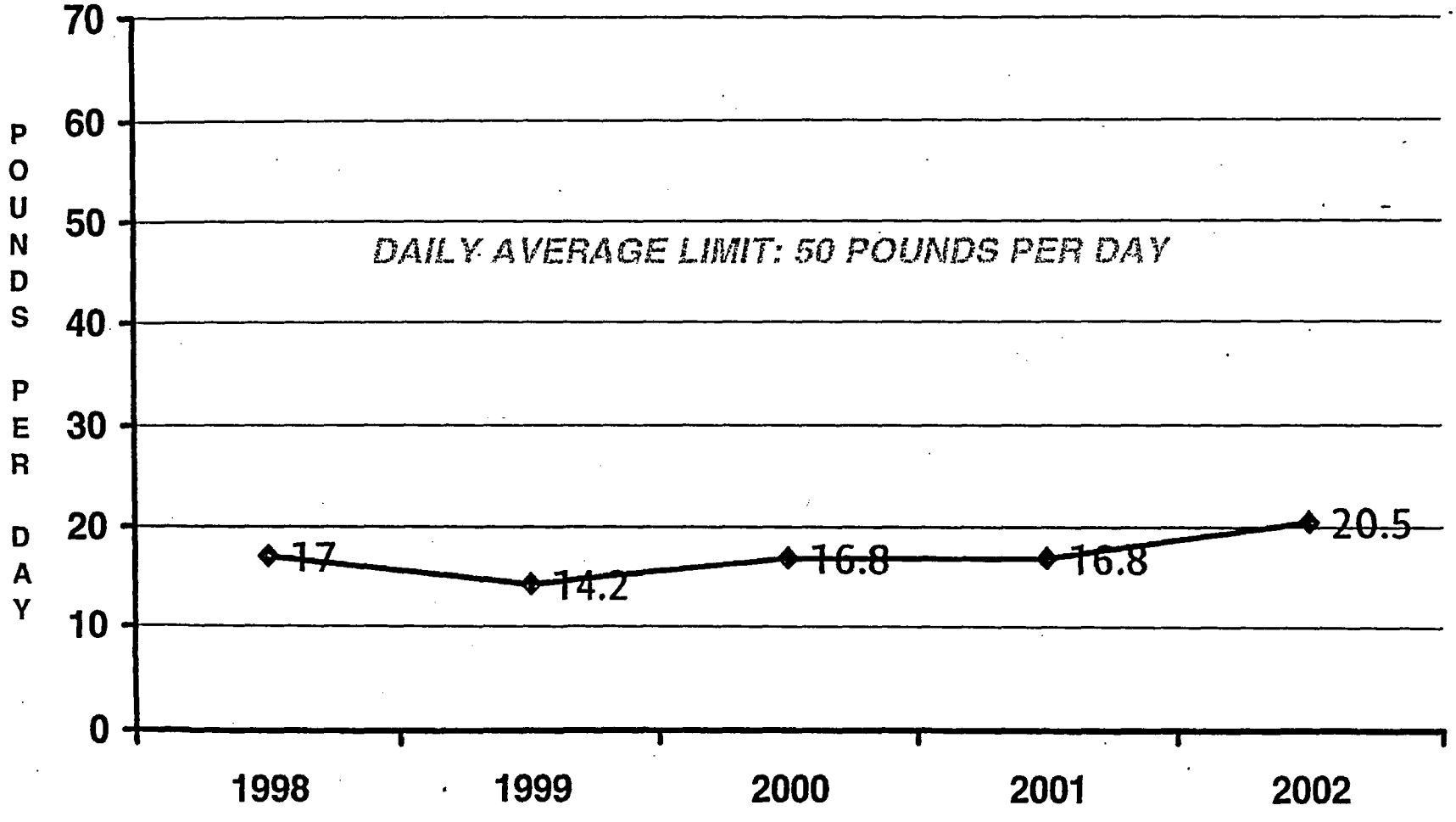
(Trends in mCi/half year)

5 YR TREND: +1.44 R(2): 0.08 P

2 YR TREND: +1.80 R(2): 0.14 P

Figure 7B

Ammonia Effluents Annual Average



(TREND IN LBS/DAY/YEAR)

5 YR TREND: 1.10; R(2): 0.48 F

Figure 7C

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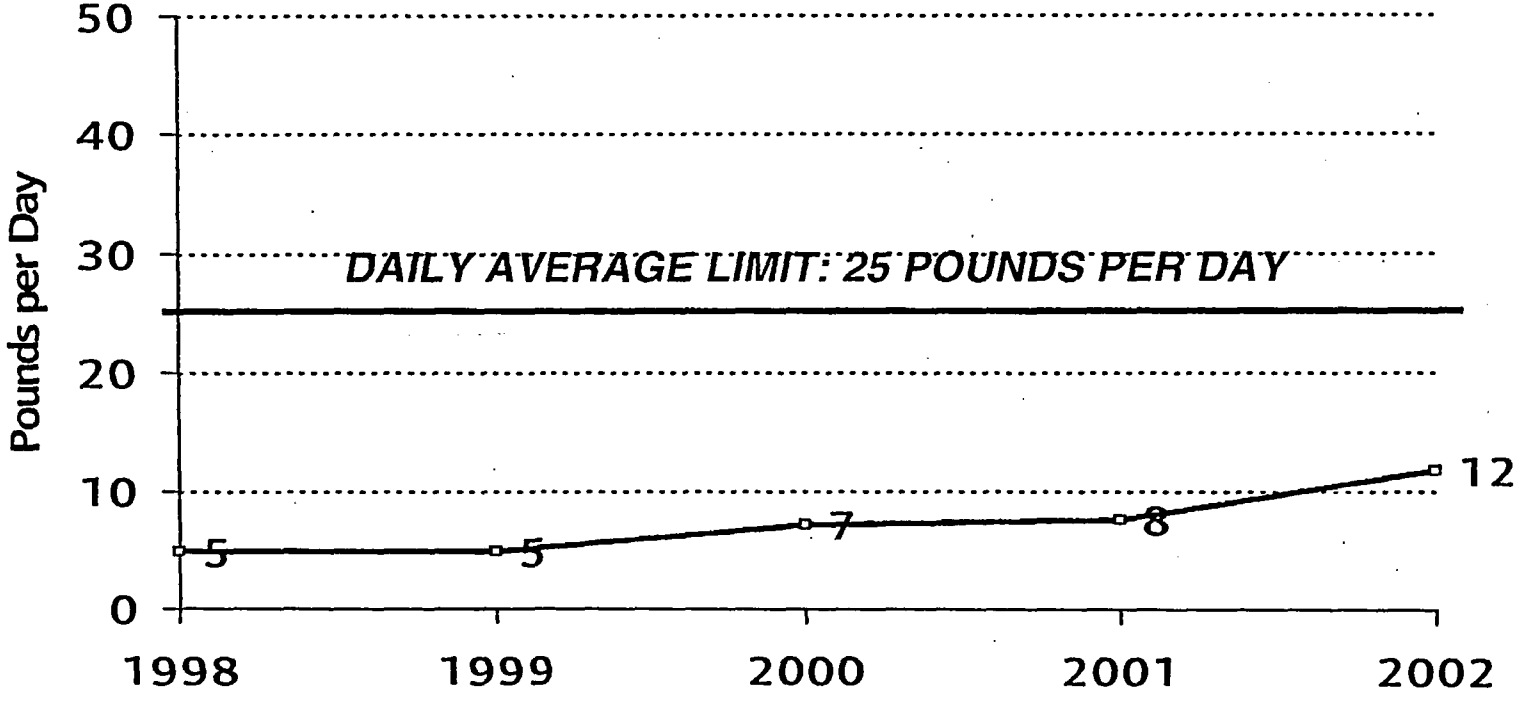
Fluoride Effluents Annual Average



(TREND IN LBS/DAY/YEAR)

