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 17, 2010

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

Re: 2009 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 2009 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

2009

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 2009.

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. FMIII-08-01 Replace all thermostats (Hg removal) complete.

5.0 New Approved Experiments
1 No new experiments were approved in 2009

6.0 Licensing and Regulatory Activities

Dr. Robert Flocchini retired as Director on 26 June. Dr. Barry Klein, Reactor Administrator/Vice-Chancellor for Research has assumed the duties of Interim Director.

The Vice Chancellor of Research approved a name change for MNRC from McClellan Nuclear **Radiation** Center to McClellan Nuclear **Research** Center.

6.1 NRC Items

a. The Nuclear Regulatory Commission performed two inspections: during the weeks of 17 February and 10 August..

6.2 Nuclear Safety Committee (UCD/NSC)

a. The Nuclear Safety Committee performed an audit on 4 September and on 21 December
b. Two NSC meetings were held: 10 July and 22 December at MNRC

7.0 OPERATIONS

OPERATING HISTORY:

TOTAL OPERATING HOURS THIS YEAR:	1544.43
TOTAL OPERATING HOURS:	42549.15
TOTAL MEGAWATT HOURS THIS YEAR:	1476.54
TOTAL MEGAWATT HOURS:	57712.34
TOTAL NUMBER OF PULSES PERFORMED THIS YEAR:	0
TOTAL NUMBER OF PULSES PERFORMED:	473

UNSCHEDULED REACTOR SHUTDOWNS and NOTED PROBLEM AREAS:

In 2009, there were three (3) unscheduled shutdowns at the MNRC reactor facility. The following is a list of the unscheduled shutdowns:
2009 REACTOR SHUTDOWNS

Type of Failures	Total Number
CSC	0
Other	3
TOTAL NUMBER OF SHUTDOWNS IN 2009	3

	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	0	0	0	0	0	0	1	0	0	0	3	0
Notes											1,2	

Notes:
1: Regulating Rod failure to operate in auto.
2: Guide tube fell due to chaffed lanyard.

January

1. There were no unscheduled shutdowns in January.

February

1. There were no unscheduled shutdowns in February

2 There were four (4) callbacks to the facility in the month of February, all weather/power related.
   a. Three (3) UPS faults, cleared upon acknowledgement.
   b. One UPS, fire/security fault, and multiple others, all cleared upon acknowledgement

March

1. There were no unscheduled shutdowns in March

April

1. There were no unscheduled shutdowns during the month of April.

May

1. There were no unscheduled shutdowns during the month of May
2. There were five (5) callbacks to the facility in the month of May.
   a. Watch Dog Timer alert, cleared upon acknowledgement.
   b. Rod Withdrawal Prohibit (RWP) alert, cleared upon acknowledgement.
   c. Cooling Tower High Level cleared upon acknowledgement.
   d. RWP cleared upon acknowledgement.
   e. Scram-Database Timeout. Required reboot of Control System Console (CSC) to clear.

An Uninterruptible Power System (UPS) fault occurred on 5/27. Investigation showed no noticeable power fluctuations/loss of power, and that the ambient temperature in the Equipment Room was elevated 12 degrees F above normal. Found the compressor for AC-2 (Equipment Room) was off even though there was a temperature call on the thermostat. AC-2 was cycled off and on at the safety switch, resetting the unit control circuits. The UPS was placed in bypass and then back to normal to reset the fault once the temperature in the space returned to normal.

Investigation of AC-2 failure showed one condenser fan motor was seized, causing the compressor to trip on high backpressure after sustained cooling operations. The condenser fan motor was replaced. AC-2 operations returned to normal.

During the startup on 5/29, reactor power decreased to 0 after placing the reactor in automatic at 1 MW. The Regulating Rod position indication showed the rod was bottomed. The Demand Power thumbwheel indicated 1 MW was selected. The reactor was placed in manual, and the operator cycled the thumbwheel several times. Demand Power indications followed switch operations on the High Resolution Monitor.. The operator was unable to reproduce the event, so the Senior Reactor Operator gave permission to return to 1 MW for operations. Subsequent attempts to reproduce the event after shutdown showed no abnormalities. The probable cause was a high resistance contact that was "wiped cleaned" during attempts to reproduce by cycling the switch. Another possible cause was a misalignment of contacts on the switch due to not fully engaging the thumbwheel in the detent when 1 MW was selected.

June

1. There were no unscheduled shutdowns in the month of June.
2. There was one callback to the facility in the month of June: Rod Withdrawal Prohibit (RWP) alert, cleared upon acknowledgement.

There was an Uninterruptible Power Supply (UPS) fault during the pre-start checks on 29 June. The ambient temperature was normal in the Equipment Room. Placing the unit in Bypass did not clear the problem. The system was placed in Maintenance Bypass and the UPS was completely secured and allowed to sit for 10 minutes. No obvious physical issues were noted within the unit. All voltages returned to normal on startup. The UPS was placed back on line. This is the second fault event in a month. Operations personnel will monitor the UPS closely for unusual responses.

