5335 PRICE AVENUE, BUILDING 258
McCLELLAN, CA 95652
PHONE: (916) 614-6200
FAX: (916) 614-6250
WEB: http://mnrc.ucdavis.edu
SACRAMENTO, CA 95652
PHONE: (916) 614-6200
FAX: (916) 614-6250

UCDAVIS
MNRC
McCLELLAN NUCLEAR RESEARCH CENTER

June 28, 2011

United States Nuclear Regulatory Commission
Attn: Document Control Desk
US Nuclear Regulatory Commission
Washington, D.C. 20555-001

Re: 2010 Annual Report for University of California Davis/ McClellan Nuclear Research Center, Docket No. 50-607, License No. R-130

To Document Control Desk:

Attached is the 2010 annual report for the McClellan Nuclear Research Center, submitted in accordance with the reporting requirements of the Technical Specifications document MNRC-0004-DOC-13 paragraph 6.7.1.

Thanks and Regards,

Dr. Barry M. Klein,
Vice Chancellor Office of Research,
Interim Director, McClellan Nuclear Research Center

A020
NRR

2010

ANNUAL REPORT

Docket Number 50-607
License Number R-130

1. Introduction

The University of California, Davis McClellan Nuclear Research Center (MNRC) consists of a research reactor and associated radiography and positioning equipment. This MNRC Annual Report is published each year in support of the license provided by the United States Nuclear Regulatory Commission (NRC). The aforementioned license is for the operation of a steady-state TRIGA™ reactor with pulsing capability.

It is the intent of this document to provide information relevant to the safe operation of the UCD/MNRC. A brief description of the MNRC facility and administration is followed by operational events and health physics information concerning this facility during CY 2010.

2. UCD/MNRC Facility Description

The UCD/MNRC is located on the McClellan Industrial Park site; the reactor is housed in Building 258. The McClellan Industrial Park site is approximately 2600 acres, located eight miles northeast of Sacramento, California.

The UCD/MNRC facility is a three level 14,720 sq. ft. rectangular-shaped enclosure that surrounds a 2 MW research reactor. The UCD/MNRC provides four neutron beams and four bays for radiography. All four bays are capable of using radiography film techniques, but Bays 1 and 3 will normally use electronic imaging devices. Space, shielding and environmental controls are provided by the enclosure for neutron radiography operations performed on a variety of samples. Adequate room has been provided to handle the components in a safe manner.

In addition to the radiography bays, the UCD/MNRC reactor also has several in-core facilities ranging from a pneumatic tube system to a central irradiation facility.

For more detailed information on the UCD/MNRC project, the reader is referred to the UCD/MNRC Safety Analysis Report.

3.0 UCD/MNRC Administration

UCD/MNRC Organization. The UCD/MNRC is licensed by the Nuclear Regulatory commission (NRC) to operate under the provisions of operating license R-130.

The University of California Regents have designated the Chancellor at UC Davis to be the license holder. The UCD Chancellor has in-turn delegated the Vice Chancellor for Research to be the licensee of record.

The UCD/MNRC is under the direction of the UCD/MNRC Director (temporary). The Vice Chancellor for Research currently holds that assignment.

4.0 Facility Modifications (Section 50.59 of 10CFR Part 50), and experiments.

1. Reactor Core configuration converted to the 30B core

5.0 New Approved Experiments

1. Experiment K-4-48, Fuel Cell Testing Station Operation at MNRC, approved 1 April.

6.0 Licensing and Regulatory Activities

6.1 NRC Items

a. The Nuclear Regulatory Commission (NRC) two inspections during the weeks of 1 February and 7 July.

6.2 Nuclear Safety Committee (UCD/NSC)

a. The Nuclear Safety Committee performed an audit on 30 June and on 22 December
b. Two NSC meetings were held: The NSC conducted their semi-annual meeting 30 June and 22 December at MNRC

7.0 OPERATIONS

OPERATING HISTORY:

TOTAL OPERATING HOURS THIS YEAR:	1145.92
TOTAL OPERATING HOURS:	43695.07
TOTAL MEGAWATT HOURS THIS YEAR:	1090.47
TOTAL MEGAWATT HOURS:	58802.81
TOTAL NUMBER OF PULSES PERFORMED THIS YEAR:	0
TOTAL NUMBER OF PULSES PERFORMED:	473

7.1 UNSCHEDULED REACTOR SHUTDOWNS and NOTED PROBLEM AREAS:

In 2010, there were five (5) unscheduled shutdowns at the MNRC reactor facility. The following is a list of the unscheduled shutdowns:

2010 REACTOR SHUTDOWNS

Type of Failures	Total Number
CSC	0
Other	5
TOTAL NUMBER OF SHUTDOWNS IN 2010	5

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CSC	0	0	0	0	0	0	0	0	0	0	0	0
Other	1	1	1	1	1	0	0	0	0	0	0	0
Notes	1	2	3	4	1							

Notes:
1: Area wide power loss.
2: NM-1000 erratic operation.
3: Transient Rod
4: Criticality alarm due to malfunction

January

1. There was one unscheduled shutdown in the month of January.
   a. Severe weather caused an area wide power loss, resulting in a loss of power to the facility.

February

1. There was one unscheduled shutdown in the month of February.
   a. NM-1000 operation became erratic during a down power maneuver to remove an experiment from the Fast Flux irradiation facility. The NM-1000 operation became noisy following a loss of power to the unit. Troubleshooting for repairs continued until March. Several days of operation were lost during the troubleshooting and repair phase. See the Anomaly Report included in this report

March

1. There was one unscheduled shutdown in the month of March.

a. The reactor was shut down following a rapid drop in reactor power. The Transient Rod came off the connecting rod. See the Anomaly Report included in this report.