5 YR TREND: +1.7 ; R(2): 0.87 G

Figure 7D

Vegetation Analysis Summary at Environmental Stations

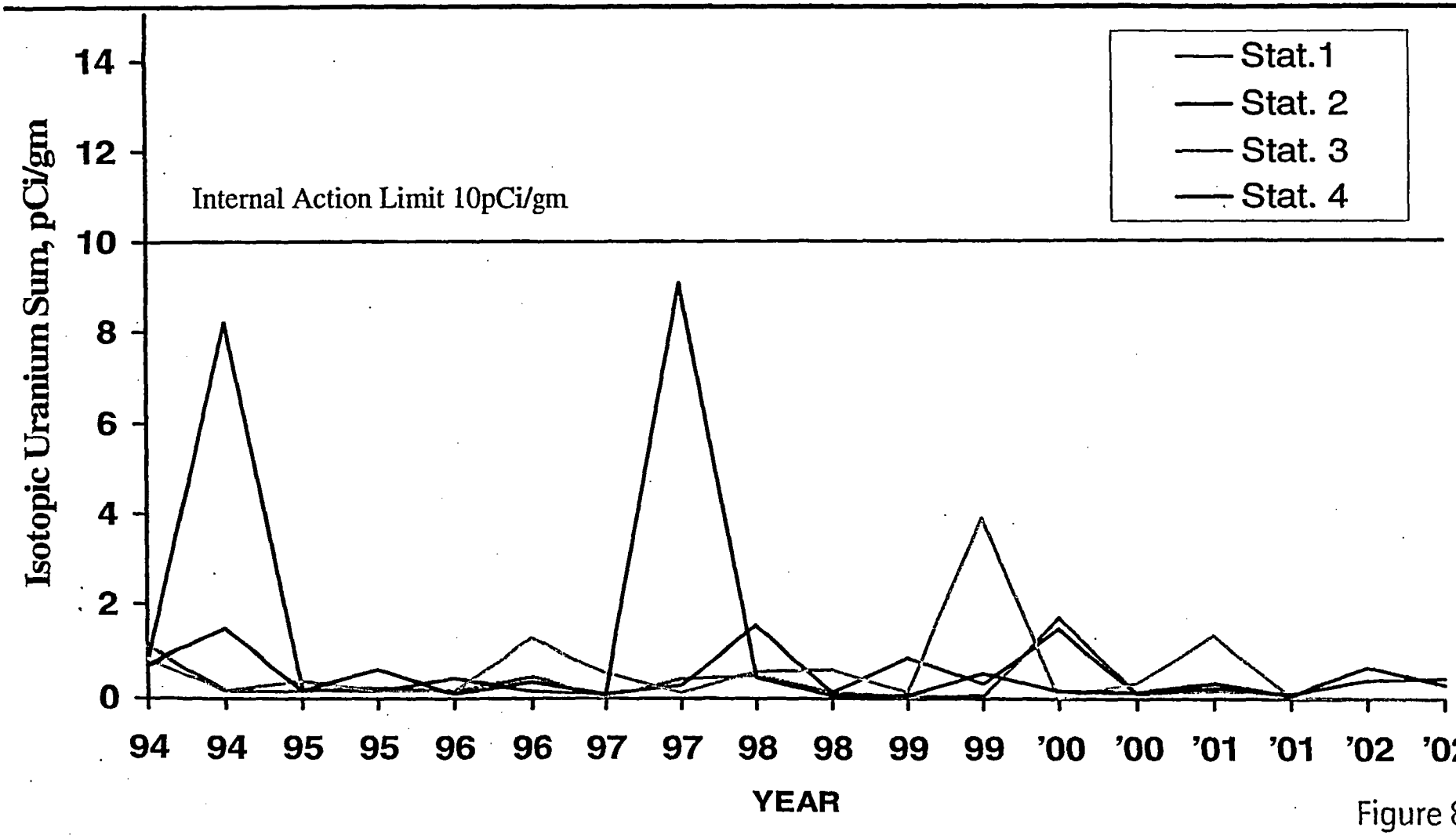


Figure 8A

Soil Analysis Summary at Environmental Stations

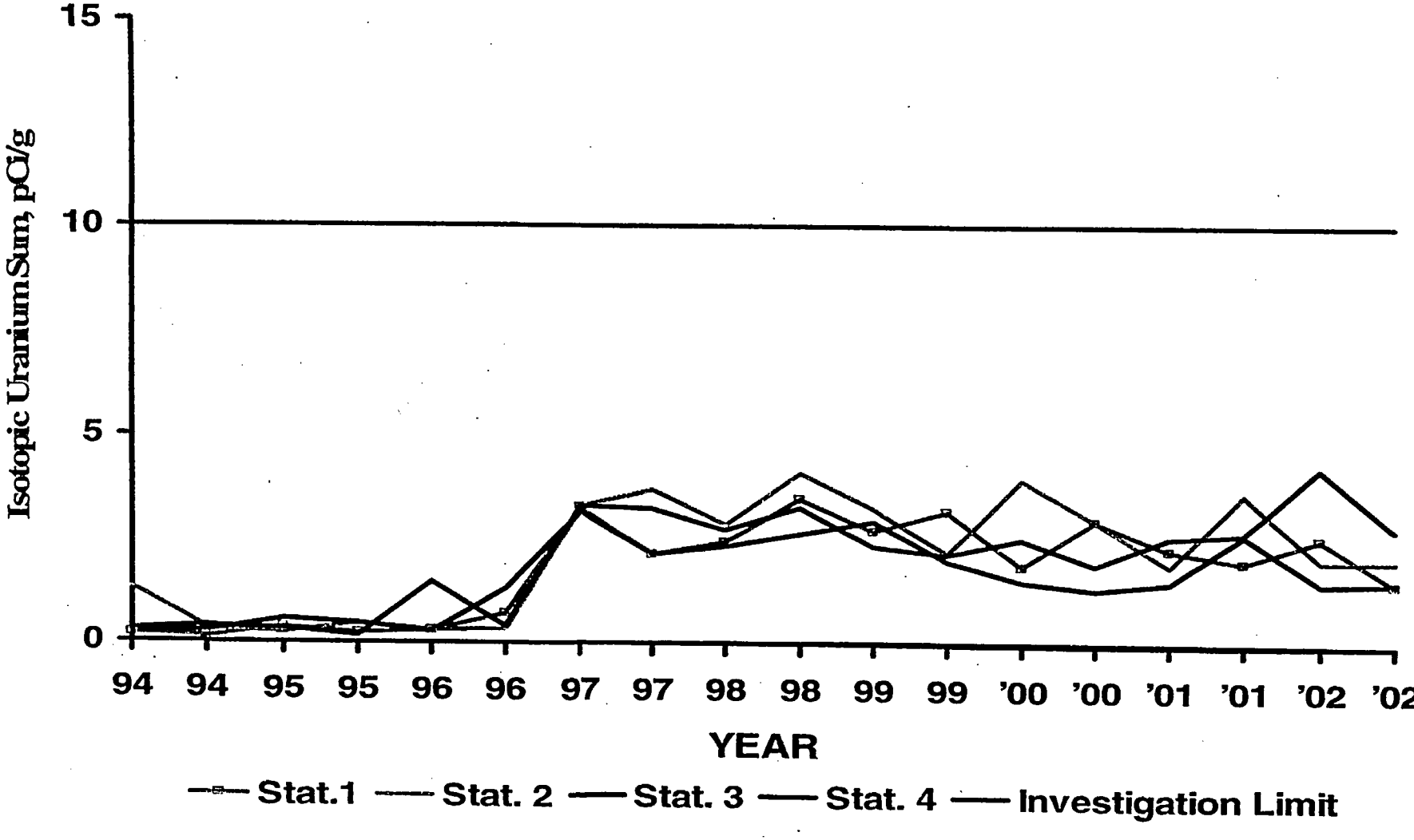


Figure 8B

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Fish and Sediment Analysis
Congaree River

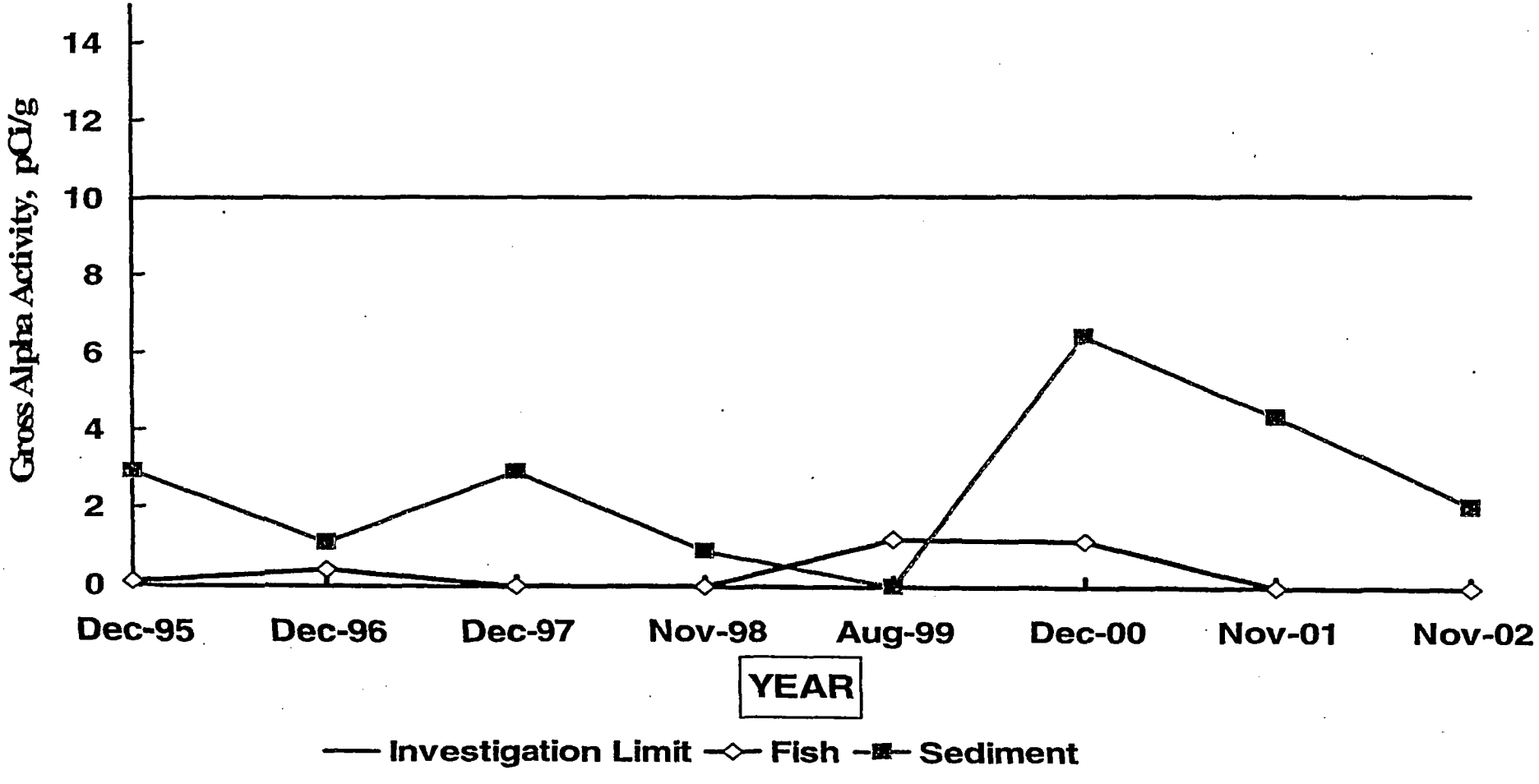

Figure 8C

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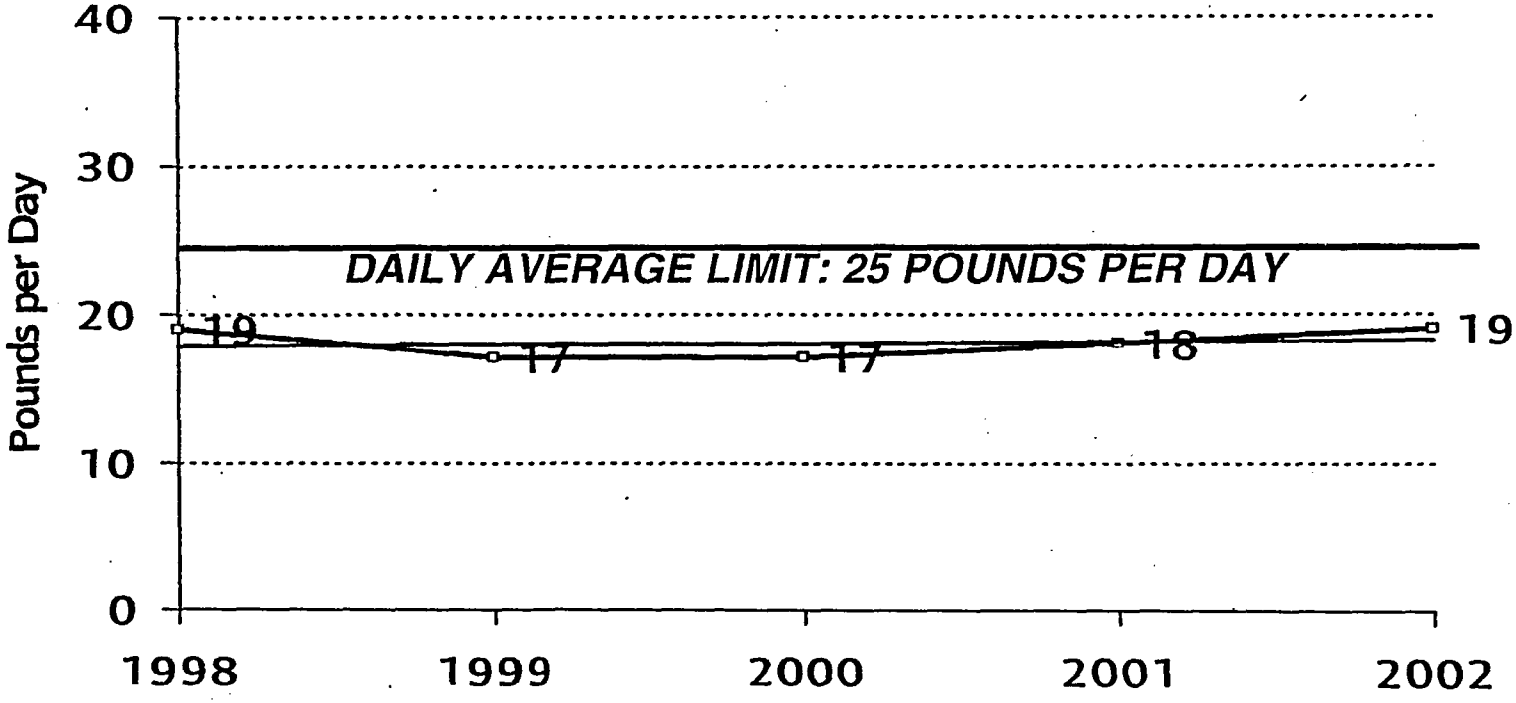
BOD 5 Effluents Annual Daily Average

