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**Idaho National Engineering and
Environmental Laboratory
Radiological Control
Performance Indicator Report**

Fourth Quarter - Calendar Year 1997

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**Idaho National Engineering and
Environmental Laboratory
Radiological Control Performance Indicator Report**

**Fourth Quarter
Calendar Year 1997**

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Published February 1998

**Idaho National Engineering and Environmental Laboratory
Radiological Control
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Idaho Falls, Idaho 83415**

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Radiological Control Performance Indicator Charter

The INEEL Radiological Control Performance Indicator Report is provided quarterly, in accordance with Article 133 of the INEEL Radiological Control Manual. Indicators are used to measure performance of the Radiological Control Program and as a motivation for improvement, not as goals in themselves. These indicators should be used by management as tools to focus priorities, attention, and adherence to As-Low-As-Reasonably-Achievable (ALARA) practices.

The ALARA Committees establish ALARA goals for the INEEL based on forecasts and goals provided by each facility organizational manager or supervisor.

Performance goals are realistic and measurable. Stringent goals are set at least annually to reflect expected workloads and improvement of radiological performance. Goals higher than previous goals may occasionally be set due to changes in work scope or mission.

The INEEL Radiological Control Performance Indicators consist of:

- Collective dose in person-rem.
- Average worker dose, maximum dose to a worker, and maximum neutron dose equivalent to a worker.
- Number of skin and clothing contaminations, including the number of contaminated wounds and facial contaminations.
- Number of radioactive material intakes resulting in a dose assessment of 10 mrem or more.
- Area of Contamination, High Contamination, and Airborne Radioactivity Areas, in square feet.
- Airborne radioactivity events and spills.

These indicators also provide tracking and trending for the previous three years.

Other Radiological Control indicators suggested in the Radiological Control Manual are tracked and trended in other reports.

- The Environmental Management Operations Support Department reports the volume and radioactivity content of radioactive waste in the INEEL Radioactive Waste Management Annual Report and on the Radioactive Waste Management Information System (RWMIS).
- Releases of liquid and airborne radioactivity discharges are reported by the Environmental Affairs Branch in the INEEL Environmental Monitoring Report and the INEEL National Emission Standard for Hazardous Pollutants (NESHAPs) - Radionuclide Annual Report.

Executive Summary

Radiological Control Performance Indicator Report

Fourth quarter 1997

This document provides a year-end report and an analysis of the Radiological Control Program through the fourth quarter of calendar year 1997 (CY-97) for Lockheed Martin Idaho Technologies Company (LMITCo). LMITCo is the prime contractor at the Idaho National Engineering and Environmental Laboratory (INEEL) This Performance Indicator Report is provided in accordance with Article 133 of the INEEL Radiological Control Manual.

The INEEL collective occupational radiation deep dose is 81.577 person-rem through the end of CY-97 compared to a goal of 102.5 person-rem. Aggressive application of ALARA protective measures at the ICPP Tank Farm and rescheduling of some of the ROVER work account for most of the difference in the goal and actual dose year to date. In the first six months work at the ICPP Tank Farm resulted in about 14 rem dose savings. This resulted in a mid-year goal adjustment. Use of shielding and other good work practices have reduced dose rates site wide. For example, dose rates at ROVER were reduced by about a factor of 10 saving nearly 18 person-rem. Some ROVER work has been re-scheduled or cancelled, and 15 of 42 fuel movement tasks have been re-scheduled, further reducing exposures. The RWMC reduced exposure by moving waste to new temporary storage facilities well ahead of schedule.

So far, year to date, there have been about 2005 direct or indirect bioassays performed in an effort to track internal dose. Of those, four LMITCo workers are considered to have low levels of internal contamination. There are ten with final determinations pending. An incident at the TRA Hot Cell operating under a privatized contract with MAC-I, resulted in two additional persons with internal dose. These are not counted in LMITCo totals since MAC-I is a private entity.

Skin and clothing contamination events are well below the three year average.

