Rio Algom Mining LLC

February 28, 2011

Certified Mail
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ADDRESSEE ONLY
Mr. Tom McLaughlin, Project Manager
U.S. Nuclear Regulatory Commission
Mail Stop T-8F5
Washington, DC 20555

Re: **License SUA-1473, Docket No. 40-8905**
2010 ALARA Review

Dear Mr. McLaughlin,

In accordance with license condition #10 of the above referenced source material license and the *Health Physics and Environmental Programs Manual*, please find attached the 2010 ALARA Review for the Ambrosia Lake facility. This summary reviews the actions taken to maintain occupational exposures as low as reasonably achievable.

If you have any questions or need additional information, please call me at (505) 287-8851 ext 15.

Sincerely,

Chuck Wentz
Environmental Department Supervisor/RSO
Rio Algom Mining LLC
chuck.wentz@bhpbilliton.com

Attachment: As Stated

xc: B. Ray
Document Control (NRC)
file

NMSS01

ALARA SUMMARY
January - December 2010

INTRODUCTION

The annual ALARA summary for Rio Algom Mining LLC's Ambrosia Lake facility for calendar year 2010 is submitted for NRC's review in accordance with Rio Algom Mining LLC's Source Material License Condition #10. License condition #10 contains Rio Algom Mining LLC's ALARA Policy as well as the NRC approved health physics and environmental effluent monitoring programs required at the facility, as specified within the *Health Physics and Environmental Programs Manual.*

Copies of the ALARA summary were submitted to the facility ALARA audit committee on February 8, 2010. This committee includes Billy Ray (Manger), Ron Powell (Reclamation Engineer), John Meador (Maintenance Forman), and Chuck Wentz (Radiation Safety Officer).

The primary activities at the site during calendar year 2010 were stockpiling crushed rock for future erosion control, obtaining a License Amendment for Alternate Disposal Cell, and continuation of the groundwater monitoring program.

HEALTH PHYSICS SAMPLING ACTIVITY

A. Bioassay

The collection of bioassay samples continued during the year in accordance with the policy statement prescribed in the Bioassay Program section of the facility *Health Physics and Environmental Programs Manual.*

As a result of mill demolition, the potential for uranium intake has been reduced. To ensure that the ALARA principle is maintained, employees continued to submit bioassay samples during 2010.

During the year there were a total of forty (40) samples collected from Rio Algom employees. Analytical results indicated that all sample concentrations were below the laboratory's lower detectable limit of five (5) micrograms per liter (µg/L).

All quality assurance spike samples were within the Regulatory Guide 8.22 suggested variance for acceptable spike result.

The reasons for the continued negligible bioassay concentrations are:

1. The site has completed mill demolition of the former yellowcake processing areas. The ion exchange plant (IX) was not utilized during 2010.
2. There was no work involving the movement of pond soils or sludge material that might contain uranium.
3. Airborne concentrations within the area are continually well below the DAC for soluble natural uranium.

B. **Personnel Alpha Contamination Checks**

Health physics personnel performed fifteen (15) random alpha contamination surveys of employees leaving the restricted area. Eight hundred twelve (812) alpha contamination surveys were conducted by employees, contractors, and visitors leaving the restricted area. The contamination checks were performed at the end of work day prior to leaving the facility. All surveys were well below the 1000 disintegrations per minute per 100 square centimeters (dpm/100 cm^2) guideline contained within NRC Regulatory Guide 8.30.

C. **Surface Contamination Checks**

There were four hundred fifty seven (457) surface contamination checks performed during the review period. The surface contamination checks were performed at various places throughout the restricted area including lunchrooms, change rooms, guard office, and the IX building. All sample results were below the respective action levels.

D. **Radon Daughter Sampling**

Personnel were not monitored for radon during 2010. Area radon monitoring was conducted in buildings such as the office, change room, shop area, etc. The highest values for the area quarterly samples averaged 0.01 working levels (wl). Since the IX building was not in operation, only quarterly radon sampling was conducted. The highest quarterly readings in the IX building averaged 0.02 wl. The annual radon daughter exposure for all employees was 0.01 working level months (wlm). The annual allowable occupational exposure limit is 4 wlm. It should be noted that the radon concentrations measured are inclusive of background concentrations. If the radon value in the office is assumed to be the background level; the final results are not significantly different.