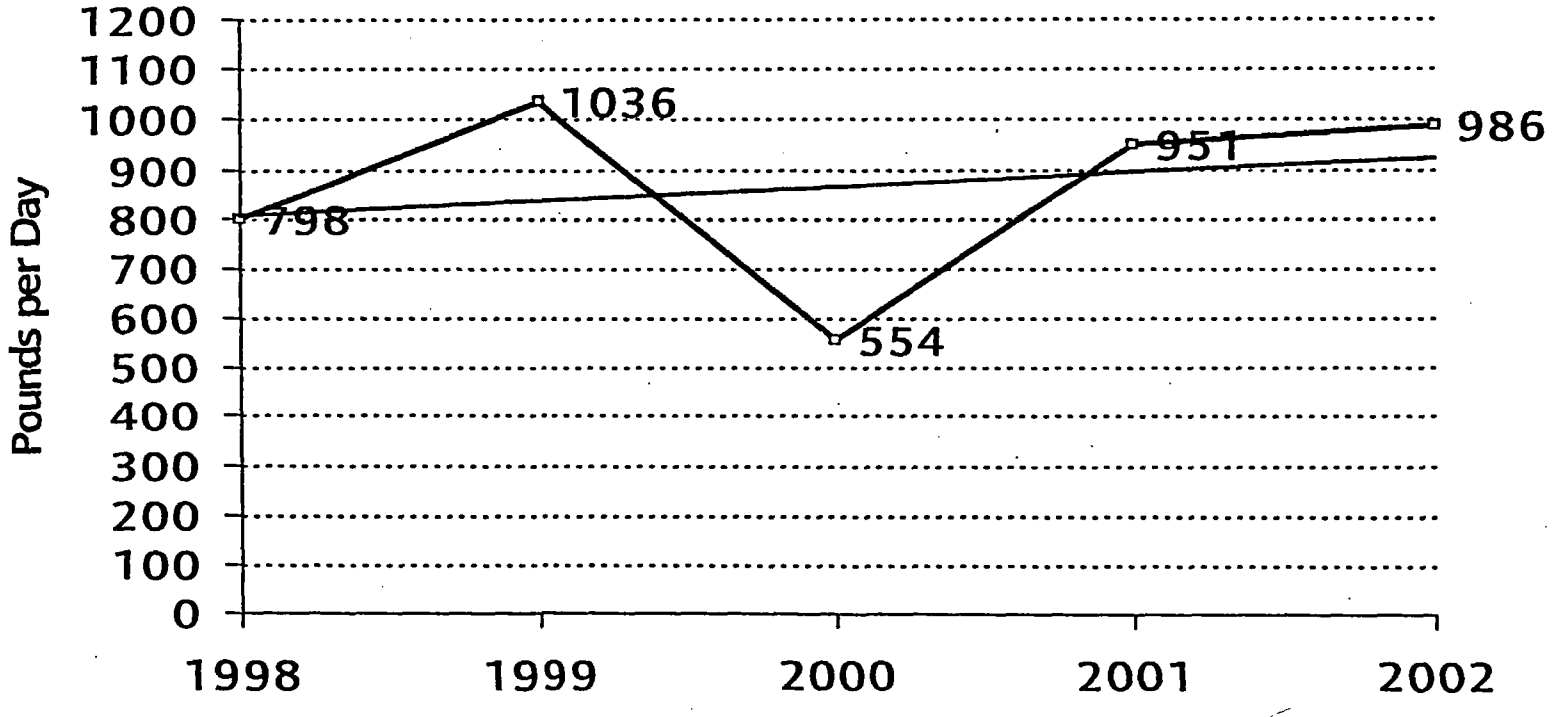


(TREND IN LBS/DAY/YEAR)

5 YR TREND: +0.1 ; R(2): 0.025 G

Figure 8D

Nitrates in Liquid Effluent



(TREND IN LBS/DAY/YEAR)