Excluding the effects of work scope changes, the data supports improvement in Radiological Control.

The charts on the following pages provide detail of the fourth quarter performance for LMITCO. The six designated facility areas contributing to LMITCO's performance are shown to provide additional detail of the company achievements.

INEEL Radiological Control Performance Indicator Overview
fourth Quarter 1997

		<u>Actual</u>	<u>Goal or Average</u>
Collective Year-to-Date Penetrating Radiation Dose		81.577 person-rem	102.465 person-rem (Goal)
Year-to-Date Average Worker Dose		0.068 rem	0.147 rem (3 Year Average)
Maximum Year-to-Date Penetrating Dose to a Worker		1.108 rem	1.500 rem (Goal)
Maximum Year-to-Date Neutron Dose to a Worker		0.111 rem	0.100 rem (3 Year Average)
Year-to-Date Skin Contaminations		13	28 (3 Year Average)

Legend

Needs Attention

OK

Good

Compared to three yr. Avg/goal.

		<u>Actual</u>	<u>Goal or Average</u>
Year-to-Date Clothing Contaminations		24	52 (3 Year Average)
Year-to-Date Airborne Events		0	2 (3 Year Average)
Year-to-Date Radioactive Material Intakes		4	15 (3 Year Average)
Contamination Area		190,010 ft ²	198,248 ft ² (3 Year Average)
High Contamination Area		297,901 ft ²	297,700 ft ² (3 Year Average)
Airborne Radioactivity Area		84,712 ft ²	83,367 ft ² (3 Year Average)
Year-To-Date Spills		5	32 (3 Year Average)

INEEL Facility Radiological Control Performance Indicator Overview fourth Quarter 1997

Maximum Year-to-Date penetrating dose to workers is redundant to facility reports and is not repeated in this report.

Maximum Year-to-Date neutron dose is no longer reported for facilities in this report.

Legend

Needs Attention

OK

Good

Compared to three yr. Avg. or goal

Year-to-Date
Clothing
Contaminations

Year-to-Date
Airborne Events

Year-to-Date
Radioactive Material
Intakes

Contamination Area
- ft²

High Contamination
Area - ft²

Airborne Radioactivity
Area - ft²

Year-to-Date
Spills

Radiological Control Performance Indicator Report Criteria

The INEEL Radiological Control Performance Indicator Report is comprised of a description of the indicator and the criteria used for measurement.

Collective Radiation Dose -

The INEEL collective total penetrating radiation exposure received and the associated quarterly and annual ALARA goals.

Average Worker Radiation Dose -

The average penetrating radiation dose based on collective dose and the total number of personnel receiving measured radiation exposure.

Maximum Radiation Dose to a Worker -

The highest penetrating radiation dose received by a worker at the INEEL.

Maximum Neutron Dose to a Worker -

This indicator reports the highest neutron radiation dose equivalent received by a worker.

Number of Skin Contaminations -

The total number of radioactive skin contaminations and the number of those contaminations resulting in an Occurrence Report, the number of facial contaminations, and the number of contaminated wounds.

Number of Clothing Contaminations -

The total number of radioactive clothing contaminations and the number of those contaminations resulting in an Occurrence Report.

Airborne Events -

The number of occupied facility areas not posted as Airborne Radioactivity Areas that exceed 10% Derived Air Concentrations (DAC).

Total Year-to-Date Intakes -

The number of positive bioassays that indicate an intake of radioactive material resulting in a dose assessment of 10 mrem or more from an INEEL occupational exposure. The total number of positive bioassays that resulted in an Occurrence Report are also tracked and trended.

Contamination Area -

The total area in square feet that falls within the description of a Contamination Area as defined in Table 2-3 of the INEEL Radiological Control Manual.

High Contamination Area -

The total area in square feet that falls within the description of a High Contamination Area as defined in Table 2-3 of the INEEL Radiological Control Manual.

Airborne Radioactivity Area -

The total area in square feet that falls within the description of an Airborne Radioactivity Area as defined in Table 2-3 of the INEEL Radiological Control Manual.