The 2010 average area radon concentration of 0.01 wl represents 3% of the DAC limit of 0.33 wl. Employee enter the IX building on a daily basis to check the building and perform swipe test; the occupancy times within the ion exchange plant are typically less than 4 hours per week.

E. **Yellowcake Samples**

As an integral component of the health physics monitoring program outlined within License Condition #10, air sampling is performed to assess potential employee exposure to airborne yellowcake. With demolition of key process areas completed in February 2004, potential exposure was greatly reduced. As a result, sampling frequency was also reduced to quarterly.

There were twenty (20) work-area uranium dust samples taken during 2010 for airborne yellowcake activity. The samples, which were obtained at random times, indicated an annual average concentration for 2010 of 5% of the DAC for soluble natural uranium.

F. **Uranium Ore Dust**

During the review period, no routine uranium ore dust samples were taken as the crushing circuit was demolished in late 2003.

G. **Gamma Surveys**

There were two semiannual gamma surveys conducted during the year as suggested by Regulatory Guide 8.30 and all areas surveyed were properly posted in accordance with 10 CFR 20.1902 and License Condition 28.

RESPIRATORY PROTECTION PROGRAM

The facility *Respiratory Protection Program* was reviewed to evaluate the effectiveness of the program in limiting exposures to individuals. This review included evaluating air sampling data, use of engineering controls when needed, bioassay results.

All employees received refresher training on the respiratory protection program. Spirometry testing by a physician indicated that all employees requiring physicals have been deemed physically fit to use respiratory protection equipment. During 2010, respirators were not required on any task performed by Rio Algom employees.

Air sampling data continues to indicate that airborne concentrations are well below the DAC for soluble natural uranium. This is attributable to demolishing the mill and following established procedures.

EXPOSURE SUMMARY

All licensees are required to ensure compliance with the occupational dose limits specified within 10 CFR 20.1201(a). This regulation establishes an annual limit

based on internal exposures as well as external exposures. During 2010 only external gamma exposure was used for dose calculation. Bioassays were below detection limits and there were no work activities requiring the use of personal lapel monitors.

A. **Total Effective Dose Equivalent**

The total effective dose equivalent (TEDE) exposure results for all employees are presented in Table 1 below. The TEDE is the sum of the deep dose equivalent (external exposures) and the committed effective dose equivalent (internal exposures, CEDE). There were no CEDE values to report for the year 2010.

The highest TEDE exposure for a Rio Algom employee for 2010 was 0.004 Rem. This exposure represents less than 0.1 % of the annual allowable occupational dose limit specified within 10 CFR 20.1201(a). Review of the results indicates that the TEDE is comprised of the Deep Dose Equivalent, DDE, obtained from personal dosimetry (OSL badges).

Appendix A, Chart 1 contains the maximum annual TEDE exposures for employees for the time period covering 1994 to 2010. The chart demonstrates that occupational exposures are being maintained ALARA.

TABLE 1
2010 TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE)

Exposure (REM)	0 - .005	.006 -.010	.011 -.050	> 0.050
No. of Employees	11	0	0	0

10 CFR 20.1502 requires exposure monitoring of any individual likely to receive a dose in excess of 10% of the occupational dose limits prescribed in 10 CFR 20.1201. Based on the annual exposures determined for facility personnel, individual exposure monitoring of visitors will not be necessary.

B. **Deep Dose Equivalent (Gamma Exposure)**

Gamma exposures are determined by the results of personnel dosimetry worn by all employees and analyzed in accordance with National Voluntary Laboratory Accreditation Program (NVLAP) procedures and specifications by an accredited outside contract laboratory. Table 2 summarizes the 2010 employee gamma dose exposures. The highest annual gamma exposure incurred by an employee was 0.004 Rem, which represents less than 0.1% of the annual allowable occupational dose limit, if there is no CEDE.