5 YR TREND: +0.1 ; R(2): 0.025 G

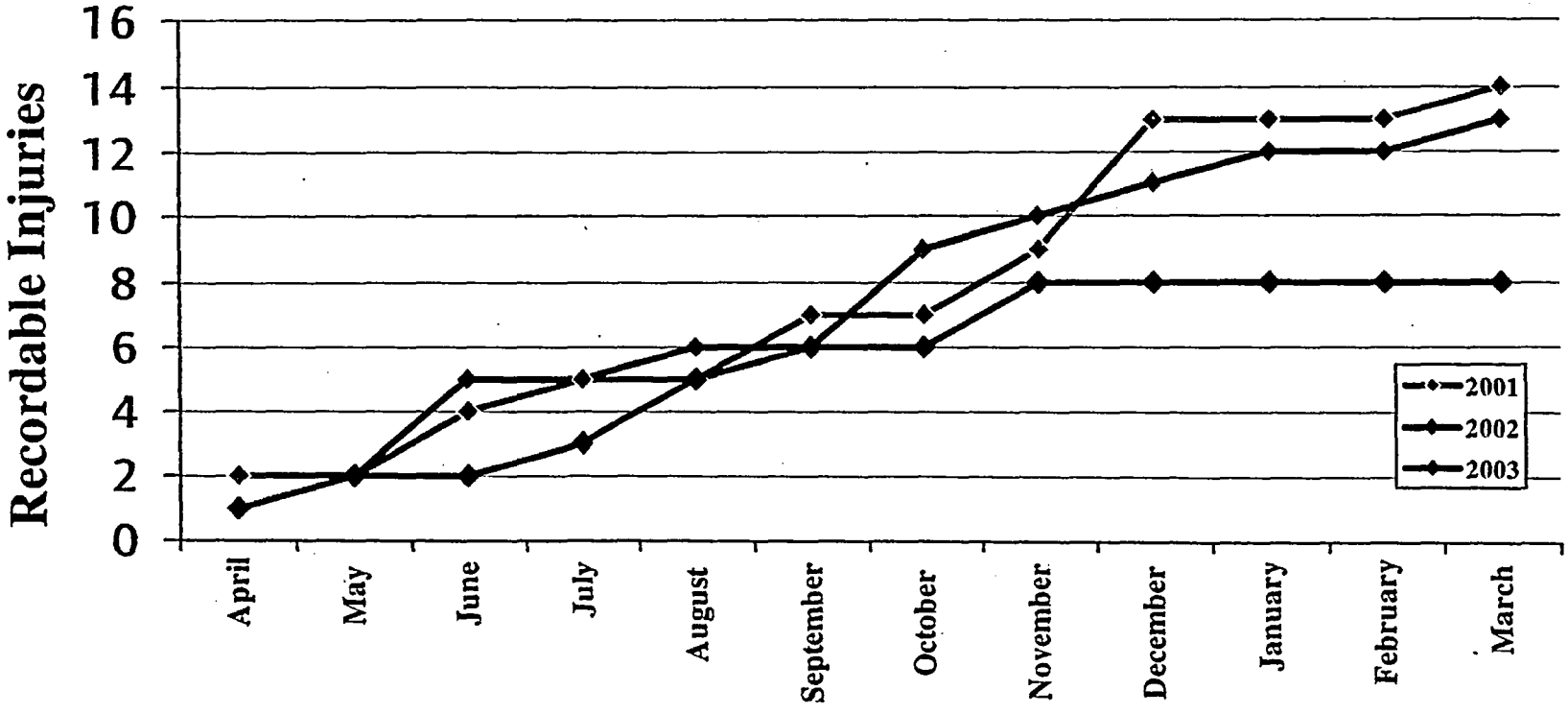
Figure 8E

Safety Statistics
Cumulative Recordable Injuries

FY 2001
Recordable Injuries = 14
TRIR =1.22

FY 2002
Recordable Injuries = 13
TRIR =1.09

FY 2003
Recordable Injuries = 9
TRIR =0..77



Safety Statistics
Reportable Injuries 2001 - 2003

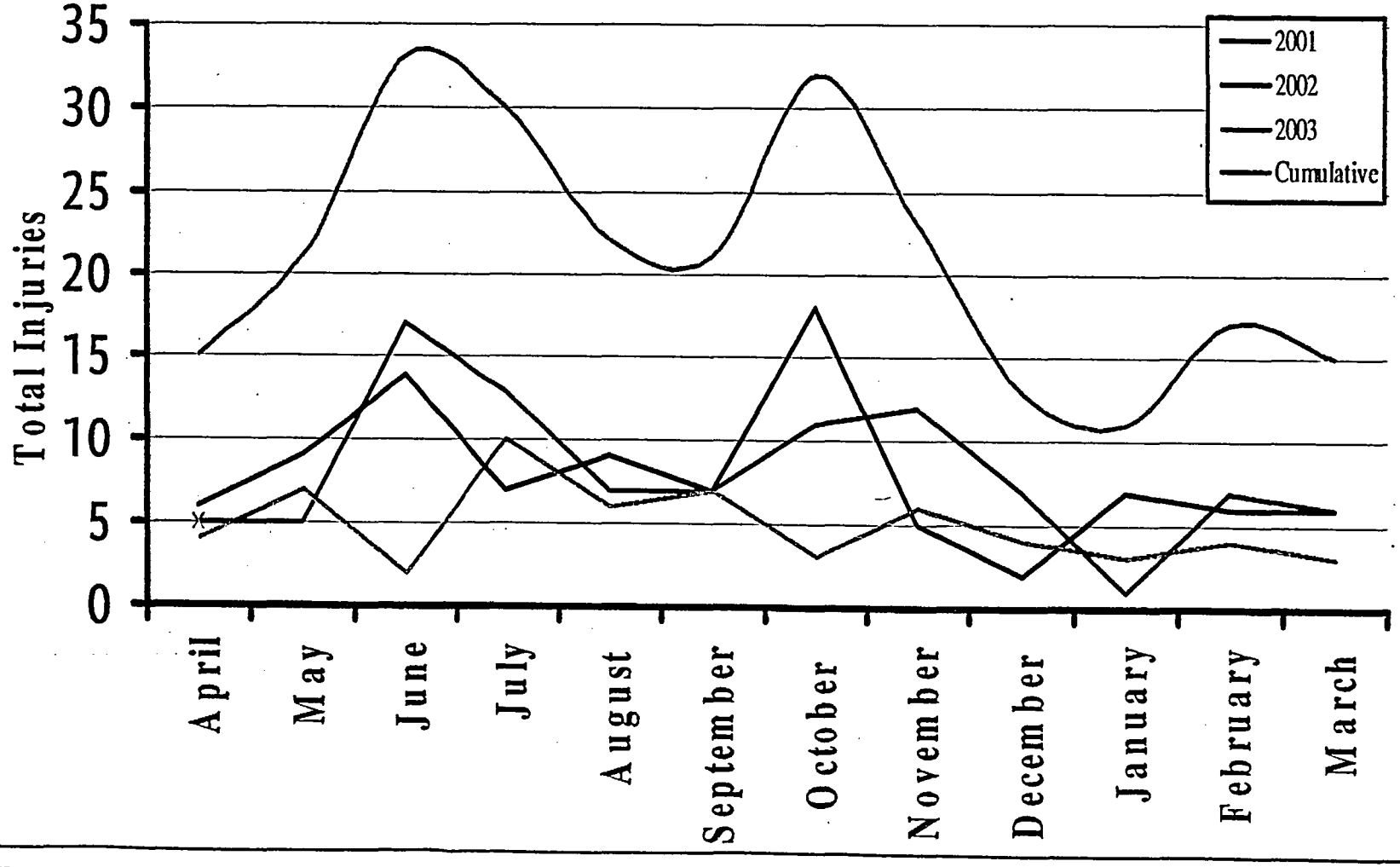


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TABLE 1A
2002 STATISTICALLY SIGNIFICANT TRENDS

DEPT.	AIRBORNE		INTERNAL				EXTERNAL			TOTAL EFFECTIVE DOSE EQUIVALENT	
	YRS IN TREND	%DAC/ QTR	YRS IN TREND	CEDE mREM/ QTR	URINE μgU/l/ QTR	INVIVO μgU-235/ QTR	YRS IN TREND	DEEP-DOSE EQUIV. MREM/QTR	SHALLOW-DOSE EQUIV. MREM/QTR	YRS IN TREND	MREM/ QTR
Conversion	5	-	5	-	-	-	5	-	NA	5	-
Conversion	2	-	2	-	-	-	2	-	NA	2	-
Pellet	5	+1.61	5	+4.07	-	-	5	-	NA	5	-
Pellet	2	-	2	-	-	-	2	-	NA	2	-
Rod	5	+0.74	5	+3.44	-	-	5	-	NA	5	-
Rod	2	-	2	-	-	-	2	-	NA	2	-
QC	5	-	5	-	-	-	5	-	NA	5	-
QC	2	-	2	-	-	-	2	-	NA	2	-
URRS	5	+1.89	5	+2.98		-	5	-	NA	5	-
URRS	2	-	2	+4.34	-	-	2	-	NA	2	-
IFBA	5	-	5	-	-	-	5	-	NA	5	-
IFBA	2	-	2	-	-	-	2	-	NA	2	-
Maintenance	5	-	5	+3.3	-	-	5	-	NA	5	-
Maintenance	2	-	2	-	-	-	2	-	NA	2	-
Rod Insp.	5	-	5	-	-	-	5	-	NA	5	-
Rod Insp.	2	-	2	-	-	-	2	-	NA	2	-
Final Insp.	5	-	5	-	-	-	5	-	NA	5	-
Final Insp.	2	-	2	-	-	-	2	-	NA	2	-
Final Assy.	5	-	5	-	-	-	5	-	NA	5	-
Final Assy.	2	-	2	-	-	-	2	-	NA	2	-

TABLE 2

2002 Airborne Radioactivity Averages (%DAC)

Area Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2002
CONTAINMENTS	118	105	141	80	119	63	87	89	78	64	65	62	89
ADU CONVERSION	59	56	53	58	55	51	58	67	63	73	73	72	62
ERBIA	16	17	13	20	9	10	11	11	10	12	12	12	13
IFBA ZrB2	7	7	7	12	8	10	8	9	8	8	9	8	8
LABORATORIES	8	9	9	10	8	9	9	9	9	9	9	8	9
MAINTENNACE SHOPS	23	24	41	25	21	20	17	20	24	21	22	20	23
PELLET MANUFACTURING	45	41	42	45	39	42	40	47	43	50	54	52	45
QC INSPECTION	21	16	17	18	15	16	17	20	19	19	22	21	19
ROD MANUFACTURING	24	18	20	24	18	20	18	20	19	19	21	21	20
URRS	39	41	46	49	49	53	66	54	64	49	42	46	50

Location Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2002
CONV DECON RM HD	42	45	46	59	58	49	50	43	45	48	35	31	46
CONV DECON RM #2	42	40	37	60	55	45	53	38	46	40	24	29	42
DECON RM WALKIN HOOD	40	43	50	59	62	54	61	48	53	48	36	34	49
DECON ROOM #1	66	74	265	126	360	55	38	90	78	66	107	65	116
DECON ROOM TABLE	48	43	237	58	260	127	65	211	136	57	80	71	116
DECON ROOM DOOR	38	36	98	56	96	32	30	47	37	33	46	43	49
1 BULK CONTAINMENT	66	58	50	43	40	41	50	49	46	51	62	62	52
2 BULK CONTAINMENT	287	200	68	70	78	73	53	100	95	108	119	136	116
3 BULK CONTAINMENT	71	60	64	70	52	53	71	73	106	75	61	82	70
4 BULK CONTAINMENT	480	447	499	204	132	97	402	193	142	111	77	69	238
1 CONV. CONTROL ROOM	23	19	19	21	19	17	23	25	22	31	25	26	23
ADU SCRAP DISSOLV HD	37	35	35	42	33	31	33	39	38	57	52	48	40
2 SCRAP HOOD	43	31	36	50	40	40	39	48	53	56	47	42	44
CONV. BLUE M #1	49	45	37	46	41	42	42	46	49	66	69	67	50
CONV. BLUE M #2	38	33	36	63	36	33	38	40	45	69	70	49	46
BLEND GATHER STATION	36	31	32	42	29	38	34	44	40	46	53	55	40
1 FEED END TOP	62	28	28	45	34	36	46	34	41	68	46	56	43
1 FEED END BOTTOM	33	26	24	35	27	27	27	30	32	38	46	39	32
1 PRODUCT END TOP	30	28	25	30	35	28	34	29	29	41	42	65	35
1 PEB MILL	64	54	51	84	82	53	53	54	72	103	100	73	70
1 UF6 BAY	34	35	44	65	48	50	61	51	48	49	41	39	47
1 CALCINER RECY HOOD	40	29	26	82	51	34	36	35	35	45	40	38	41
1 PEB CALCIN PROD HD	41	36	37	48	47	46	42	45	44	73	54	52	47
1 ELEVATOR BOTTOM HD	38	53	152	85	41	45	165	39	53	65	58	55	71
LINE 1 WEIGH TABLE	64	61	59	73	64	66	55	61	70	100	77	88	70
2 FEED END TOP	50	34	37	60	36	38	40	44	34	44	53	49	43
2 FEED END BOTTOM	46	41	33	49	44	49	51	59	163	57	61	83	61
2 PRODUCT END TOP	37	32	35	46	38	36	37	48	47	63	57	49	44
2 PEB MILL	50	67	63	46	54	55	42	76	83	95	83	82	66
2 UF6 BAY	42	39	52	68	53	55	60	44	45	45	33	34	48

TABLE 2

2002 Airborne Radioactivity Averages (%DAC)

Location Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2002
2 CALCINER RECY HOOD	39	59	31	35	29	32	34	28	40	42	48	39	38
2 ELEVATOR BOTTOM	55	41	42	57	30	31	35	36	37	65	108	48	49
2 PEB CALCIN PROD HD	36	37	36	44	49	46	38	53	62	77	62	53	49
LINE 2 WEIGH TABLE	83	89	68	62	95	87	84	133	121	124	122	125	100
3 FEED END TOP	37	28	28	48	37	38	41	56	30	33	55	52	40
3 FEED END BOTTOM	31	28	25	35	35	30	30	55	56	37	47	73	40
3 PRODUCT END TOP	25	26	22	28	25	28	24	30	25	34	42	32	28
3 PEB MILL	67	72	58	47	44	47	39	52	45	63	70	62	55
3 UF6 BAY	32	34	43	59	47	49	55	41	40	40	35	35	43
3 CALCINER RECY HOOD	37	36	34	36	39	49	39	42	40	44	61	57	43
3 PEB CALCIN PROD HD	64	59	56	53	73	72	56	87	69	89	91	78	71
3 ELEVATOR BOTTOM	31	45	27	36	45	35	33	41	38	36	50	62	40
LINE 3 WEIGH TABLE	67	67	59	54	56	65	49	70	68	90	85	102	70
4 FEED END TOP	50	37	46	34	35	36	32	36	34	32	48	44	39
4 FEED END BOTTOM	54	29	34	33	31	38	30	36	29	31	48	83	40
4 PRODUCT END TOP	64	24	29	30	23	27	23	26	27	38	42	50	34
4 PEB MILL	131	98	100	125	117	74	88	114	111	128	65	90	103
4 UF6 BAY	36	39	46	61	49	50	53	35	35	33	36	44	43
4 ELEVATOR BOTTOM HD	53	32	43	50	45	38	32	54	39	39	52	71	46
4 PEB CALCIN PROD HD	112	82	97	97	82	62	64	93	99	107	92	90	90
LINE 4 WEIGH TABLE	142	108	108	113	107	68	88	97	96	128	126	136	110
5 FEED END TOP	59	59	48	55	57	55	55	60	61	81	69	81	62
5 FEED END BOTTOM	23	19	18	21	22	22	26	24	26	11	15	17	20
5 PRODUCT END TOP	38	31	31	38	31	33	33	32	40	50	46	72	40
5 PEB MILL	53	42	55	60	44	42	42	65	32	54	45	51	49
5 UF6 BAY	30	29	45	65	64	61	59	49	44	48	40	45	48
5 CALCINER RECY HD	29	26	20	23	32	28	42	50	35	59	40	40	35
5 PEB CALCIN PROD HD	32	27	28	32	30	29	36	41	35	51	38	45	35
5 DRYING HOOD	68	49	40	54	40	43	36	45	124	72	58	57	57
LN 5 ELEVATOR BOTTOM	31	30	25	28	47	27	126	102	32	50	36	33	47
LINE 5 WEIGH TABLE	51	48	59	63	54	47	45	67	60	73	59	62	57
BULK BLEND RM DESK	84	98	96	54	50	50	48	65	54	61	86	81	69
CONSOL STATION	88	78	80	139	98	74	111	176	135	159	160	124	118
2 REMILL BOTTOM	79	91	75	61	89	71	87	112	81	89	137	107	90
1 REMILL BOTTOM	150	149	133	91	103	86	80	127	105	149	190	197	130
2 REMILL TOP	101	154	130	123	144	135	168	260	153	175	264	208	168
1 REMILL TOP	146	163	144	104	105	158	221	218	163	247	146	165	165
POWDER SAMPLE HOOD	66	68	56	71	77	73	69	87	78	99	125	90	80
BULK CLEAN STATION	48	41	24	32	33	28	34	47	39	42	50	49	39
FEED CLEANING HOOD	49	49	31	36	40	35	39	52	37	40	69	59	45
FEEDER COVER HD	245	338	194	199	222	211	250	316	308	367	301	325	273
POWDER DUMP STATION	85	83	64	61	58	61	49	68	53	47	66	42	61
Erbia Lab HD 1&2	7	9	6	8	6	7	9	8	7	9	8	8	8