Radioactive Spills -

The total number of radioactive spills at the INEEL. A spill is considered an inadvertent loss or release of radioactive contamination outside a Radiologically Controlled Area.

INEEL CY-97 Year to Date Collective Penetrating Radiation Dose

DOE and LMITCO policy is to maintain occupational radiation exposure as low as reasonably achievable (ALARA). The above chart provides a comparison of the INEEL goal and the total year to date collective penetrating radiation dose.

The CY-97 ALARA goal was revised to 102.465 person-rem in the third quarter. Reductions in work scope at the RWMC and ICPP were responsible for the revision. Evaluations and adjustment to the yearly and quarterly goals may be periodically performed to provide realistic values based on changes in work scope.

The collective radiation exposure through the end of the fourth quarter was 81.577 person-rem. The collective exposure is well below the goal primarily due to aggressive application of ALARA protective measures at the ICPP such as decontamination on the Tank Farm where results were more effective than anticipated. Valve box work savings were on the order of 14 rem due in part to use of mock ups, practice entry and egress in cold areas and a better coordinated radiological work ethic. Some ROVER work has been deferred or cancelled, and completion of work well ahead of schedule at the RWMC accounts for additional exposure savings.

The INEEL Performance Indicators are designed to reflect a challenging, yet positive control of occupational radiological work.

This chart and the charts on the following pages provide an indication of how well LMITCO is performing as a company. Following the company charts are charts showing the six specific facility areas and their performance in selected indicators.

INEEL CY-97 Year to Date Average Worker Dose

The Average Occupational radiation dose for INEEL workers through the end of the fourth quarter was 0.068 rem based on 1202 workers who received dose greater than 10 mrem.

INEEL CY-97 Maximum Year to Date Penetrating Dose to a Worker

The Maximum penetrating radiation dose to a worker through the end of the fourth quarter was 1.108 rem. The dose resulted from activities associated with the ROVER project at the ICPP.

INEEL CY-97 Maximum Year to Date Neutron Dose to a Worker

Neutron dose is included in the total penetrating radiation dose. It is shown here as a separate indicator to identify the maximum neutron dose to a worker. Through the end of the fourth quarter the maximum neutron dose is 0.111 rem. An IRC worker using neutron sources for research work received this dose.

INEEL CY-97 Year to Date Skin Contaminations

There were ten skin contaminations at the INEEL during the fourth quarter. Two were ORs. One of the events resulted in a facial contamination. There were no contaminated wounds.

INEEL CY-97 Year to Date Clothing Contaminations

There were ten clothing contaminations at the INEEL during the fourth quarter. Six are included in three ORs. Details are contained in the facility report sections.

INEEL CY-97 Year to Date Airborne Radioactivity Events

There have been no airborne radioactivity events attributable to LMITCo. MAC-I (the TRA Hot Cell) had one event not depicted by this chart since they are a privatized organization.

INEEL CY-97 Year to Date Radioactive Material Intakes

Radioactive material intakes depict the number of positive bioassays that result in a dose assessment of 10 mrem or greater. One was reported during the fourth quarter from TAN activities. One ICPP third quarter bioassay sample assessment was finished in the fourth quarter that resulted in an assigned dose of 24 mrem CEDE.

INEEL CY-97 Contamination Area

The total area designated as Contamination Area at the end of the fourth quarter was 190,010 square feet. 150,800 square feet is designated as permanent and in use.

Total High Contamination Area at the end of the fourth quarter was 297,901 square feet. 296,641 square feet is designated as permanent or in use, such as the sizing facility at WERF. The increase is from an area within the TRA.

The total Airborne Radioactivity Area at the INEEL at the end of the fourth quarter was 84,712 square feet. 83,662 square feet is designated as permanent and in use.

INEEL CY-97 Year to Date Spills

There were no spills considered to be loss of control of radioactive material during the fourth quarter. The year to date comparison with ORs from previous years is much improved.