Appendix A, Chart 2 contains the maximum annual deep dose equivalent exposures for the time period covering 1994 to 2010. The chart demonstrates that occupational external radiation exposures are being maintained ALARA.

TABLE 2
2010 DEEP DOSE EXPOSURES

Exposure (REM)	0 -.005	.006 -.010	.011 -.050	> 0.050
No. of Employees	11	0	0	0

C. **Radon Daughter Exposures**

Air samples are obtained in accordance with the facility sampling program outlined within the NRC approved *Health Physics and Environmental Programs Manual*. Occupancy times are then factored into these values in order to obtain an employee's internal exposure to radon daughters for that time period.

Based on occupancy factors, all employee radon daughter exposures during 2010 were 0.00 wlm. The annual allowable occupational exposure limit is 4 wlm. These exposures are the result of reduced production within the ion exchange plant and demolition of the mill.

Appendix A, Chart 3 contains a chart depicting the maximum annual radon daughter exposures for the time period covering 1994 to 2010. The chart demonstrates that occupational exposures to radon are being maintained ALARA.

D. **Yellowcake and Uranium Ore Dust**

Internal exposures to soluble uranium are determined by analyzing the yellowcake samples for gross alpha activity to obtain an average air concentration for the area. Air samples are obtained in accordance with the facility sampling program as well as from radiation work permits which may require personnel sampling. Occupancy times are then factored into these values in order to obtain an employee's internal exposure for that time period or task.

Table 3 summarizes the 2010 employee internal exposures to soluble uranium. Due to no activity occurring in 2010 associated with

uranium/yellowcake activity or radiation work permits, no employee exposures were incurred.

Appendix A, Chart 4 contains a chart depicting the maximum annual exposures to uranium for the time period covering 1994 to 2010. The chart demonstrates that occupational exposures to uranium are being maintained ALARA.

TABLE 3
2010 SOLUBLE URANIUM (YELLOWCAKE) EXPOSURES

Exposure (DAC-Hr)	< 0.1	0.1-1.0	1.01-2.0	> 2.0
No. of Employees	11	0	0	0

E. **Dose to Members of the Public**

In addition to the occupational exposures discussed above, Rio Algom Mining LLC prepares an annual evaluation for radiation doses to members of the public. These are prepared as per requirements of 10 CFR 20.1301-1302 and 40 CFR 190.10.

Rio Algom Mining LLC submits semi-annual Effluent Monitoring Reports to the NRC. These reports are generally submitted in February and August of each year; exact dates of the submittals are dependent on the dates results are received from the laboratories. Rio Algom Mining LLC would like to incorporate these reports by reference.

Dose to members of the public are prepared for the nearest resident, a typical delivery driver, and the occasional visitor that might spend some time near the boundary of the site property, such as a hunter or rancher. The 2010 results for dose to member of the public are submitted below.

Table 4

2010 Dose to Members of the Public

Individual	Direct Gamma (mrem)	Radon (mrem)	Air Particulate (mrem)	Total TEDE (mrem)
Nearest Resident	11	<1	<1	11
Delivery Person	1	1	<1	2
Occasional Visitor	<1	2	<1	2

The table shows that the potential dose calculations for members the public for 2010 was well below the 10 CFR 20.1301 dose limit of 100 mrem/yr.

MISCELLANEOUS ALARA ACTIVITIES

A. Health, Safety, Environment and Community Management System Implementation

Implementation of the corporate wide Health, Safety, Environment and Community Management system (HSEC) continued throughout 2010. The management system provides a framework for personal, site, and corporate HSEC responsibilities and leadership and ensures the continued improvement of HSEC programs and performance.

Integration of the ALARA principle into the site HSEC management system has provided an additional mechanism to monitor progress toward continued improvement in HSEC activities.

Key improvements involved increased employee awareness, incorporating the concept of performing job safety analyses, and expanding the task observation program so that potential exposure concerns are identified and addressed prior to initiation of work.