2. There were six (6) callbacks to the facility in the month of March:
   a. Five (5) callbacks were for a Rod Withdrawal Prohibit alert on the Control System Computer (CSC) that cleared upon acknowledgement.
   b. One (1) callback was a bird induced security system alarm. The system was reset satisfactorily. The Security Manager will work with the installation company to reduce the probability of spurious alarms.

April

1. There was one unscheduled shutdown in the month of April.
   a. The reactor was scrammed following receipt of a Criticality Alarm. See the Anomaly Report included in this report.
2. There were three (3) callbacks to the facility in the month of April.
   a. One (1) callback was for a Rod Withdrawal Prohibit alert on the Control System Computer (CSC) that cleared upon acknowledgement.
   b. Two (2) callbacks were weather induced security system alarms. The system was reset satisfactorily. The Security Manager is working with the installation company to reduce the probability of spurious alarms. Note that the new security system is still undergoing grooming to minimize spurious alarms and signals.

May

1. There was one unscheduled shutdown in the month of May.
   a. The reactor was shut down following a total loss of building power. Utilities loss cause unknown.
2. There were two (2) callbacks to the facility in the month of May.
   a. UPS Fault alert on the Control System Computer (CSC) that cleared upon acknowledgement.
   b. Bird induced security system alarm. The system was reset satisfactorily. The Security Manager will work with the installation company to reduce the probability of spurious alarms. Note that the new security system is still undergoing grooming to minimize spurious alarms and signals..

June

1. There were no unscheduled shutdowns in the month of June.
2. There were three (3) callbacks during the month of June.
   a. Two (2) callbacks for Rod Withdrawal Prohibit alerts on the Control System Computer (CSC) that cleared upon acknowledgement.
   b. One (1) callback was a bird induced security system alarm. The system was reset satisfactorily. The Security Manager will work with the installation company to reduce the probability of spurious alarms. Note that the new security system is still undergoing grooming to minimize spurious alarms and signals. This is an ongoing issue as various sensors are adjusted.

July

1. There were no unscheduled shutdowns in July.

August

1. There were no unplanned shutdowns during the month of August.
2. There was one callback to the facility in the month of August.
   a. Spurious Security System alarm, no obvious cause of alarm, alarm reset.

September

1. There were no unscheduled shutdowns in the month of September.
2. There were three callbacks to the facility in the month of September.
   a. (3) Rod Withdrawal Prohibit alerts, all cleared upon acknowledgement

October

1. There were no unscheduled shutdowns during the month of October.
2. There were six callbacks to the facility in the month of October.
   a. (2) Rod Withdrawal Prohibit alerts, all cleared upon acknowledgement.
   b. (4) Security System sensor faults. The system contractor replaced one faulty sensor on 25 October.

November

1. There were no unscheduled shutdowns in November
2. There were two callbacks to the facility in the month of November.
   a. (2) Security System faults. The contractor is continuing grooming the system

December

1. There were no unscheduled shutdowns in December.
2. There was one callback to the facility in the month of December.
   a. Rod Withdrawal Prohibit (RWP) alert. The alert cleared upon acknowledgement.
3. Testing following the installation of the new 30/30 Instrumented Fuel Element (IFE) shows that channel T/C #1 failed. Connections were shifted to channel T/C #3, with channel T/C #2 verified and placed in standby mode.

7.2 ANOMALIES:

During 2010, there were 3 reported anomalies at the MNRC facility. The specifics are listed below

February

1. There was one anomaly reported in the month of February as follows:

Anomaly Report for: Loss of NM-1000

Time: 6:00 AM, Wednesday Feb. 17 2010

Reactor conditions prior to the anomaly and what occurred during the anomaly:
While performing the upstairs portion of the start-up checklist, we received a UPS fault. After clearing the UPS fault and insuring that the UPS was operating normally, the control room operator informed me that there was no power indication on the NM-1000 channel

What actions were taken to correct this anomaly:
A decision was made to reboot the NM-1000. There was no change.
A decision was made to check the constants on the NM-1000.....we found many incorrect readings. After correcting all the readings we found that there was no change on the NM-1000 display in the control room.

The reactor operations supervisor was notified, and the electronics engineer was called in to trouble shoot and repair the system.

What corrective actions are needed to prevent this anomaly from reoccurring in the future:
None.

March

1. There was one anomaly reported in the month of March as follows.

Anomaly Report For: Dropped Transient Control Rod

Time: 11:30, **8 March 2010**

Reactor conditions prior to the anomaly and what occurred during the anomaly:
The reactor was operating at one (1) Megawatt for routine radiography. It was noted that power level suddenly dropped to below 20%. Withdrawing control rods had no effect on power level. The reactor was shut down. Probable cause was a dropped control rod. Indications on the High-Resolution monitor for control rods was normal, indicating the Transient Rod (TR) most likely became uncoupled

What actions were taken to correct this anomaly?
The TR was disassembled per OMM 5140: 5140-A6 VISUALLY INSPECT THE TRANSIENT ROD. It was determined that the TR had un-threaded from the connecting rod and fallen. No signs of damage were found. The TR was re-assembled and new set screw was installed.

What corrective actions are needed to prevent this anomaly from re-occurring:
No further corrective actions are needed. This is a normal part of the above annual inspection. Operators will be briefed to be more diligent in re-assembling the TR during the PM.

April

1. There was one anomaly reported the month of April, as follows:

Anomaly Report for: Actuation of the Facility Evacuation Horn due to the Reactor Room Radiation Area Monitor Malfunction

Time: 0842, 12APRIL, 2010

Reactor conditions prior to the anomaly and what occurred during the anomaly:
The reactor was operating steady state at 1 megawatt for radiography. The Criticality Alarm sounded. The Reactor Room Radiation Area Monitor (RAM) output display at the Auxiliary Panel meter was pegged, and the Console status monitor was reading 1.5E7 mR/hr. All other RAMS and Continuous Air Monitor (CAM) readings were as expected for normal operations.