The three-year average noted on this chart represents only those spills that were reportable as ORs in prior report years.

Central Facilities Area

The CFA Facility report also includes
other outlying area information

Summary

1. The major activity contributing to radiological exposure so far this year has been Decontamination and Decommissioning. Environmental Restoration, sampling, and facility maintenance have added minimal additional dose.
2. Work scope at the CFA is basically similar to that of last year. However, D&D at ARA I has proven to be more difficult than originally planned resulting in increased work scope in the hot cell area. The ALARA committee and CFA RadCon evaluated the increased scope. Based on the evaluation, approval was given to increase the CFA ALARA goal by 1.8 person-rem. The revised goal is 4.8 person-rem
3. The ARA-1 Hot Cell 2 area was decontaminated to levels as low as practicable and remaining contamination was fixed with paint. This effort reduced High Contamination Areas and Airborne Radioactivity Areas by 372 square feet during the second quarter.

CFA CY-97 Year to Date Penetrating Radiation Dose

The collective penetrating occupational radiation exposure at CFA through the end of the fourth quarter is 4.135 person-rem. The major contributor has been Decontamination and Decommissioning (D&D) at ARA. The effort has resulted in significantly more scope than originally planned. Therefore the ALARA goal was reviewed and increased by 1.8 person-rem.

CFA CY-97 Year to Date Average Worker Dose

The CFA average worker dose through the end of the fourth quarter was 0.024 rem evaluating dose from 169 workers with dose greater than 10 mrem.

CFA CY-97 Year to Date Skin Contaminations

There were no skin contaminations at CFA areas through the end of the fourth quarter

CFA CY-97 Year To Date Clothing Contaminations

There were no clothing contaminations at CFA areas through the end of the fourth quarter.

CFA CY-97 Year to Date Airborne Radioactivity Events

There has been no airborne radioactivity detected that was greater than 10 % DAC at CFA areas through the end of the fourth quarter.

CFA CY-97 Year to Date Radioactive Material Intakes

There were no positive bioassays indicating a radioactive material intake that resulted in a dose assessment of 10 mrem or greater at CFA through the end of the fourth quarter.

CFA CY-97 Contamination Area

The total Contamination Area at CFA at the end of the fourth quarter was 14,105 square feet. None of this area was designated as permanent and in use.

CFA CY-97 High Contamination Area

The 372 square foot High Contamination Area at CFA (ARA 1 Hot Cell 2) was decontaminated during the second quarter. Any remaining contamination was fixed with paint.

The 372 square foot Airborne Radioactivity Area at ARA I Hot Cell 2 was eliminated during the second quarter due to decontamination of the cell.

CFA had no radioactive spills or loss of control of radioactive material during the fourth quarter.

Idaho Chemical Processing Plant

SUMMARY

1. Major contributors to fourth quarter occupational radiation exposure were activities related to the CPP-640 ROVER deactivation, ROVER fuel movement to CPP 603, and the NWCF operations.
2. Operations management and the RCT's go through significant training prior to the start of radiological jobs. Operations and S&H encourage this training. The training allows for identification of problems without unnecessary exposure to the hazards. For example, each fuel movement plan is verified and walked down prior to performance even though the exposure is not high. Rescheduling 15 of 42 tasks associated with fuel movement account for some of the ICPP dose reductions. Exposure at the Tank Farm was reduced by about 14 person-rem earlier in the year accounting for a mid-year goal adjustment. ROVER has reduced overall dose from a forecast of 52.25 person-rem to 34.6 person-rem through use of time distance and shielding. More reductions in work scope and deferred work at ROVER have further reduced dose at the ICPP accounting for the difference in goal and year to date actual dose.
3. Details of three clothing contaminations that occurred during the fourth quarter are contained in OR ID-LITC-WASTEMNGT-1997-0027 and ID-LITC-WASTEMNGT-1997-0030.
4. There were two reportable skin contaminations during the fourth quarter. ORs ID-LITC-WASTEMNGT-1997-0027 and ID-LITC-PHASEOUT-1997-0011 contain the detail of these contaminations.
5. There were no reportable spills during the fourth quarter.
6. The one internal contamination comes from a bioassay collected from a worker during the third quarter. Final analysis of the sample was completed in the fourth quarter.