TABLE 2

2002 Airborne Radioactivity Averages (%DAC)

Location Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2002
Erbia Lab HD 3&4	8	9	7	7	6	6	8	8	7	9	8	7	7
Erbia Pak Dump Hd 1	18	18	8	7	6	6	9	9	9	10	9	8	10
Erbia Polypak Hood	20	21	9	8	6	7	8	6	7	8	8	8	10
Erbia Pak Dump Hd 2	17	19	11	10	20	10	12	11	10	10	9	12	13
500 Kg Roll Comp. In	12	13	6	8	7	5	6	5	6	8	8	9	8
500 Kg Blender Input	14	15	8	8	6	5	7	6	6	7	8	8	8
ERBIA BULK CONTAIN	23	28	34	28	21	26	25	21	21	20	22	21	24
ERBIA SE EXPANSION 1	19	23	23	29	19	22	21	20	19	22	22	22	22
Ebria Roll Hood	14	11	8	5	6	7	8	8	8	12	13	12	9
Erbia Pellet Press 1	5	5	3	3	2	2	5	5	3	4	5	5	4
Erbia Blender Bottom	14	14	10	12	9	10	12	11	12	12	11	9	11
500Kg Receiver	16	22	20	26	20	20	19	14	15	15	14	13	18
Dewax Furnace #1 In	14	16	11	11	6	6	9	9	8	8	10	14	10
Dewax Furnace #2 In	7	7	6	5	3	5	5	5	5	5	6	7	5
Sinter Furnace #1 In	18	16	14	16	6	7	8	8	7	8	9	9	10
Sinter Furnace #2 In	17	17	11	14	7	9	12	11	11	13	13	12	12
Sinter Furnace 1 Out	26	20	12	12	5	6	8	8	7	9	10	10	11
Sinter Furnace 2 Out	17	16	11	12	11	13	15	14	15	16	18	17	15
Pellet - Rod xfer Hd	4	5	3	11	5	5	6	6	5	6	5	7	6
Erbia Rod Rework Hd	3	4	3	5	4	4	6	4	3	5	4	6	4
Erbia Rod Dump Hd	3	3	2	4	3	4	6	6	3	4	4	6	4
Erbia Pellet Loader	5	6	7	8	4	6	14	9	5	7	7	7	7
Erbia QC Hood South	18	15	12	10	7	10	14	13	11	14	14	13	12
Erbia QC Hood North	13	13	10	11	8	10	12	12	10	14	11	10	11
Erbia Pellet Grinder	70	73	39	299	7	9	13	23	11	15	19	30	51
Erbia Centrifuge Hd	15	16	11	13	6	8	10	10	7	8	9	8	10
Erbia Sludge xfer Hd	24	29	16	11	9	10	13	12	11	10	13	13	14
Erbia Blue M Hood	11	14	9	9	9	6	8	10	10	12	12	13	10
Erbia Mop Water Hd			12	16	11	11	11	8	9	9	8	7	10
ERBIA SE EXPANSION 2	22	25	45	42	24	26	25	21	21	23	26	22	27
ERBIA BULK FEED PC	23	28	29	37	20	23	22	22	23	25	27	26	25
ERBIA DRYING OVEN	19	17	13	13	8	11	11	8	8	9	8	8	11
BLENDER SAMPLE HD	15	14	8	8	6	8	10	8	9	11	12	11	10
PELLET TRANSFER HD 1	13	14	12	11	9	10	11	12	13	38	11	10	14
PELLET TRANSFER HD 2	16	18	18	25	18	18	25	23	23	24	28	24	22
ERBIA MAINTENANCE HD	18	16	8	9	6	6	8	8	8	9	9	9	9
ERBIA SCRAP RECOV HD	6	6	3	5	8	6	6	6	8	5	6	5	6
ERBIA WHEEL GRINDER	19	32	17	20	15	14	15	12	13	11	10	9	16
ERBIA SIFTER HOOD			6	8	14	8	9	10	10	9	10	10	9
COATER #1	5	4	4	6	3	4	4	5	4	4	5	4	4
COATER #2	3	3	4	5	3	4	4	4	6	5	5	5	4
FIXTURE LOADING	3	3	3	9	4	6	5	5	4	5	7	5	5
QC PELLET INSP. HOOD	3	3	3	4	3	2	4	4	4	4	4	4	3

TABLE 2

2002 Airborne Radioactivity Averages (%DAC)

Location Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2002
FIXTURE HOOD #3	5	5	5	8	4	5	4	5	8	7	8	6	6
COATER #5	6	6	4	7	5	7	6	9	9	12	10	9	7
TUBE INSP. STATION	2	1	2	3	2	1	2	2	3	2	2	2	2
VAC. DRY OVEN #2	2	2	2	2	2	2	3	2	3	3	3	2	2
GLOVE BOX ENTRANCE	2	3	3	3	3	3	3	4	4	3	4	3	3
GLOVE BOX PLEN. HD	4	4	4	5	4	5	4	5	4	4	5	5	4
FIXTURE REPAIR ROOM	12	12	11	11	10	10	8	10	11	9	11	8	10
IFBA INPUT	26	24	21	25	21	24	21	36	25	27	29	16	25
ACID WASH HOOD	3	4	4	9	4	8	7	5	6	6	7	5	6
IFBA LATHE	12	8	11	16	10	14	16	18	11	13	21	16	14
IFBA BLUE M	19	20	21	96	39	71	24	26	25	22	24	21	34
IFBA CHEM LAB #1	2	2	2	3	3	3	3	3	3	3	3	3	3
IFBA CHEM LAB #2	2	2	2	3	2	3	3	4	3	3	3	3	3
IFBA CHEM LAB #3	1	1	2	3	2	2	3	3	2	2	2	2	2
IFBA CHEM LAB #4	1	1	1	1	1	2	2	2	2	2	1	2	2
GLOVE BOX CENTER	2	3	2	4	2	3	4	4	4	3	4	3	3
MOP WATER PRESS	3	3	3	9	4	7	6	5	4	4	6	4	5
IFBA REWORK HOOD	2	2	1	3	2	3	3	3	4	3	3	3	3
COATER #3	3	3	3	4	3	3	4	4	4	4	5	4	4
MANUAL COLLATOR	4	8	4	6	2	3	3	3	3	5	7	5	5
IFBA WORK TABLE	66	57	48	56	49	45	38	64	60	69	60	60	56
TURNOVER FIXTURE	4	5	4	7	4	4	4	5	5	5	6	4	5
ROD DUMP HOOD	11	11	16	20	16	14	12	16	13	15	18	14	15
COATER #6	3	2	3	3	4	6	7	6	6	4	6	3	4
IFBA QC HOOD	2	2	3	5	3	5	5	3	4	3	4	2	4
IFBA BEAD BLAST	2	3	1	4	2	2	2	2	2	2	2	2	2
IFBA OX. SAMPLE HOOD	14	12	13	45	18	30	25	25	19	22	27	21	23
MANUAL COLLATOR #2	12	10	11	20	13	14	16	17	12	11	17	14	14
COATER #4	3	3	3	5	3	3	3	3	3	3	4	3	3
TARGET SANDBLASTER				6	6	10	7	5	4	4	5	2	5
COATER 7								4	5	4	4	3	4
DEV CHEM LAB HD 2	30	35	34	34	29	24	23	27	25	28	31	26	29
SCRAP TRANSFER HD	30	33	33	34	29	28	27	29	31	32	30	27	30
CHEM LAB HOOD #1	6	7	7	7	7	8	9	10	9	8	7	5	7
CHEM LAB HOOD #2	3	4	3	4	5	6	6	6	5	5	4	4	5
LAB LINES RM SCALE	8	10	11	9	9	10	11	11	11	11	12	11	10
CHEM LAB HOOD #4	4	6	6	10	6	6	6	8	8	8	6	5	7
CHEM LAB HOOD #5	3	4	4	4	5	6	7	6	6	7	7	6	5
CHEM LAB HOOD #6	1	1	1	1	1	2	2	2	3	1	1	1	1
CHEM LAB HD #8-#11	5	7	5	5	5	5	7	6	5	6	6	5	6
CHEM LAB WINDOW	9	8	10	9	7	8	7	7	7	8	7	7	8
MET LAB 1	4	3	2	2	2	3	3	3	3	4	4	2	3
MET LAB 2	3	3	3	3	2	3	3	2	2	3	3	2	3

TABLE 2

2002 Airborne Radioactivity Averages (%DAC)

Location Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2002
CHEM LAB HD # 7	2	3	2	3	4	4	5	3	4	3	3	3	3
PUMP REBUILD ROOM	25	28	31	33	26	33	22	27	52	24	21	22	29
MAINTENANCE SHOP #2	33	34	81	33	27	25	23	30	30	27	26	25	33
MAINTENANCE SHOP #3	30	30	54	38	30	24	23	24	27	27	30	28	30
MAINTENANCE SHOP #1	30	34	84	30	26	23	23	25	22	24	26	26	31
GREG'S CONSTR SHOP 1	6	6	7	10	10	7	5	6	8	11	11	7	8
MAINT REBUILD SHOP 1	26	16	19	21	17	16	17	18	19	26	22	24	20
GREG'S CONST SHOP 2	13	18	9	13	11	9	8	8	8	11	15	10	11
THERMO STABLTY FURN	8	6	7	16	9	15	13	13	12	11	13	12	11
DIAMOND WHEEL GRIND	27	30	42	46	64	56	56	57	47	45	50	53	48
PELL STACKING CAGE	48	39	44	54	37	41	43	50	41	56	45	44	45
1 OXIDATION HD	23	22	37	44	35	28	19	23	26	15	15	79	31
1 RIBBON BLENDER	67	67	35	35	57	24	26	31	24	28	24	27	37
1 ROLL HOOD	62	60	70	57	42	53	47	54	47	63	52	66	56
1 PELLET PRESS	73	62	66	76	118	70	67	75	69	75	89	82	77
1 FURNACE	68	58	59	60	48	74	57	60	58	78	57	71	62
1 PELLET GRINDER	52	47	45	47	23	48	37	43	31	46	61	53	44
1 PELLET TABLE	29	25	33	31	25	23	22	28	25	32	33	28	28
1 AUTO PREP HOOD	15	14	18	21	16	15	16	15	13	17	20	23	17
2 OXIDATION HOOD	93	117	54	34	43	67	41	33	26	49	92	73	60
2 RIBBON BLENDER	36	62	42	49	38	41	35	51	45	50	64	82	50
2 ROLL HOOD	66	75	71	73	59	87	73	108	79	88	99	81	80
2 PELLET PRESS	49	54	53	53	79	96	81	96	96	85	107	97	79
2 FURNACE	99	111	82	52	68	50	61	78	74	84	78	77	76
2 PELLET GRINDER	14	12	21	18	15	31	40	33	40	27	21	27	25
2 PELLET TABLE	27	25	25	33	25	25	25	29	27	31	37	35	29
2 AUTO PREP HOOD	19	18	17	20	15	16	21	27	19	23	24	28	20
3 OXIDATION HOOD	33	45	46	49	54	59	59	80	71	72	76	70	59
3 RIBBON BLENDER	89	44	77	41	36	81	45	42	54	48	100	47	59
3 ROLL HOOD	41	42	43	49	39	38	41	51	40	46	51	49	44
3 PELLET PRESS	51	46	53	68	55	69	54	68	50	82	110	66	64
3 FURNACE	81	73	69	91	49	63	65	81	64	66	70	95	72
3 PELLET GRINDER	34	21	27	32	25	20	18	30	23	29	33	27	27
3 PELLET TABLE	27	24	27	35	20	23	27	33	25	29	27	30	27
3 AUTO PREP HOOD	27	20	25	32	18	22	22	26	24	31	33	37	27
4 OXIDATION HOOD	35	32	48	35	21	37	33	31	25	41	76	72	41
4 RIBBON BLENDER	17	12	15	17	12	15	16	20	18	14	14	18	16
4 ROLL HOOD	72	78	72	58	62	53	79	76	68	66	72	63	68
4 PELLET PRESS	58	71	53	57	49	55	54	74	51	71	65	68	61
4 FURNACE	73	69	66	83	62	65	83	89	82	103	84	85	79
4 PELLET GRINDER	15	27	24	30	30	23	28	25	42	43	55	35	31
4 GRINDER TRAY LIFT	31	30	54	82	76	73	63	58	78	80	74	51	63
4 PELLET TABLE	25	25	32	39	26	24	26	31	32	32	27	28	29