The reactor was immediately scrammed, and all unnecessary personnel were evacuated from the facility. An investigation was conducted. The Reactor Room radiation readings was 0.2 mR/hr inside the reactor room door. Further surveys in the Reactor Room showed levels at normal post shutdown values.

The Radiation Safety Officer (RSO) found that the detector mounts to the bridge had broken, and caused a loose wire/contact when the detector came loose and shifted. Note that the Reactor Room RAM passed the weekly source

checks performed earlier in the day, and no visual problems were noted at that time.

All three components of the RAM (the detector, the local readout, and the Aux Panel readout) were replaced with the calibrated spare units. A source check was performed successfully.

Normal reactor operations were resumed.

What actions were taken to correct this anomaly:
The removed unit was bench tested, and various connections and contacts were tightness checked without obvious movement.

The spare detector was mounted to the bridge using larger/longer mounting straps.

What corrective actions are needed to prevent this anomaly from reoccurring in the future:
Tightness checks for the mounts will be performed each time the unit is calibrated

7.3 MAINTENANCE OTHER THAN PREVENTIVE:

January

1. Replaced the failed drive belt on EF-2 (Radiography Bay Ventilation)

February

1. Replaced expended Helium System supply bottle.
2. Performed troubleshooting on the NM-1000.

March

1. Found a loose connector in the #2 Primary Pump controller that resulted in a high resistance connection. Repaired burned contacts, connectors and wiring in motor controller.
2. Trouble shoot/repair loss of NM-1000 signal. No significant problems found during troubleshooting. All connections and cards reset. The system was recalibrated, and is functioning as required. This was a carryover item from February. See anomaly report.
3. Reattached the Transient Rod to the lower threaded connecting rod. Replaced set screw. Rod drop time 0.39, Operability test sat. Control rod calibration sat. See the anomaly report.
4. Adjusted Transient Rod limit switches for the full down position, and re-centered the drive mechanism on its foundation. Performed rod drop test 0.37 sec, operability checks sat.
5. Loosened and retightened pneumatic cylinder tensioning rods on the Transient Rod to correct rough operation. Transient Rod operates smoothly. Rod drop time 0.37 seconds, operability checks sat.

April

1. Replaced the failed first stage compressor in AC-3 (Bay 1 ventilation).
2. Replaced expended Helium system supply bottle
3. Replaced detector in the Equipment Room Radiation Area Monitor (RAM).
4. Replaced the Reactor Room RAM with the calibrated spare. See Anomaly Report

May

1. Adjusted sensor sensitivity settings to reduce spurious alarms.

June

1. Replaced depleted Helium System supply bottle.

July

1. Changed out depleted Helium System supply bottle.
2. Replaced Pneumatic Transfer System blower HEPA filter and seals.
3. Recalibrated the Reactor Continuous Air Monitor (CAM) Iodine channel following failure to pass a weekly calibration check.

August

1. Replaced the Iodine channel check source solenoid on the Reactor Room Continuous Air Monitor (CAM).

September

1. There was no maintenance other than preventive performed in the month of September

October

1. Contractor replaced A/C-6 (Bay 3 Ventilation).
2. Replaced breaker 9-11 (A/C-6 power supply) in panel 2A with a 40 amp breaker, replaced wiring to AC-6 with 8 gage wire.
3. Changed out Helium System supply bottle.

November

1. Changed out Helium System supply bottle

December

1. 1. MNRC completed the annual reactor maintenance shutdown during the month of December. Technical Specification required periodic maintenance as well as general maintenance was performed. The five (5) 8.5/20 fuel followed control rods were replaced with new 20/20 fuel followed control rods. All 8.5/20 fuel was removed from the core. Fourteen (14) new 30/20 fuel elements were added to the core, including one Instrumented Fuel Element (IFE). The remaining grid locations were filled with eight (8) graphite elements. Included maintenance in the core reconfiguration was control rod and fuel inspections, and parametric verifications.

2. Parametric values noted during testing are as follows:

Control Rod Worth:

Transient Rod:	Shim 1:	Shim 2:
$1.95	$2.61	$2.69
Shim 3:	Shim 4:	Regulating Rod:
$2.87	$3.14	$2.83

Control Rod Scram Drop Times:

Transient Rod:	Shim 1:	Shim 2:
0.38 sec	0.39 sec	0.36 sec
Shim 3:	Shim 4:	RegulatingRod:
0.40 sec	0.39 sec	0.38 sec

Shutdown Margin: $4.94

At Power Scram values: NPP-1000: 108% indicated, NM-1000: 102% indicated.

A nuclear instrument calorimetric calibration was performed. The NPP channel of Nuclear Instruments was adjusted based on results. The NM-100 channel did not require adjustment

3. Calibrated the Orion Digicator for use in the Primary calorimetric calibration
4. Replaced the two south Demineralizer System resin bottles.

7.4 Training

January

1. All Operations personnel completed Fuel Handling training.
2. All Operations personnel attended sessions of Reactor Physics training.
3. All Operations personnel attended Facility Instrumentation and Control training.

February

1. There was no scheduled training held in the month of February.

March

1 One Senior Reactor Operator attended Energy Solutions' Advanced Radioactive Materials Shipper Certification class for shipments by ground transport.
2. Senior Reactor Operators attended Facility Design and Operating Characteristics training.
3. Senior Reactor Operators attended Administrative Controls and Procedures training.
4. Three Senior Reactor Operators took and successfully passed the Biennial Requalification Written Examination.

April

1. One Senior Reactor Operator attended Facility Design and Operating Characteristics training.
2. One Senior Reactor Operator attended Administrative Controls and Procedures training.
3. One Senior Reactor Operator took and successfully passed the Biennial Requalification Written Examination.
4. The Reactor Supervisor participated in Department of Energy sponsored training at the Delat Nuclear Center, Delat, Vietnam and the Thai Institute for Nuclear Technology in Bangkok, Thailand.

May

1. One Senior Reactor Operator attended FexEx Shipper Certification classes for shipments of Dangerous Goods, DOT Security Awareness, and Radioactive Materials by air transport.