ICPP CY-97 Year to Date Collective Penetrating Radiation Dose

The ICPP collective penetrating occupational radiation exposure through the end of the fourth quarter was 48.756 person-rem. Use of shielding and good work practices, as well as work scope changes, contributed to an adjustment of the ICPP goal during the second quarter to 63.865 person-rem. Deferred work this quarter accounts for the lower than projected dose. Refer to the summary page for details.

ICPP CY-97 Year to Date Average Worker Dose

The average worker dose for the ICPP through the end of the fourth quarter was 0.109 rem resulting from 445 workers receiving dose greater than 10 mrem.

ICPP CY-97 Year To Date Skin Contaminations

The ICPP had two-reportable skin contaminations during the fourth quarter. There were no facial contaminations or contaminated wounds.

ICPP CY-97 Year to Date Clothing Contaminations

Three reportable clothing contaminations occurred during the fourth quarter at the ICPP. Details are contained on OR ID-LITC-WASTEMNGT-1997-0027 and 1997-0030

ICPP CY-97 Year to Date Airborne Events

No airborne activity greater than 10 % DAC in unposted areas was detected in ICPP areas during the fourth quarter.

ICPP CY-97 Year to Date Radioactive Material Intakes

There was one bioassay from a third quarter sample with the final analysis completed during the fourth quarter that resulted in a dose assessment of about 24 mrem CEDE. There have been no assessments greater than 10 mrem for the fourth quarter.

ICPP CY-97 Year to Date Contamination Area

Total Contamination Area at the ICPP at the end of the fourth quarter remains at 64,819 square feet. The reduction in the second quarter is due to decontamination of about 600 square feet of the WCF decontamination makeup room. 64,684 square feet is designated as permanent and in-use.

ICPP CY-97 Year to Date High Contamination Area

The total High Contamination Area at the ICPP remains at 251,961 square feet at the end of the fourth quarter. 251,311 square feet are designated as permanent and in-use.

ICPP CY-97 Year to Date Airborne Radioactivity Area

Total Airborne Radioactivity Area at the ICPP at the end of the fourth quarter remains at 82,712 square feet. 82,062 square feet is designated as permanent and in-use.

ICPP CY-97 Year to Date Spills

There were no spills or loss of control of radioactive material during the fourth quarter.

Power Burst Facility

Waste Reduction Operations Complex

Waste Experimental Reduction Facility

(PBF/WROC)

Summary

1. Major contributors to the fourth quarter occupational radiation exposure in the PBF/WROC reporting area were working with mixed waste, sizing and compaction of low level waste, incineration, change out of WERF HEPA filters and bags in the Bag House, routines, and instrument calibrations.
2. The only skin contamination occurred at the WERF during the first quarter and was classified as an OR. Detail is contained in OR ID-LITC-WERF-1997-0001

PBF/WROC collective penetrating radiation exposure through the end of the fourth quarter was 0.941 person rem.

The PBF/WROC average worker dose through the end of the fourth quarter was 0.015 rem. Average dose is based on a comparison of workers who receive measurable dose.

PBF/WROC CY-97 Year to Date Skin Contaminations

There were no skin contaminations at the PBF/WROC area during the fourth quarter.

PPBF/WROC CY-97 Year to Date Clothing Contaminations

There were no clothing contaminations at the PBF/WROC area during the fourth quarter

**PBF/WROC CY-97 Year to Date
Airborne Radioactivity Events**

There have been no airborne activity events greater than 10 % DAC detected at the PBF/WROC area through the fourth quarter.

**PBF/WROC CY-97 Year to Date
Radioactive Material Intakes**

There were no positive bioassays indicating radioactive material intakes that resulted in a dose assessment of 10 mrem or greater in the PBF/WROC area.