B. Daily and Weekly Inspections

No RWPs were issued during 2010. Job safety analyses were typically performed prior to initiation of work to identify potential hazards expected to be encountered with appropriate mitigation controls implemented.

Weekly inspections of pertinent mill areas by the radiation safety officer are performed to observe and ensure that general radiological control practices are being used. The weekly inspections did not identify any unusual conditions or situations that required corrective action.

C. Safety and Training Activities

The annual eight (8) hour refresher course was completed for all employees and included the topics as outlined in Rio Algom Mining LLC's "Radiation Safety Training Program". All employees also completed a first aid training session during 2010.

All employees receiving physicals were administered a pulmonary function evaluation during 2010. Results from these spirometry tests indicated that all current employees are medically qualified to wear respiratory protection equipment.

Safety meetings, conducted throughout the year, reviewed various topics pertaining to radiation safety including the HSEC management system, contamination control, personnel dosimetry, personnel survey procedures, bioassay procedures, and the importance of practicing good personal hygiene and housekeeping while working in the mill area to ensure exposures remain ALARA.

D. **Performance of Emission Control Equipment**

The facility emission control equipment was demolished in late 2003.

E. **Operational Procedures & Emergency Response Actions**

During the year, all Standard Operating Procedures (SOP) and Emergency Response Procedures were reviewed and are being updated, if necessary, to better conform to the corporate HSEC management guidelines. In addition, all procedures utilized within the radiation safety program were reviewed and are being updated, as necessary.

APPENDIX A

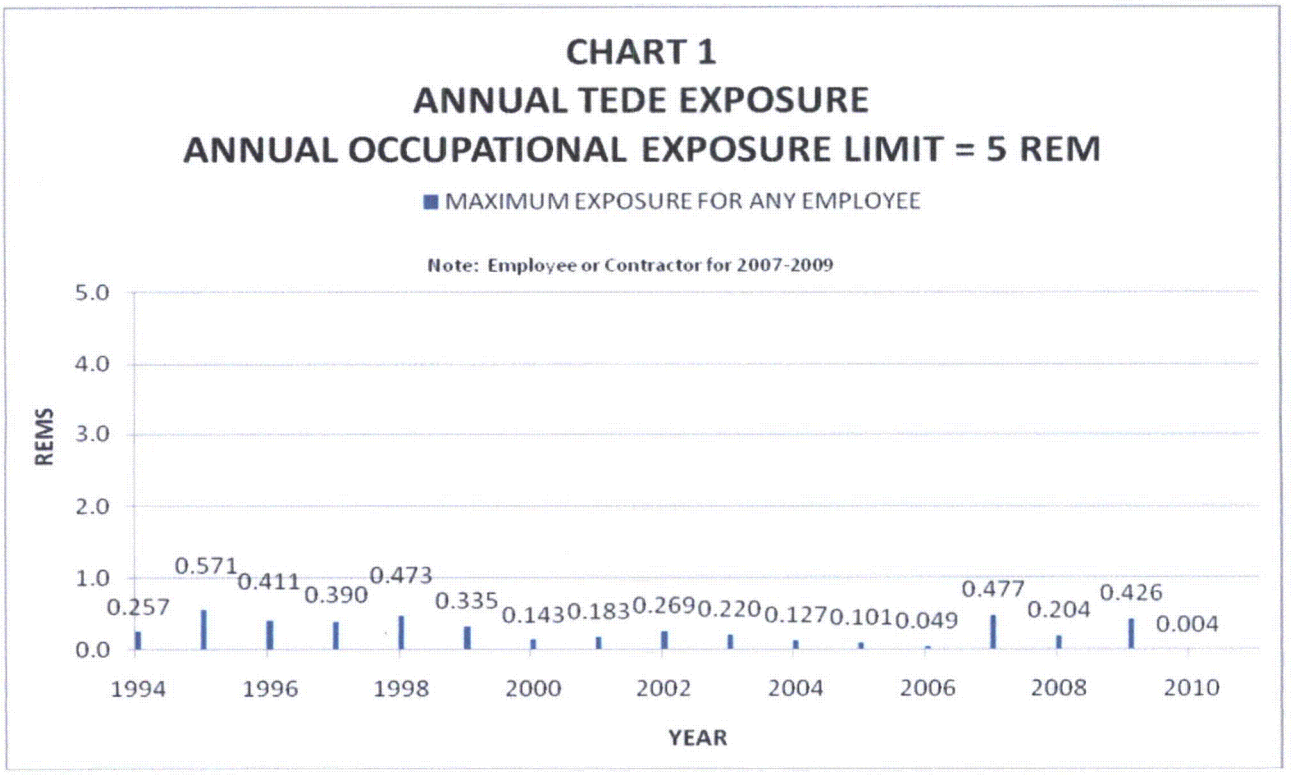
CHART 1
ANNUAL TEDE EXPOSURE
ANNUAL OCCUPATIONAL EXPOSURE LIMIT = 5 REM
MAXIMUM EXPOSURE FOR ANY EMPLOYEE
Note: Employee or Contractor for 2007-2009
REMS
5.0
4.0
3.0
2.0
1.0
0.0
0.257
0.571
0.411
0.390
0.473
0.335
0.143
0.183
0.269
0.220
0.127
0.101
0.049
0.477
0.204
0.426
0.004
1994
1996
1998
2000
2002
2004
2006
2008
2010
YEAR