June

1. There was no scheduled training held in the month of June.

July

1. All Senior Reactor Operators have completed their Annual Operators Examination.

August

1. There was no scheduled training held in the month of August.

September

1. All licensed operators attended Fuel training.
2. The Reactor Supervisor and the Facility Manager attended the combined TRTR and IGORR conference in Knoxville, TN.
3. The Radiation Safety Officer attended Electronic Dosimetry Training For First Responders presented by the Y-12 National Security Complex in Oak Ridge TN with a member of the first responder team from the Sacramento Sheriff's office.

October

1. All licensed operators attended Physical Security Plan Rev. 9 training.

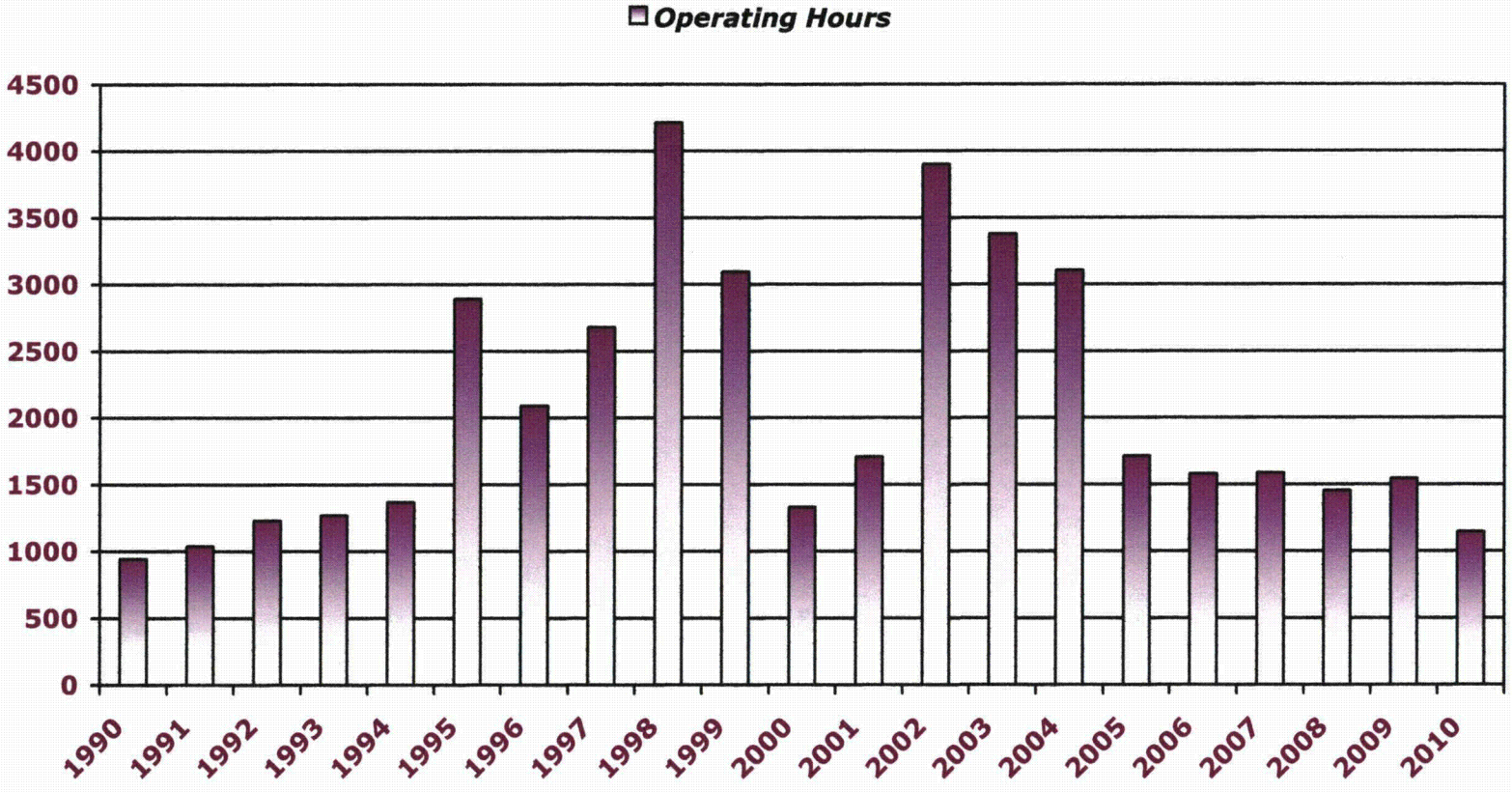
November

1. There was no scheduled training in the month of November.

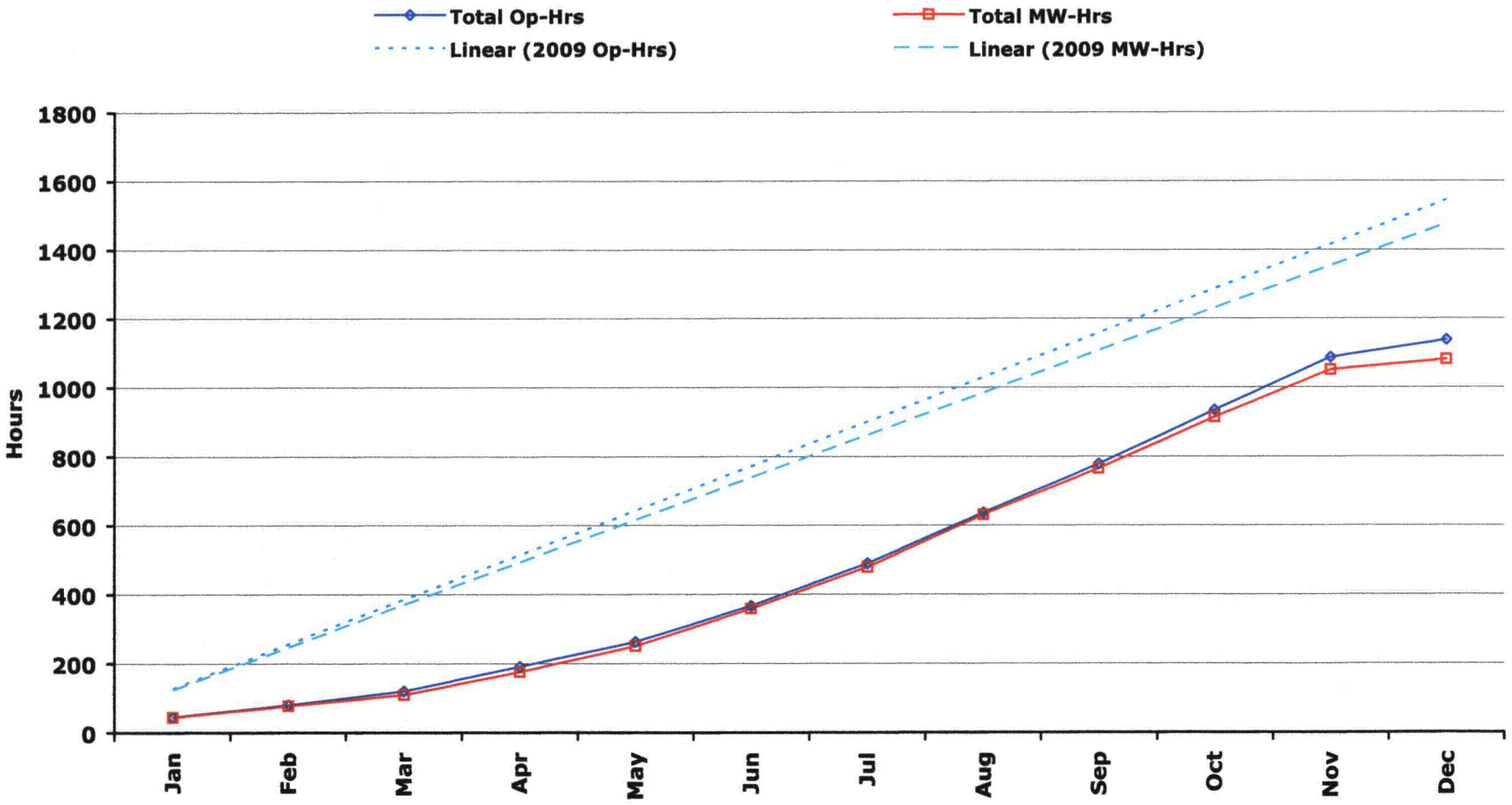
December

1. All Operations and Radiography personnel attended Normal/Abnormal/Emergency Procedures , Annual Emergency Drill, and Pre-Shutdown Briefing.
2. All Operations personnel attended Fuel Handling training