TABLE 2

2002 Airborne Radioactivity Averages (%DAC)

Location Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2002
4 AUTO PREP HOOD	15	13	13	15	11	9	11	15	13	14	15	16	13
5 OXIDATION HOOD	48	34	39	17	15	16	11	11	11	10	39	39	24
5 MIX HOOD	45	36	38	47	37	46	38	47	54	101	74	56	52
5 ROLL HOOD	52	41	42	45	43	40	47	54	49	51	64	64	49
5 LIFT BOTTOM	62	41	45	60	49	44	48	64	57	64	58	58	54
5 PELLET PRESS	46	29	33	44	39	45	43	56	40	50	54	41	43
5 FURNACE	38	27	31	39	31	30	35	45	49	36	50	40	37
5 PELLET GRINDER	11	8	8	12	9	8	8	10	10	10	13	12	10
LINE 5 BOAT LOADER	43	29	32	37	31	36	36	43	36	50	50	55	40
5 PELLET TABLE	24	17	20	27	20	22	21	24	22	21	26	23	22
PILOT LN. OX. HOOD	45	40	47	54	39	39	35	42	40	61	62	62	47
PILOT LINE WORK HOOD	52	33	48	63	40	38	35	47	45	65	58	62	49
QC MOISTURE SAMP. HD	8	8	8	9	8	7	9	10	8	9	7	7	8
QC PELLET CRUSH HD	7	6	7	8	7	7	7	7	7	7	7	6	7
1 QC HOOD A	21	14	19	21	17	17	22	23	20	22	22	26	20
1 QC HOOD B	17	13	17	20	14	15	19	22	16	15	16	17	17
2 QC HOOD A	25	22	25	28	24	30	29	34	33	35	34	33	29
2 QC HOOD B	21	15	16	18	14	18	16	19	20	21	20	19	18
3 QC HOOD A	43	25	24	20	14	20	23	29	25	22	32	38	26
3 QC HOOD B	20	15	18	16	14	15	15	19	18	21	23	20	18
4 QC HOOD A	29	21	18	15	16	13	13	17	18	19	22	22	19
4 QC HOOD B	19	17	14	15	12	14	14	16	17	17	19	18	16
5 QC HOOD A	21	16	20	26	17	18	19	23	21	22	26	25	21
5 QC HOOD B	25	19	22	23	21	21	21	26	24	24	33	24	24
ROD SALVAGE HOOD	26	22	24	25	25	28	16	19	19	19	29	22	23
3 LATHE	30	18	22	27	25	28	23	21	18	18	22	20	23
1 LATHE	17	13	16	21	12	14	13	16	18	16	19	16	16
2 LATHE	28	18	18	18	17	19	19	20	21	20	23	22	20
PROD CNTRL SALV HD	28	18	20	29	23	30	27	24	21	19	24	23	24
MANUFACTURING AREA 1	1	1	1	1	1	2	2	2	2	1	2	1	1
1 PELLET LOADER	19	15	18	26	14	16	18	20	23	17	20	21	19
2 PELLET LOADER	20	15	18	21	13	15	16	17	19	19	21	22	18
3 PELLET LOADER	25	18	17	20	15	15	16	21	18	18	18	20	18
4 PELLET LOADER	22	22	26	28	16	19	17	26	19	22	18	21	21
ROD TRANSFER	44	36	37	46	36	36	31	33	36	40	40	39	38
FILTER CLEANING HD	34	36	45	44	42	40	42	49	45	45	50	57	44
ASH HD PULVERIZER	40	46	41	51	51	50	75	49	83	45	34	39	50
SOLEX CONCENTRATOR	54	51	52	44	55	71	67	47	65	64	48	48	55
INCINERATOR INPUT	49	48	50	53	56	63	192	56	148	55	43	45	72
INCINERATOR OUTPUT	52	50	68	62	52	63	164	62	161	47	38	40	72
INCIN. FITZMILL	45	56	48	58	58	69	105	55	114	54	40	43	62
EXPANSION UF6 BAY	21	26	26	31	27	27	35	43	32	33	34	33	31
DISASSEMBLY TABLE	48	51	56	52	45	40	45	61	51	53	63	76	54

TABLE 2

2002 Airborne Radioactivity Averages (%DAC)

Location Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2002
ULTRASONIC CLEANER	27	30	40	37	39	38	37	38	35	35	44	47	37
SOLEX BLUE M	41	42	48	54	57	59	59	43	60	44	36	36	48
SCRAP HOOD - URRS	17	17	21	28	26	27	35	38	29	29	28	25	27
URRS SPONGE BLAST	24	23	35	39	46	43	53	48	38	38	43	42	39
SOLV. EXTRACT DRY HD	48	46	60	63	62	75	74	49	68	55	37	36	56
SOLEX PRESS HOOD	41	46	47	51	46	51	52	40	61	44	33	39	46
FLOURIDE STRIPPER	48	52	53	58	61	67	79	64	90	67	49	50	62
UF6 BAY CYLIND WASH	48	40	60	73	66	65	72	78	79	88	69	100	70
ASSAY #2	35	34	38	56	52	55	59	74	58	54	47	46	51
URRS METAL DETECTOR	28	32	40	62	52	55	69	87	66	65	48	47	54
#1 SHREDDER/BAILER	16	20	23	33	26	30	36	41	32	33	28	29	29
#2 SHREDDER	23	24	30	45	34	37	44	50	42	41	36	38	37
HONER TOP	23	25	35	35	39	37	39	38	34	40	46	46	36
HONER BOTTOM	25	27	33	38	36	36	35	34	32	36	43	43	35
YELLOW M DRYING HOOD	40	48	52	53	56	65	74	57	71	53	43	44	55
1 DISSOLV. FEED HD	60	70	73	65	67	81	76	84	62	64	38	42	65
1 DISSOLV. DISCH. HD	40	40	43	46	48	54	66	50	63	45	39	42	48
2 DISSOLV. FEED HD	80	80	85	61	64	71	68	70	58	58	42	55	66
2 DISSOLV. DISCH. HD	35	38	40	42	49	51	58	49	59	44	41	46	46
3 DISSOLV. FEED HD	59	57	59	52	56	58	57	56	55	53	40	48	54
FILTER PRESS 755-A	37	40	45	50	51	57	65	50	60	49	37	43	49
FILTER PRESS 755-B	36	43	44	51	53	57	69	49	58	48	43	53	50
3 DISSOLV. DISCH. HD	39	39	45	47	48	54	57	51	61	49	37	37	47

TABLE 3
2002 Candidate Locations For Corrective Action

AREA	CEDE > 4 REM	mREM/hr CEDE > 2 mREM/hr	DAC > 100%	SPIKES >10 >500 % DAC
CONVERSION				
FEEDER COVER HD			273	109
2 REMILL TOP			168	31
1 REMILL TOP			165	38
1 REMILL BOTTOM			130	
CONSOL STATION			118	22
LINE 4 WEIGH TABLE			110	
4 PEB MILL			103	
LINE 2 WEIGH TABLE			100	
1 ELEVATOR BOTTOM HD				11
ERBIA				
PELLET TRANSFER HD 1*		3.911		
URRS				
SOLEX CONTROL RM	5.799			

* Due to Acute Internal Exposure Incident to an Employee While Cleaning Pellet Trays Improperly

TABLE 4

NRC COMPLIANCE INSPECTION SUMMARY

DATES	ENFORCEMENT CATEGORY								NO. OF INSP.
	IV		V		VI		OTHERS		
	HP/CR	SGDS	HP/CR	SGDS	HP/CR	SGDS	HP/CR	SGDS	
01/01/96-06/30/96	1	0	0	0	0	0	0	0	3
07/01/96-12/31/96	6[1]	0	0	0	0	0	0	0	6
01/01/97-06/30/97	4	5[2]	0	0	0	0	0	0	7
07/01/97-12/31/97	6[3]	0	0	0	0	0	0	0	3
01/01/98-06/30/98	3	3	0	0	0	0	0	0	7
07/01/98-12/31/98	3	0	0	0	0	0	0	0	8
01/01/99-06/30/99	0	0	0	0	0	0	0	0	6
07/01/99-12/31/99	0	0	0	0	0	0	0	0	3
01/01/00-06/30/00	4	0	0	0	0	0	0	0	6
07/01/00-12/31/00	1	1	0	0	0	0	0	0	4
01/01/01-06/30/01	3	1	0	0	0	0	7[4]	0	6
07/01/01-12/31/01	2	2	0	0	0	0	0	0	5
01/01/02-06/30/02	1	0	0	0	0	0	0	0	6
07/01/02-12/31/02	1	1	0	0	0	0	0	0	4

(1) Six violations, one in emergency preparedness, one in maintenance, and four related to self-assessments and nuclear criticality safety process reviews

(2) Aggregate violations regarding two misplaced fuel rods considered as Severity Level III, with no Civil Penalty

(3) Aggregate violations of nuclear criticality safety issues considered as Severity Level III, resulting in a Civil Penalty of $13,750

(4) Five Severity Level III violations associated with Programmed Logic Controller failures in the Conversion Area and two Severity Level III violations associated with UN crystal shipment