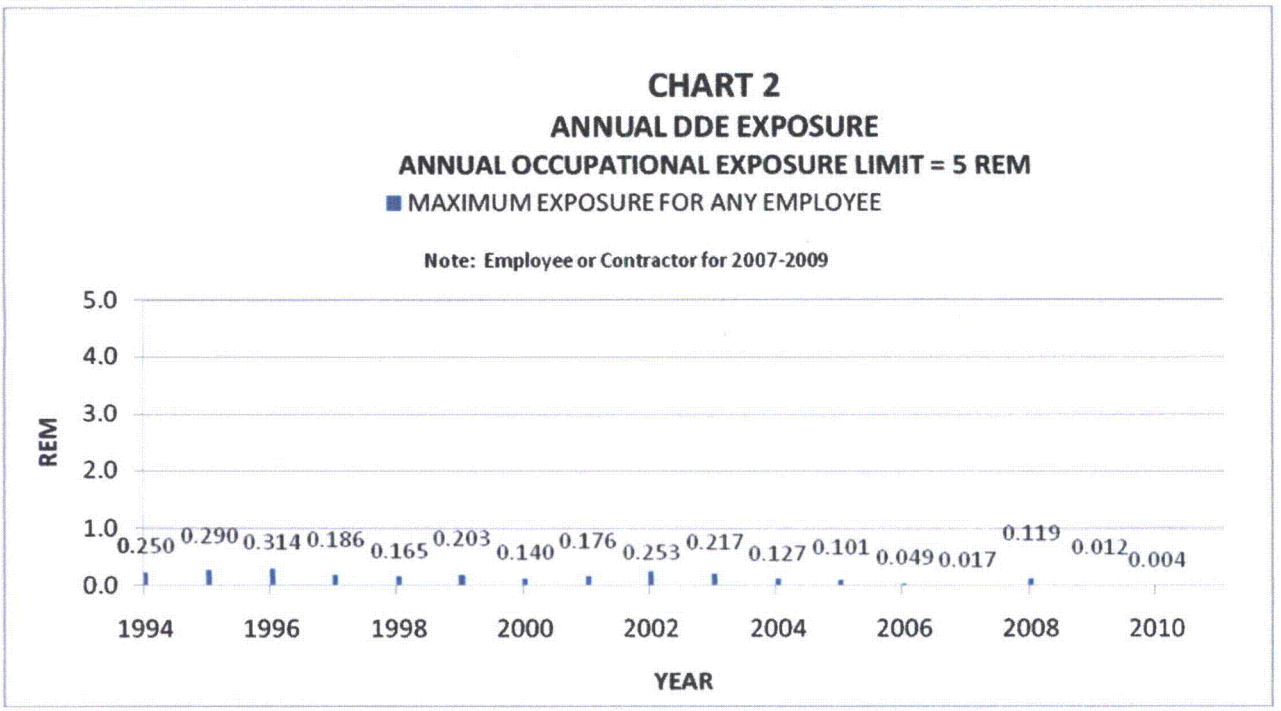
CHART 2
ANNUAL DDE EXPOSURE
ANNUAL OCCUPATIONAL EXPOSURE LIMIT = 5 REM
MAXIMUM EXPOSURE FOR ANY EMPLOYEE
Note: Employee or Contractor for 2007-2009
REM
5.0
4.0
3.0
2.0
1.0
0.0
0.250
0.290
0.314
0.186
0.165
0.203
0.140
0.176
0.253
0.217
0.127
0.101
0.049
0.017
0.119
0.012
0.004
1994
1996
1998
2000
2002
2004
2006
2008
2010
YEAR