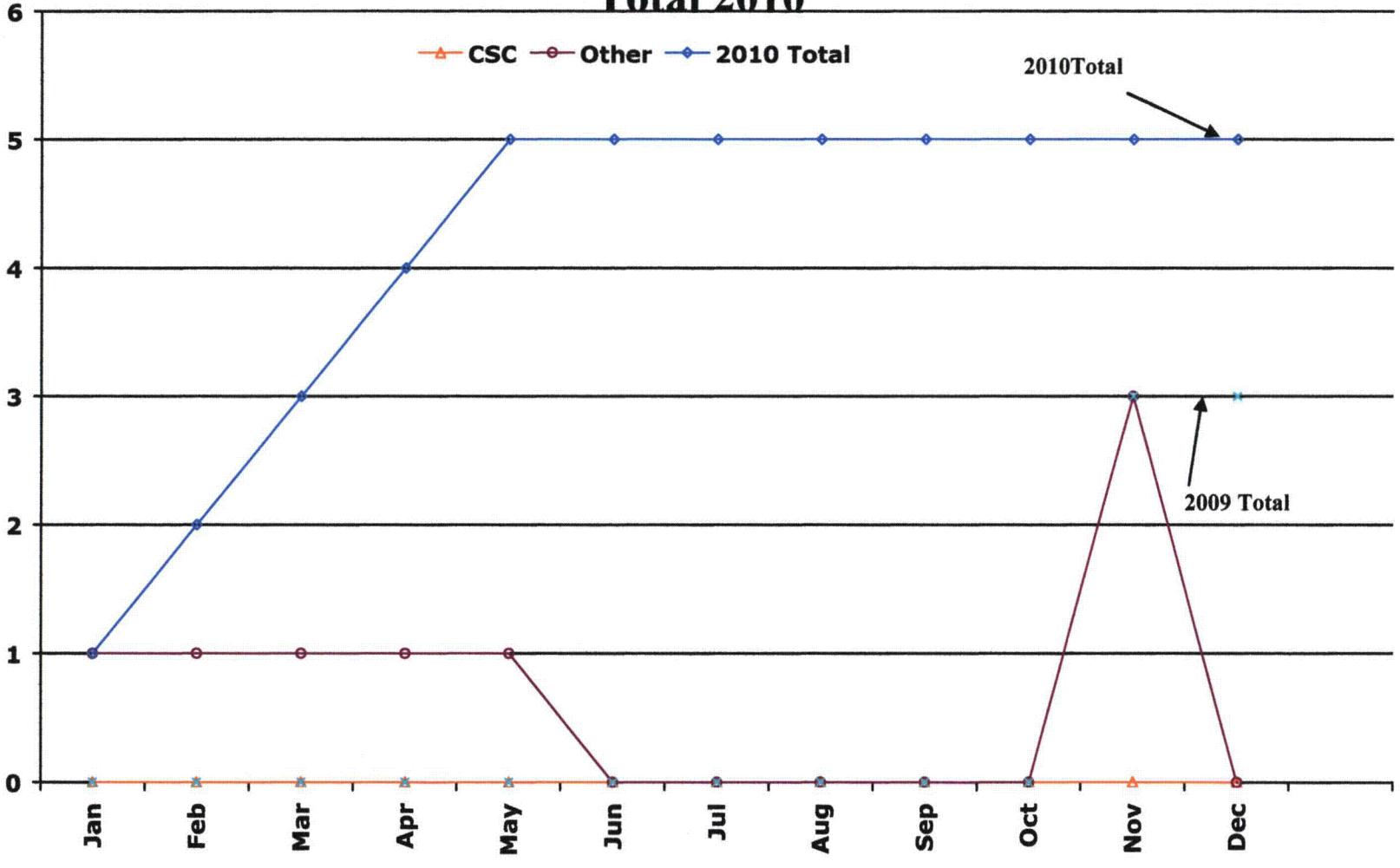
UCD/MNRC Operating History



Reactor Hours (2010)



Unscheduled Shutdowns-- Total 2010



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