WEC-02-43

Attachment "A" GASEOUS EFFLUENT DISCHARGES - JANUARY 1 THROUGH JUNE 30, 2002

TABLE 5

	2002 FIRST HALF GASEOUS EFFLUENTS STACK IDENTIFICATION	QUANTITY RELEASED uCi URANIUM/ 6months	GROSS ALPHA (URANIUM) Conc., uCi/ml		ERROR	LLD, uCi/ml	Flow Rate Meters/sec	Derived Isotopic Concentration uCi/ml U234	U235	U238	DERIVED ISOTOPIC DISCHARGE, uCi U234	U235	U238	
1	FURNACE EX LINE 1	14.27	3.30E-13	+/-	6.50E-14	8.00E-14	2.78	2.81E-13	9.90E-15	3.96E-14	12.13	0.43	1.71	
2	FURNACE EX LINE 2	4.42	1.02E-13	+/-	3.61E-14	8.00E-14	2.78	8.67E-14	3.06E-15	1.22E-14	3.76	0.13	0.53	
3	FURNACE EX LINE 3	4.41	1.02E-13	+/-	3.61E-14	8.00E-14	2.78	8.67E-14	3.06E-15	1.22E-14	3.75	0.13	0.53	
4	FURNACE EX LINE 4	3.70	8.56E-14	+/-	3.31E-14	8.00E-14	2.78	7.28E-14	2.57E-15	1.03E-14	3.15	0.11	0.44	
5	FURNACE EX LINE 5	4.65	1.08E-13	+/-	3.72E-14	8.00E-14	2.78	9.18E-14	3.24E-15	1.30E-14	3.95	0.14	0.56	
6	NEW DECON RM	9.37	3.68E-13	+/-	1.10E-13	8.00E-14	1.64	3.13E-13	1.10E-14	4.42E-14	7.96	0.28	1.12	
7	MET LAB EX	4.44	5.14E-13	+/-	1.07E-13	8.00E-14	0.56	4.37E-13	1.54E-14	6.17E-14	3.77	0.13	0.53	
8	INCINER EX	18.89	6.60E-13	+/-	1.11E-13	8.00E-14	1.89	5.61E-13	1.98E-14	7.92E-14	16.06	0.57	2.27	
9	SUPPL INC EX	3.06	2.09E-13	+/-	6.56E-14	8.00E-14	0.94	1.78E-13	6.27E-15	2.51E-14	2.60	0.09	0.37	
10	CONVERS 1-A EX	9.07	1.41E-13	+/-	4.25E-14	8.00E-14	4.17	1.20E-13	4.23E-15	1.69E-14	7.71	0.27	1.09	
11	CONVERSION 1-B	0.29	4.80E-13	+/-	7.84E-14	8.00E-14	4.17	4.08E-13	1.44E-14	5.76E-14	0.25	0.01	0.03	
12	SCRAP REC 2-A	5.49	1.10E-13	+/-	3.75E-14	8.00E-14	2.78	9.35E-14	3.30E-15	1.32E-14	4.67	0.16	0.66	
12a	S-1030-A	0.33	2.29E-13	+/-	5.42E-14	8.00E-14	7.56	1.95E-13	6.87E-15	2.75E-14	0.28	0.01	0.04	
13	SCRAP REC 2-B	0.29	1.87E-13	+/-	4.89E-14	8.00E-14	2.78	1.59E-13	5.61E-15	2.24E-14	0.25	0.01	0.03	
14	CONV 3-A	20.33	1.23E-12	+/-	1.26E-13	8.00E-14	2.78	1.05E-12	3.69E-14	1.48E-13	17.28	0.61	2.44	
15	CONV 3-B	3.03	4.68E-13	+/-	7.74E-14	8.00E-14	2.78	3.98E-13	1.40E-14	5.62E-14	2.58	0.09	0.36	
16	MAINT ENCL 4B	0.00	4.68E-13	+/-	7.74E-14	8.00E-14	3.89	3.98E-13	1.40E-14	5.62E-14	0.00	0.00	0.00	
17	CONV ENCL EX 4C	9.62	1.59E-13	+/-	4.51E-14	8.00E-14	3.89	1.35E-13	4.77E-15	1.91E-14	8.18	0.29	1.15	
18	CONV ENCL EX 4D	0.00	3.29E-13	+/-	6.49E-14	8.00E-14	3.89	2.80E-13	9.87E-15	3.95E-14	0.00	0.00	0.00	
19	CONV EMERG EX 4E	5.99	4.31E-13	+/-	7.43E-14	8.00E-14	3.89	3.66E-13	1.29E-14	5.17E-14	5.09	0.18	0.72	
20	CHEM LAB FILTERED EX	7.82	9.05E-13	+/-	1.08E-13	8.00E-14	5.56	7.69E-13	2.72E-14	1.09E-13	6.65	0.23	0.94	
21	DECON ROOM EX	32.24	1.46E-12	+/-	1.37E-13	8.00E-14	1.42	1.24E-12	4.38E-14	1.75E-13	27.40	0.97	3.87	
22	CAL COMBGAS LN 1	1.59	5.67E-13	+/-	8.52E-14	8.00E-14	0.18	4.82E-13	1.70E-14	6.80E-14	1.35	0.05	0.19	
23	CAL COMBGAS LN 2	0.80	3.15E-13	+/-	6.35E-14	8.00E-14	0.18	2.68E-13	9.45E-15	3.78E-14	0.68	0.02	0.10	
24	CAL COMBGAS LN 3	0.58	2.28E-13	+/-	5.40E-14	8.00E-14	0.18	1.94E-13	6.84E-15	2.74E-14	0.49	0.02	0.07	
25	CAL COMBGAS LN 4	0.51	1.99E-13	+/-	5.05E-14	8.00E-14	0.18	1.69E-13	5.97E-15	2.39E-14	0.43	0.02	0.06	
26	CAL COMBGAS LN 5	1.34	5.27E-13	+/-	8.22E-14	8.00E-14	0.18	4.48E-13	1.58E-14	6.32E-14	1.14	0.04	0.16	
27	CHEM LAB # 2	3.72	4.10E-13	+/-	7.25E-14	8.00E-14	0.58	3.49E-13	1.23E-14	4.92E-14	3.16	0.11	0.45	
28	CHEM LAB #3	0.47	9.50E-14	+/-	3.49E-14	8.00E-14	0.64	8.08E-14	2.85E-15	1.14E-14	0.40	0.01	0.06	
29	HP LAB EX	0.83	9.13E-14	+/-	3.42E-14	8.00E-14	0.58	7.76E-14	2.74E-15	1.10E-14	0.71	0.02	0.10	
30	DEV LAB 1 EX	5.95	4.05E-13	+/-	7.20E-14	8.00E-14	0.94	3.44E-13	1.22E-14	4.86E-14	5.06	0.18	0.71	
31	DEV LAB 2 EX	8.54	5.81E-13	+/-	8.63E-14	8.00E-14	0.94	4.94E-13	1.74E-14	6.97E-14	7.26	0.26	1.02	
32	PELLET COMBINED	6.32	8.61E-14	+/-	3.32E-14	8.00E-14	4.72	7.32E-14	2.58E-15	1.03E-14	5.37	0.19	0.76	
33	SOLV X N	6.71	1.59E-13	+/-	4.51E-14	8.00E-14	3.33	1.35E-13	4.77E-15	1.91E-14	5.70	0.20	0.81	
34	SOLV X S	3.18	3.46E-13	+/-	6.66E-14	8.00E-14	3.33	2.94E-13	1.04E-14	4.15E-14	2.70	0.10	0.38	
35	SCRAP REC DRY	6.86	4.67E-13	+/-	7.73E-14	8.00E-14	0.94	3.97E-13	1.40E-14	5.60E-14	5.83	0.21	0.82	
36	MAP COMBINED	0.00	3.08E-13	+/-	6.28E-14	8.00E-14	2.78	2.62E-13	9.24E-15	3.70E-14	0.00	0.00	0.00	
37	IFBA EX	5.88	8.00E-14	+/-	3.20E-14	8.00E-14	4.72	6.80E-14	2.40E-15	9.60E-15	5.00	0.18	0.71	
38	MAINT WELD EX	5.88	4.01E-14	+/-	2.27E-14	8.00E-14	0.94	3.41E-14	1.20E-15	4.81E-15	5.00	0.18	0.71	
39	AC-3	5.48	9.34E-14	+/-	3.46E-14	8.00E-14	3.89	7.94E-14	2.80E-15	1.12E-14	4.66	0.16	0.66	
40	BULK BLEND EX	5.24	1.21E-13	+/-	3.94E-14	8.00E-14	2.78	1.03E-13	3.63E-15	1.45E-14	4.45	0.16	0.63	
41	AC-5	5.65	9.61E-14	+/-	3.51E-14	8.00E-14	3.89	8.17E-14	2.88E-15	1.15E-14	4.80	0.17	0.68	
42	AC-8	4.93	8.39E-14	+/-	3.28E-14	8.00E-14	3.89	7.13E-14	2.52E-15	1.01E-14	4.19	0.15	0.59	
43	AMMONIA FUME SC 1008-A	3.14	1.07E-13	+/-	3.70E-14	8.00E-14	1.89	9.10E-14	3.21E-15	1.28E-14	2.67	0.09	0.38	
44	AMMONIA FUME SC 1008-B	0.00	1.17E-13	+/-	3.87E-14	8.00E-14	1.89	9.95E-14	3.51E-15	1.40E-14	0.00	0.00	0.00	
45	AC-4	4.84	8.00E-14	+/-	3.20E-14	8.00E-14	3.89	6.80E-14	2.40E-15	9.60E-15	4.11	0.15	0.58	
46	HOT OIL RM EX	20.74	3.43E-14	+/-	2.10E-14	8.00E-14	3.89	2.92E-14	1.03E-15	4.12E-15	17.63	0.62	2.49	
47	ERBIA FURNACE EX	10.24	8.06E-14	+/-	3.21E-14	8.00E-14	8.06	6.85E-14	2.42E-15	9.67E-15	8.70	0.31	1.23	
48	ERBIA SCRUBBER EX	5.39	8.00E-14	+/-	3.20E-14	8.00E-14	4.44	6.80E-14	2.40E-15	9.60E-15	4.58	0.16	0.65	
49	ERBIA CHANGE ROOM	2.38	8.07E-14	+/-	3.22E-14	8.00E-14	1.89	6.86E-14	2.42E-15	9.68E-15	2.02	0.07	0.29	
	Total uCi	288.9						TOTAL DERIVED ISOTOPIC RELEASE			245.6	8.7	34.7	Total 288.90