The fourth quarter Contamination Area for the PBF/WROC area remains at 7,378 square feet. All of this is considered permanent and in-use.

The total High Contamination Area through the end of the fourth quarter at the PBF/WROC area remains at 2,288 square feet. All of this is considered permanent and in use.

PBF/WROC CY-97 Airborne Radioactivity Area

The total Airborne Radioactivity Area at PBF/WROC at the end of the fourth quarter remained at 2000 square feet. All of this area is designated as permanent and in-use.

PBF/WROC CY-97 Year to Date Spills

There have been no spills at PBF/WROC through the end of the fourth quarter.

Radioactive Waste Management Complex

Summary

1. Major contributors to the fourth quarter RWMC occupational radiation exposure have been from waste disposal, drum handling, and assay and inspections.
2. The HCA area at the RWMC is under a protective tarp covering the waste stack at the TSA-RE. This area will remain a permanent HCA until retrieval operations begin in that area.
3. Two 4x4x8 waste boxes in storage modules 635 and 630 remain contaminated at the end of the fourth quarter. These boxes represent the increase in low level contamination shown in the chart on page 39.

RWMC CY-97 Collective Year to Date Penetrating Radiation Dose

The RWMC collective penetrating radiation exposure through the end of the fourth quarter was 3.777 person-rem. Due to work scope reductions, the goal was revised to 3.80 rem during the third quarter to match scheduled work. Projected work is on track with the revised goal.

RWMC CY-97 Year to Date Average Worker Dose

The average worker dose at the RWMC through the end of the fourth quarter was 0.039 rem

RWMC year to date skin contaminations remain at zero through the end of the fourth quarter.

There were no clothing contaminations at the RWMC through the end of the fourth quarter.

RWMC CY-97 Year To Date Airborne Radioactivity Events

No airborne activity greater than 10 % DAC was detected at RWMC in areas not posted as Airborne Radioactivity Areas through the fourth quarter.

RWMC CY-97 Year to Date Radioactive Material Intakes

In the last quarter of 1996, final analysis of one positive bioassay indicated an uptake of 43 mrem CEDE as shown on the chart. There have been no positive bioassays year to date indicating an intake of radioactive material that resulted in a dose assessment of 10 mrem or greater.

RWMC CY-97 Contamination Area

The total Contamination Area at the RWMC through the end of the fourth quarter increased to 800 square feet due to two contaminated 4x4x8 boxes in storage containers at the RWMC. These are being decontaminated.

RWMC CY-97 High Contamination Area

The total High Contamination Area at the RWMC through the end of the fourth quarter was 29,525 square feet. All of this area is designated as permanent and in-use.

The total Airborne Radioactivity Area at the RWMC at the end of the fourth quarter remains at zero square feet.

There were no spills or loss of control of radioactive material during the fourth quarter at the RWMC.

Test Reactor Area

Summary

1. Outages at the Advance Test Reactor within the Test Reactor Area are responsible for the major portions of dose and the contamination events during the fourth quarter. Total Penetrating dose for the report is 19.739. MAC-I dose is 5.112 person-rem year to date.
2. This report has been modified to show TRA dose without the MAC-I hot cell dose. The hot cell is under a separate contract and tracks their own dose. The MAC-I dose was not considered in the original ALARA goal.
3. There were two non-reportable skin contaminations at ATR during the fourth quarter.
4. There were six clothing contaminations at ATR. Three are on one OR, OR# ID-LITC-ATR-1997-0020.

TRA CY-97 Collective Year to Date Penetrating Radiation Dose

TRA collective penetrating radiation dose through the end of the fourth quarter was 19.739 person-rem. The total DOES NOT include dose from MAC Isotopes (TRA Hot Cell), since they are a privatized company. TRA tracks MAC-I dose separately, which is 5.112 person-rem.

TRA CY-97 Average Year To Date Worker Dose

The average worker dose at the TRA through the end of the fourth quarter was 0.067 rem based on 293 workers with dose greater than 10 mrem.