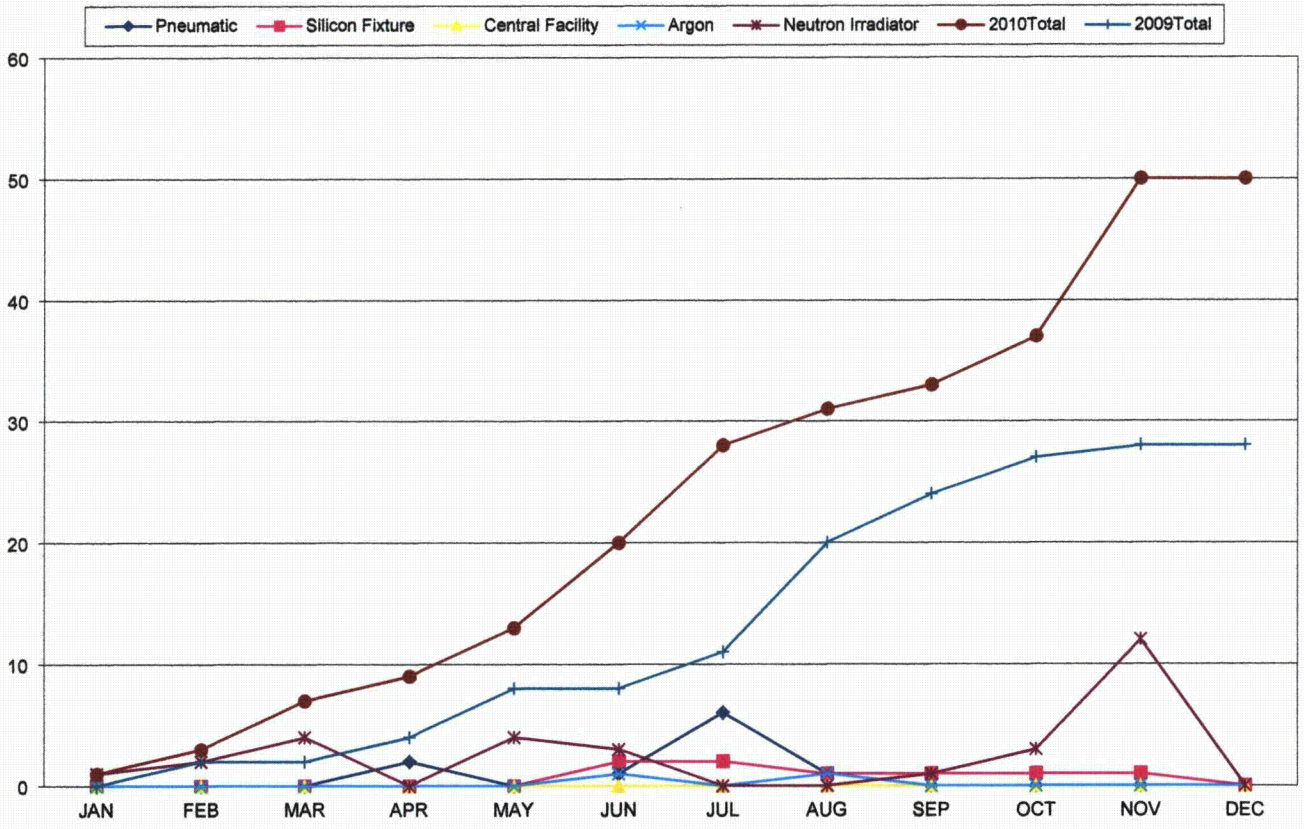
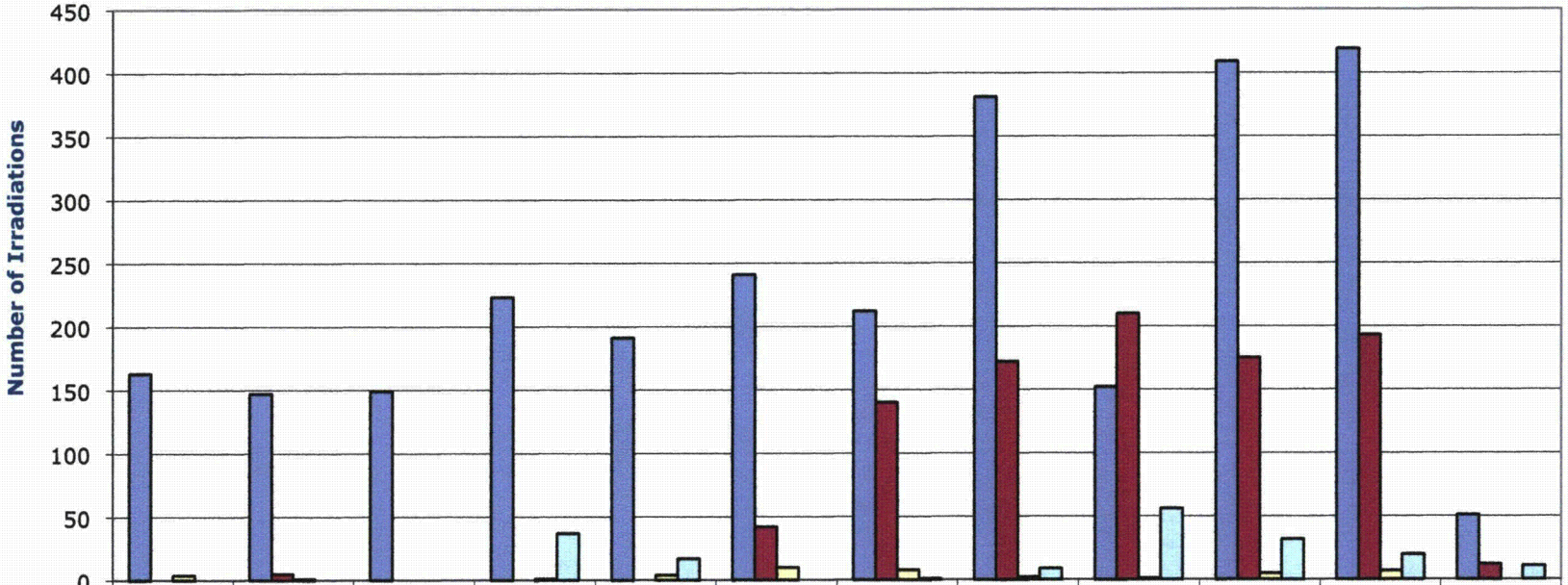
Reactor Tank Irradiation Facilities
Total Number of Irradiations Completed (2010)