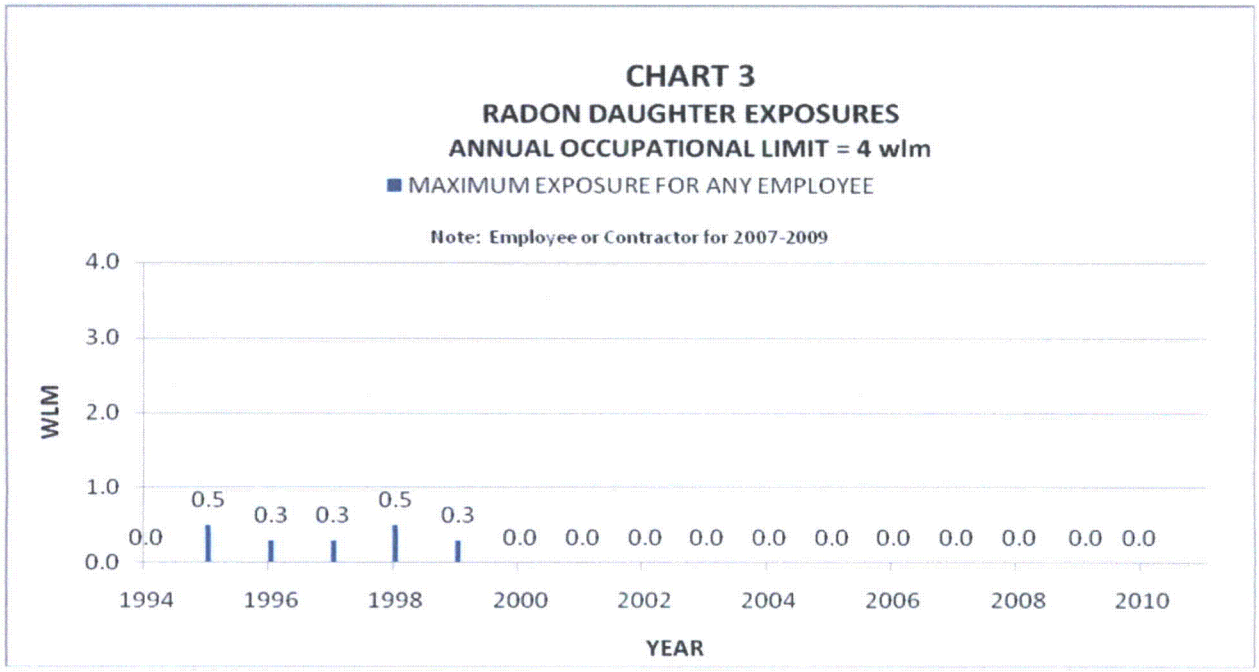
CHART 3
RADON DAUGHTER EXPOSURES
ANNUAL OCCUPATIONAL LIMIT = 4 wlm
MAXIMUM EXPOSURE FOR ANY EMPLOYEE
Note: Employee or Contractor for 2007-2009
WLM
4.0
3.0
2.0
1.0
0.0
0.0 0.5 0.3 0.3 0.5 0.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
1994 1996 1998 2000 2002 2004 2006 2008 2010
YEAR