TRA CY-97 Year to Date Skin Contaminations

There were two non-reportable skin contaminations at the TRA during the fourth quarter. There were no contaminated wounds or facial contaminations.

TRA-CY-97 Year to Date Clothing Contaminations

There were six clothing contaminations at the TRA during the fourth quarter. Three met recordable criteria and are listed on OR ID-LITC-ATR-1997-0020.

TRA CY-97 Year to Date Airborne Radioactivity Events

No airborne activity greater than 10 % DAC was detected at the TRA in areas not already posted as Airborne Radioactivity Areas during the fourth quarter.

TRA CY-97 Year to Date Radioactive Material Intakes

There were no positive bioassays indicating an intake of radioactive material that resulted in a dose assessment of 10 mrem or greater at the TRA during the fourth quarter. See details covering the MAC-I event in the TRA summary.

Total Contamination Area for the TRA 49,682 square feet. 25,619 square feet is designated as permanent and in-use.

Total High Contamination Area for the TRA at the end of the fourth quarter was 2,601 square feet. 1,991 square feet of this area is designated as permanent and in-use. The chart shows rounded values.

Total Airborne Radioactivity Area at the TRA at the end of the fourth quarter remains at zero square feet.

There were no spills or loss of control of radioactive material at the TRA during the fourth quarter.

Test Area North & Specific Manufacturing Capability

Summary

1. TAN hot shop work, handling repackaging, and shipment of hot waste, cask disassembly, ER remediation activities, and pool cleaning and vacuuming account for dose at TAN Ops. For SMC, routine armor manufacturing and routine activities account for the dose contribution.
2. The dose evaluations for CEDE for CY-96 were increased from zero to nine during the first quarter. These are included in the 1996 total and show on the three-year average chart.
3. There were two skin contaminations at TAN during the fourth quarter. One was a facial contamination at TAN-Ops and one was on the arm of a worker at SMC. The SMC event also caused contamination of company coveralls. There was no personal clothing contaminated in either case. The events were not classified as recordable.
4. A four hundred square foot Contamination Area at the SMC was decontaminated reducing the total Contamination Area by that amount.
5. The facial contamination at TAN resulted in an intake resulting in 13 mrem CEDE.

TAN/SMC CY-97 Collective Year to Date Penetrating Radiation Dose

TAN and SMC collective penetrating radiation dose through the end of the fourth quarter was 5.576 person-rem. Work scope is consistent with that of past years.

TAN/SMC CY-97 Year to Date Average Worker Dose

The average worker dose at the TAN/SMC through the end of the fourth quarter was 0.041 rem based on 137 workers who received dose greater than 10 mrem.

There were two skin contaminations at TAN/SMC during the fourth quarter. One was a facial contamination. There were no contaminated wounds during the quarter.

There was one non-reportable contamination on company clothing that occurred at SMC during the fourth quarter. No personal clothing has been contaminated this year.

TAN/SMC CY-97 Year to Date Airborne Radioactivity Events

No airborne activity event greater than 10 % DAC was detected at TAN/SMC in areas not posted as Airborne Radioactivity Areas during the fourth quarter.

TAN/SMC CY-97 Year to Date Radioactive Material Intakes

One employee received an internal uptake resulting in about 13 mrem CEDE. The uptake was from a facial contamination at TAN.

The total Contamination Area at TAN/SMC at the end of the fourth quarter was 53,226 square feet. 52,926 square feet was designated as permanent and in-use. A 400 square foot area was decontaminated at the SMC during the second quarter.

The total High Contamination Area at TAN/SMC at the end of the fourth quarter remains constant at 11,526 square feet. All of this area is designated as permanent and in-use.

TAN/SMC CY-97 Airborne Radioactivity Area

Total Airborne Radioactivity Area at TAN/SMC remains at zero through the end of the fourth quarter.

TAN/SMC CY-97 Year to Date Spills

There were no spills or loss of control of radioactive material at TAN/SMC during the fourth quarter.

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