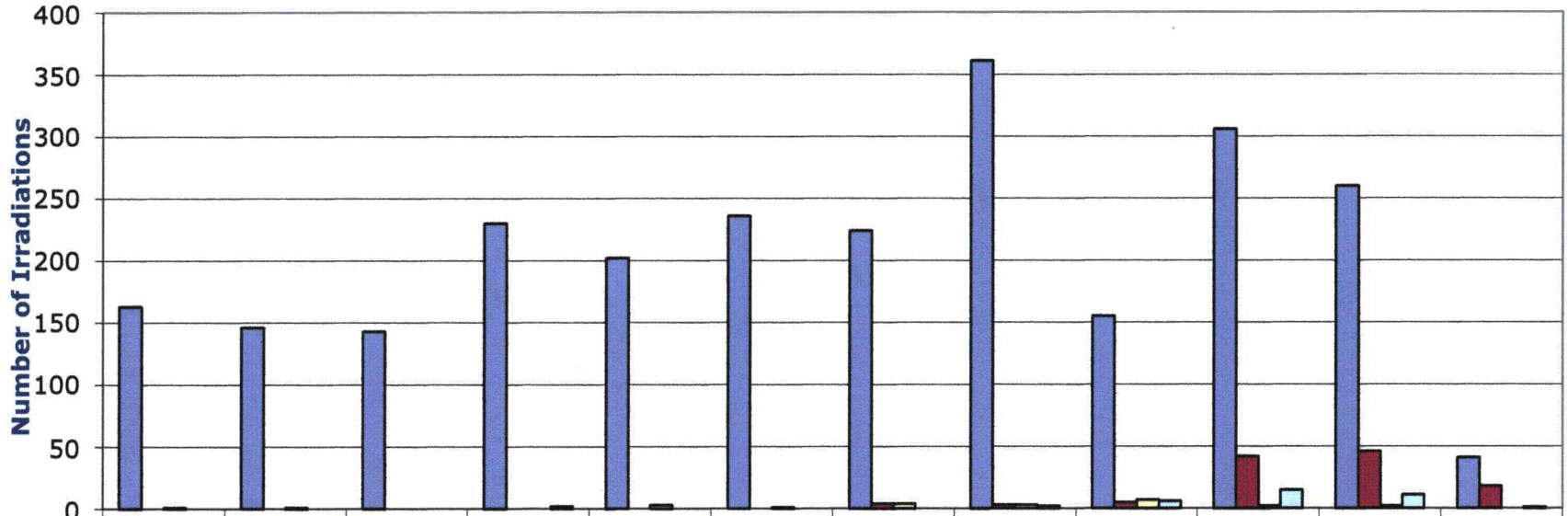


Bay Utilization (Shutter Operations) 2010



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bay 1	163	147	149	223	191	241	212	381	152	409	419	51
Bay 2	0	5	0	0	0	42	140	172	210	175	193	12
Bay 3	4	1	0	1	4	10	8	2	1	5	7	0
Bay 4	0	0	0	37	17	0	1	9	56	32	20	11

Bay Irradiations Completed 2010



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bay 1	163	146	143	230	202	236	224	361	155	306	260	41
Bay 2	0	0	0	0	0	0	4	3	5	42	46	18
Bay 3	1	1	0	0	3	1	4	3	7	2	2	0
Bay 4	0	0	0	2	0	0	0	2	6	15	11	1

8.0 Radioactive Effluents

A summary of the nature and amount of radioactive effluents released or discharged to the environment beyond the effective control of the MNRC, as measured at or prior to the point of such release or discharge, include the following:

8.1 Liquid Effluents

No liquid effluents were released during 2010.

8.2 Airborne Effluents

Airborne radioactivity discharged during 2010 is tabulated in Table 1 below.