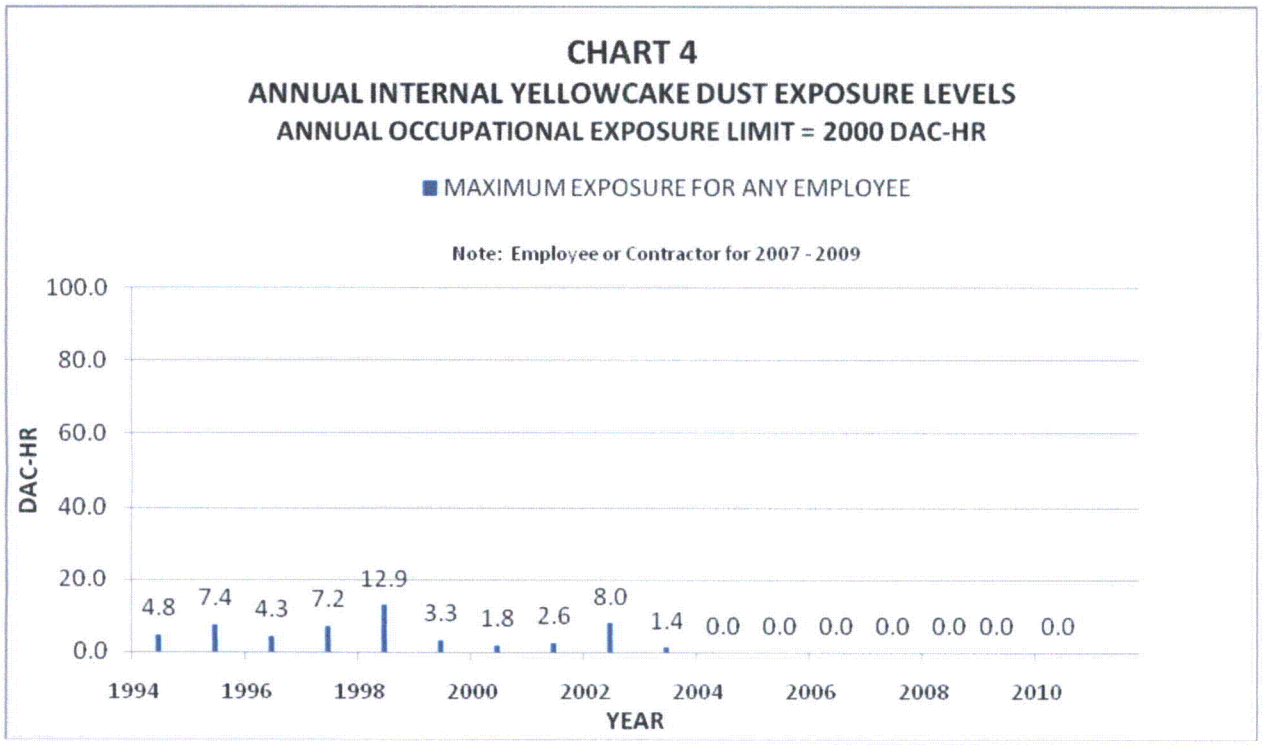
CHART 4
ANNUAL INTERNAL YELLOWCAKE DUST EXPOSURE LEVELS
ANNUAL OCCUPATIONAL EXPOSURE LIMIT = 2000 DAC-HR
MAXIMUM EXPOSURE FOR ANY EMPLOYEE
Note: Employee or Contractor for 2007 - 2009
DAC-HR
100.0
80.0
60.0
40.0
20.0
0.0
4.8 7.4 4.3 7.2 12.9 3.3 1.8 2.6 8.0 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
1994 1996 1998 2000 2002 2004 2006 2008 2010
YEAR