Attachment "A" GASEOUS EFFLUENT DISCHARGES JULY 1 THROUGH DECEMBER 31, 2002

	2002 SECOND HALF GASEOUS EFFLUENTS STACK IDENTIFICATION	QUANTITY RELEASED uCi URANIUM/ 6months	GROSS ALPHA (URANIUM) Conc., uCi/ml		ERROR	LLD, uCi/ml	Flow Rate Meters/sec	Derived Isotopic Concentration uCi/ml U234	U235	U238	DERIVED ISOTOPIC DISCHARGE, uCi U234	U235	U238	
1	FURNACE EX LINE 1	7.34	1.67E-13	+/-	4.63E-14	8.00E-14	2.78	1.42E-13	5.01E-15	2.00E-14	6.24	0.22	0.88	
2	FURNACE EX LINE 2	4.82	1.10E-13	+/-	3.75E-14	8.00E-14	2.78	9.35E-14	3.30E-15	1.32E-14	4.10	0.14	0.58	
3	FURNACE EX LINE 3	4.35	9.90E-14	+/-	3.56E-14	8.00E-14	2.78	8.42E-14	2.97E-15	1.19E-14	3.70	0.13	0.52	
4	FURNACE EX LINE 4	3.84	8.74E-14	+/-	3.35E-14	8.00E-14	2.78	7.43E-14	2.62E-15	1.05E-14	3.26	0.12	0.46	
5	FURNACE EX LINE 5	4.77	1.09E-13	+/-	3.74E-14	8.00E-14	2.78	9.27E-14	3.27E-15	1.31E-14	4.05	0.14	0.57	
6	NEW DECON RM	19.98	7.71E-13	+/-	1.60E-13	8.00E-14	1.64	6.55E-13	2.31E-14	9.25E-14	16.98	0.60	2.40	
7	MET LAB EX	4.99	5.68E-13	+/-	1.13E-13	8.00E-14	0.56	4.83E-13	1.70E-14	6.82E-14	4.24	0.15	0.60	
8	INCINER EX	10.31	3.98E-13	+/-	8.59E-14	8.00E-14	1.89	3.38E-13	1.19E-14	4.78E-14	8.76	0.31	1.24	
9	SUPPL INC EX	4.62	3.10E-13	+/-	7.99E-14	8.00E-14	0.94	2.64E-13	9.30E-15	3.72E-14	3.93	0.14	0.55	
10	CONVERS 1-A EX	10.29	1.57E-13	+/-	4.48E-14	8.00E-14	4.17	1.33E-13	4.71E-15	1.88E-14	8.75	0.31	1.23	
11	CONVERSION 1-B EX	0.10	3.66E-13	+/-	6.85E-14	8.00E-14	4.17	3.11E-13	1.10E-14	4.39E-14	0.09	0.00	0.01	
12	S-1030-A	15.61	2.29E-13	+/-	5.42E-14	8.00E-14	7.56	1.95E-13	6.87E-15	2.75E-14	13.27	0.47	1.87	
13	S-1030-B	2.48	4.15E-13	+/-	7.29E-14	8.00E-14	7.56	3.53E-13	1.25E-14	4.98E-14	2.11	0.07	0.30	
14	MAINT ENCL 4B	0.00	5.96E-13	+/-	8.74E-14	8.00E-14	3.89	5.07E-13	1.79E-14	7.15E-14	0.00	0.00	0.00	
15	CONV ENCL EX 4C	11.38	1.85E-13	+/-	4.87E-14	8.00E-14	3.89	1.57E-13	5.55E-15	2.22E-14	9.67	0.34	1.37	
16	CONV ENCL EX 4D	0.00	2.80E-13	+/-	5.99E-14	8.00E-14	3.89	2.38E-13	8.40E-15	3.36E-14	0.00	0.00	0.00	
17	CONV EMERG EX 4E	0.75	4.10E-13	+/-	7.25E-14	8.00E-14	3.89	3.49E-13	1.23E-14	4.92E-14	0.64	0.02	0.09	
18	CHEM LAB FILTERED EX	8.40	9.56E-14	+/-	3.50E-14	8.00E-14	5.56	8.13E-14	2.87E-15	1.15E-14	7.14	0.25	1.01	
19	DECON ROOM EX	32.57	1.45E-12	+/-	1.36E-13	8.00E-14	1.42	1.23E-12	4.35E-14	1.74E-13	27.68	0.98	3.91	
20	CAL COMBGAS LN 1	1.41	5.45E-13	+/-	8.36E-14	8.00E-14	0.16	4.63E-13	1.64E-14	6.54E-14	1.20	0.04	0.17	
21	CAL COMBGAS LN 2	0.72	2.78E-13	+/-	5.97E-14	8.00E-14	0.16	2.36E-13	8.34E-15	3.34E-14	0.61	0.02	0.09	
22	CAL COMBGAS LN 3	0.64	2.45E-13	+/-	5.60E-14	8.00E-14	0.16	2.08E-13	7.35E-15	2.94E-14	0.54	0.02	0.08	
23	CAL COMBGAS LN 4	0.70	2.70E-13	+/-	5.88E-14	8.00E-14	0.16	2.30E-13	8.10E-15	3.24E-14	0.60	0.02	0.08	
24	CAL COMBGAS LN 5	1.41	5.45E-13	+/-	8.36E-14	8.00E-14	0.16	4.63E-13	1.64E-14	6.54E-14	1.20	0.04	0.17	
25	CHEM LAB # 2	3.64	3.95E-13	+/-	7.11E-14	8.00E-14	0.58	3.36E-13	1.19E-14	4.74E-14	3.09	0.11	0.44	
26	CHEM LAB #3	0.45	8.85E-14	+/-	3.37E-14	8.00E-14	0.64	7.52E-14	2.66E-15	1.06E-14	0.38	0.01	0.05	
27	HP LAB EX	0.80	8.70E-14	+/-	3.34E-14	8.00E-14	0.58	7.40E-14	2.61E-15	1.04E-14	0.68	0.02	0.10	
28	DEV LAB 1 EX	2.00	1.34E-13	+/-	4.14E-14	8.00E-14	0.94	1.14E-13	4.02E-15	1.61E-14	1.70	0.06	0.24	
29	DEV LAB 2 EX	9.22	6.17E-13	+/-	8.89E-14	8.00E-14	0.94	5.24E-13	1.85E-14	7.40E-14	7.84	0.28	1.11	
30	PELLET COMBINED EX	6.39	8.56E-14	+/-	3.31E-14	8.00E-14	4.72	7.28E-14	2.57E-15	1.03E-14	5.43	0.19	0.77	
31	SOLV X N EX	7.47	1.65E-13	+/-	4.60E-14	8.00E-14	3.33	1.40E-13	4.95E-15	1.98E-14	6.35	0.22	0.90	
32	SOLV X S EX	2.94	3.91E-13	+/-	7.08E-14	8.00E-14	3.33	3.32E-13	1.17E-14	4.69E-14	2.50	0.09	0.35	
33	SCRAP REC DRY	6.86	4.67E-13	+/-	7.73E-14	8.00E-14	0.94	3.97E-13	1.40E-14	5.60E-14	5.83	0.21	0.82	
34	MAP COMBINED	0.00	4.79E-13	+/-	7.83E-14	8.00E-14	2.78	4.07E-13	1.44E-14	5.75E-14	0.00	0.00	0.00	
35	IFBA EX	5.98	8.01E-14	+/-	3.20E-14	8.00E-14	4.72	6.81E-14	2.40E-15	9.61E-15	5.08	0.18	0.72	
36	MAINT WELD EX	2.83	1.89E-13	+/-	4.92E-14	8.00E-14	0.94	1.61E-13	5.67E-15	2.27E-14	2.41	0.08	0.34	
37	AC-3	4.78	8.00E-14	+/-	3.20E-14	8.00E-14	3.78	6.80E-14	2.40E-15	9.60E-15	4.06	0.14	0.57	
38	BULK BLEND EX	3.52	8.03E-14	+/-	3.21E-14	8.00E-14	2.78	6.83E-14	2.41E-15	9.64E-15	2.99	0.11	0.42	
39	AC-5	5.19	8.69E-14	+/-	3.34E-14	8.00E-14	3.78	7.39E-14	2.61E-15	1.04E-14	4.41	0.16	0.62	
40	AC-8	4.78	8.00E-14	+/-	3.20E-14	8.00E-14	3.78	6.80E-14	2.40E-15	9.60E-15	4.06	0.14	0.57	
41	AMMONIA FUME SC 1008-A	4.15	1.39E-13	+/-	4.22E-14	8.00E-14	1.89	1.18E-13	4.17E-15	1.67E-14	3.53	0.12	0.50	
42	AMMONIA FUME SC 1008-E	0.00	1.74E-13	+/-	4.72E-14	8.00E-14	1.89	1.48E-13	5.22E-15	2.09E-14	0.00	0.00	0.00	
43	AC-4	4.92	8.00E-14	+/-	3.20E-14	8.00E-14	3.89	6.80E-14	2.40E-15	9.60E-15	4.18	0.15	0.59	
44	HOT OIL RM EX	21.46	3.49E-13	+/-	6.69E-14	8.00E-14	3.89	2.97E-13	1.05E-14	4.19E-14	18.24	0.64	2.58	
45	ERBIA FURNACE EX	10.33	8.00E-14	+/-	3.20E-14	8.00E-14	8.17	6.80E-14	2.40E-15	9.60E-15	8.78	0.31	1.24	
46	ERBIA SCRUBBER EX	5.59	8.15E-14	+/-	3.23E-14	8.00E-14	4.33	6.93E-14	2.45E-15	9.78E-15	4.75	0.17	0.67	
47	ERBIA CHANGE ROOM	2.44	8.13E-14	+/-	3.23E-14	8.00E-14	1.90	6.91E-14	2.44E-15	9.76E-15	2.07	0.07	0.29	
	Total	267.2												Total
	TOTAL DERIVED ISOTOPIC RELEASE										227.1	8.0	32.1	267.2

TABLE 6

2002 Total Effective Dose Equivalent (TEDE) Summary By Department

Deep-Dose Equivalent (DDE)+ Internal (CEDE)

DEPARTMENT	MAX. (Rem)	NUMBER OF EMPLOYEES				Dept. Collective Dose	AVG. % DDE	AVG. % CEDE
		<0.5 Rem	0.5 – 1.0 Rem	1.0 – 1.5 Rem	1.5-2.0 Rem			
ADU CONVERSION	1.573	10	34	19	1	53.86	54	46
PELLET MFG.	1.524	21	48	33	1	82.99	57	43
ROD MFG.	0.662	21	9			10.243	67	33
URRS	1.082	29	24	1		23.917	50	50
MAINTENANCE	0.893	41	25			23.675	67	33
ELECTRICIANS	0.541	19	1			3.598	72	28
INSTRUMENTS	0.255	21				2.367	67	33
IFBA	0.637	51	2			11.163	94	6
ERBIA	1.189 *	17	4	1*		8.276	80	20
CRYSTAL OPS	0.836	2	5			3.820	70	30
FINAL ASSEMBLY	0.877	10	10			10.053	100	
ANALYTICAL SERVICES	0.523	29	1			5.119	99	1
QC ASSEMBLY	0.770	3	6			5.108	100	
QC RODS	0.653	21	4			9.030	100	
PACKING	0.666	3	1			2.547	100	
CONTRACTORS	0.588	134	1			18.351	88	12
OTHER	0.526	55	3			3.894	96	4
TOTAL		494	182	54	2	279.3	74	26

* This employee worked in both Pellet Manufacturing and the Erbia area during 2002.

TABLE 7

PLANT NOMINAL ENRICHMENT HISTORY

YEAR	NOMINAL U-235 ENRICHMENT YEARLY AVERAGE
2002	4.293
2001	4.246
2000	4.112
1999	4.271
1998	4.144
1997	4.228
1996	3.881
1995	3.913
1994	3.957
1993	3.784
1992	3.828
1991	3.726

Withhold All Ex 4 (2 pages)

NRC FORM 327 (10-2001) 10 CFR 70.51(e)(5), 74.31(c)(5). 74.33(c)(4), and 74.59(f)(1)	U. S. NUCLEAR REGULATORY COMMISSION TABLE 8	APPROVED BY OMB: 3150-0139 EXPIRES: 10/31/2004

SPECIAL NUCLEAR MATERIAL (SNM) AND SOURCE MATERIAL (SM) PHYSICAL INVENTORY SUMMARY REPORT

(Physical inventories of SM pertain only to uranium enrichment facilities.)
(See NUREG/BR-0096 for instruction and guidance for completing this form)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 4 HOURS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND THE PAPERWORK REDUCTION PROJECT (3150-0139), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

A. LICENSEE NAME	B. FACILITY LOCATION
Westinghouse Electric Company	Post Office Drawer R 5801 Bluff Road Columbia, SC

C. DOCKET NUMBER	D. SNM LICENSE NUMBER	E. PLANT DESIGNATION
70-1151	SNM-1107	Single Plant Operation

F. MATERIAL BALANCE PERIOD	BEGINNING DATE	ENDING DATE
	4-8-2001	4-27-2002

Ex. 4

SNM PHYSICAL INVENTORY
MATERIAL DISTRIBUTION

1998-2002

CATEGORY	1998	1999	2000	2001	2002

Withhold All

4 x 3