TABLE 1
2010 SUMMARY OF AIRBORNE EFFLUENTS

MONTH	TOTAL EST. QUAN. Ar-41 RELEASED	EST.MAX AVG. CONC. OF Ar-41 IN UNRESTRICTED AREA (1)	FRACTION OF *APPLICABLE* 10CFR20 Ar-41 CONC. LIMIT FOR UNRESTRICTED AREA (1)	EST. DOSE (2) FROM Ar-41 FOR UNRESTRICTED AREA (1)	FRACTION OF APPLICABLE 10CFR20 DOSE LIMIT FOR UNRESTRICTED AREA (1)	TOT. EST. QUANTITY OF ACT. IN PART. FORM WITH HALF-LIFE >8 DAYS	AVERAGE CONC. OF PART. ACT. RELEASED WITH HALF-LIFE > 8 DAYS
	(Ci)	(uCi/ml)	(%)	(mrem)	(%)	(Ci)	(uCi/ml)
JAN	0.50	2.99E-11	0.3%	1.82E-01	1.82%	NONE	NONE
FEB	1.47	8.80E-11	0.9%	5.36E-01	5.36%	NONE	NONE
MAR	0.43	2.59E-11	0.3%	1.58E-01	1.58%	NONE	NONE
APR	0.78	4.65E-11	0.5%	2.83E-01	2.83%	NONE	NONE
MAY	0.69	4.11E-11	0.4%	2.50E-01	2.50%	NONE	NONE
JUN	1.31	6.97E-11	0.7%	4.24E-01	4.24%	NONE	NONE
JUL	2.01	1.07E-10	1.1%	6.52E-01	6.52%	NONE	NONE
AUG	2.37	1.26E-10	1.3%	7.69E-01	7.69%	NONE	NONE
SEP	2.20	1.17E-10	1.2%	7.15E-01	7.15%	NONE	NONE
OCT	2.09	1.11E-10	1.1%	6.77E-01	6.77%	NONE	NONE
NOV	2.64	1.41E-10	1.4%	8.56E-01	8.56%	NONE	NONE
DEC	0.71	3.78E-11	0.4%	2.30E-01	2.30%	NONE	NONE
TOT	17.2	9.42E-10	-	5.73	-	NONE	NONE
AVG	1.43	7.85E-11	0.8%	4.8E-1	4.78%		

(1) This location is 240 meters downwind which is the point of maximum expected concentration based on the worst case atmospheric conditions (see MNRC SAR Chapter 11).
(2) Based on continuous occupancy and the calculation techniques used in Appendix A of the MNRC SAR (Ar-41 at 2.3E-10 uCi/ml continuous for one year equals 1.4 mrem).
(3) 10CFR20 Limit for concentration is 1E-8 (Appendix B, Table 2); Limit for dose is 100mrem/year (20.1301)

8.3 Solid Waste

No waste shipments were made in 2010

9.0 Radiation Exposure

Radiation exposure received by facility operations personnel, facility users, and visitors during 2010 is summarized in Table 2 below.

TABLE 2
2010 SUMMARY OF PERSONNEL RADIATION EXPOSURES

	NUMBER OF INDIVIDUALS	AVERAGE TEDE PER INDIVIDUAL	GREATEST INDIVIDUAL TEDE	AVERAGE EXTREMITY	GREATEST EXTREMITY
		(mrem)	(mrem)	(mrem)	(mrem)
FACILITY PERSONNEL	8	59	169	128	562
FACILITY USERS	8	1.75	2	*	*
VISITORS	800	<1	2	*	*

* Extremity monitoring was not required.

10.0 Radiation Levels and Levels of Contamination

Radiation levels and levels of contamination observed during routine surveys performed at the MNRC during 2010 are summarized in Table 3 below.

TABLE 3
2010 SUMMARY OF RADIATION LEVELS AND CONTAMINATION LEVELS DURING ROUTINE SURVEYS

	AVERAGE (mrem/hr)	HIGHEST (mrem/hr)	AVERAGE (dpm/100cm^2)	HIGHEST (dpm/100cm^2)
OFFICE SPACES	<0.1	<0.1	<800(1)	<800(1)
REACTOR CONTROL RM	<0.1	<0.1	<800(1)	<800(1)
RADIOGRAPHY CONTROL RM	<0.1	<0.1	<800(1)	<800(1)
COUNTING LAB	<0.1	<0.1	<800(1)	<800(1)
STAGING AREA	<0.1	<0.1	<800(1)	<800(1)
COMPOUND	<0.1	<0.1	<800(1)	<800(1)
EQUIPMENT RM	1.0	90	<800(1)	<800(1)
DEMINERALIZER AREA	9	310	<800(1)	<800(1)
REACTOR RM	2	1700	<800(1)	<800(1)
SILICON STORAGE SHED	<0.1	<0.1	<800(1)	<800(1)
RADIOGRAPHY BAYS	*2.0	*1500	<800(1)	<800(1)

(1) <800 dpm/100 cm^2 = Less than the lower limit of detection for a swipe survey.
* Due to Bay 1 Storage Areas; most other areas and other bays are significantly lower

11.0 Environmental Surveys

Environmental surveys performed outside of the MNRC during 2010 are summarized in Tables 4 & 5 below. The environmental survey program is described in the MNRC Facility Safety Analysis Report.

TABLE 4
2010 SUMMARY OF ENVIRONMENTAL TLD RESULTS
(WITH NATURAL BACKGROUND(1) SUBTRACTED)

	AVERAGE (mrem)	HIGHEST (mrem)
ON BASE (OFF SITE 1-20 & 64)	4	23
ON SITE (SITES 50 – 61 & 65-71)	11	31

(1) Natural background assumed to be the off base (Sites 27-42) average of 29 mrem.

TABLE 5
2010 SUMMARY OF RADIOACTIVITY IN WELL WATER

	ALPHA (pCi/l)	BETA (pCi/l)	TRITIUM (pCi/l)	Cs-137 (pCi/l)
AVERAGE	<MDA	<MDA	<MDA	<MDA
HIGHEST		2.91E+00		

MDA is the minimum detectable activity at the 95% confidence level.
The MDA range for the analyzed radionuclides (pCi/L).

	MIN	MAX
Alpha	1.47E+00	1.65E+00
Beta	2.96E+00	3.14E+00
Tritium	2.99E+02	3.60E+02
Cs-137	4.63E+00	8.96E+00