July

1. There were no unscheduled shutdowns in July.
2. There was one callback to the facility in the month of July: Rod Withdrawal Prohibit (RWP) alert, cleared upon acknowledgement

August

1. There were no unplanned shutdowns during the month of August.
2. There were three callbacks to the facility in the month of August: Rod Withdrawal Prohibit (RWP) alert, cleared upon acknowledgement, on 1, 28 and 29 August

September

1. There were no unscheduled shutdowns in the month of September.

October

1. There were no unscheduled shutdowns during the month of October.
2. There was one callback to the facility in the month of October: Security system alarm, reset.

November

1. There were three unscheduled shutdowns in November
   a. Chaffed lanyard parted, dropping a guide tube on top of Beam 1 insert. See included Anomaly Report.
   b. Regulating Rod failed to control in automatic (twice). See included Anomaly Report.

December

1. There were no unscheduled shutdowns in December.
2. There were five (5) callbacks to the facility in the month of December. All Callbacks were for Rod Withdrawal Prohibit alerts, and were reset upon acknowledgement.

7.2 ANOMALIES:

During 2009, there were 2 reported anomalies at the MNRC facility. The specifics are listed below

November

1. There were two anomalies reported in the month of November as follows:

1: Chaffed lanyard released guide tube

Anomaly Report 11/09/09
Date/ Time of Discovery/Occurrence: 11/09/09 -0900 hrs

The Reactor was operating at 1 MW (startup was at 0802 – so at most 1 hour had elapsed before discovery) with one primary pump running.

During a tour of the Reactor Room and visual inspection of the Reactor Tank, two sections of frayed nylon lanyard were noted floating on the tank surface with the other end tied off on a section of air sample piping. It was quickly noted that one of the old transient rod guide tubes had chaffed through this nylon cord and had fallen to near the bottom of the reactor tank on top of the Bay 1 beam tube insert.

The Reactor Supervisor directed that the reactor be shutdown and primary and demineralizer pumps secured.

The Reactor Supervisor and Radiation Safety Officer retrieved the old guide tube and reattached the tube to the air sample piping. New nylon lanyard was used to reattach the tube and the lanyard was also replaced on the second tube also hanging from the same sample piping. These tubes are decaying in place in the tank until they can be removed and sectioned for disposal or weld repaired and reused.

A visual inspection from the tank surface revealed no damage to the Bay 1 beam tube insert or helium lines and the reactor core structure and fuel were never at risk.

The Reactor Supervisor then granted permission to restart the reactor and return to normal 1 MW operation.

Corrective Action:

This type of chaffing failure has not been noted before at the MNRC. Senior Reactor Operators have been briefed on the occurrence and have been instructed to replace the lines as necessary if any chaffing is noted.

*2: **Regulating Rod failed to operate in Automatic***

Anomaly Report for Regulating Rod failure to operate in automatic, 11/23/2009
Time: 1400

Reactor conditions prior to the anomaly and what occurred during the anomaly:

The reactor was in automatic, steady state operation at 1 Megawatt with two main coolant pumps operating for radiography. The reactor operator attempted to level rods after the 1400 logs by bumping in 5 control rods several units each. The Regulating Rod did not drive out as expected, and reactor power drifted down to approximately 44% from 50%.

Several attempts were made to change reactor power by use of the thumbwheel demand power switch, with no Regulating Rod movement noted. During these attempts the control rod power translator was monitored for proper operation. No unusual indications were noted on the translator.

What actions were taken to correct this anomaly:

The reactor was shut down, and the CSC computer was rebooted.
All control rods were operated in and out. The Regulating Rod did not move on the initial attempt. Translator connections were checked for tightness, and the Regulating Rod operation was observed. Note that no obvious loose connections were found.

Control rod operability checks were performed on the Regulating Rod, with satisfactory operation noted and the drop time was 0.39 seconds, in specification.

The Regulating Rod was again operated full travel, with no unusual operations noted. The CSC DOM32 and DISO64 utilities were run, with no abnormalities found.

On 25 November, the Regulating Rod again failed to operate in the out direction when the other rods were bumped in to level rod heights.

Shim 1 and Shim 2 were placed in automatic, and controlled the reactor by moving in and out as needed. The Regulating Rod did not move out, but did move in during auto operation. This showed the problem was not in the DAC control circuitry for Automatic Operation. The reactor was shut down, and troubleshooting began.

Troubleshooting isolated the problem to the signal wiring from the Regulating Rod translator to the 9 pin D connector at the motor on the bridge.

Continuity checks on the wiring showed no problems. All Regulating Rod translator wiring was lifted, checked and reconnected. Following the reconnection and tightening of the wires and

connectors, the Regulating Rod operated normally. No obvious corrosion/oxidation was noted during the checks, and the connectors appeared to be tight prior to the checks.

Rod operability checks were performed for both Shim 4 and the Regulating Rod. Both passed the op checks sat, with the Regulating Rod drop time of 0.38 seconds, and the Shim 4 drop time of 0.40 seconds.

What corrective actions are needed to prevent this anomaly from reoccurring in the future:

Subsequent operation will require additional surveillance to insure proper and safe operation of the reactor. All systems appear to be functioning correctly, and normal reactor operations have been resumed.

7.3 MAINTENANCE OTHER THAN PREVENTIVE:

January

1. Repositioned and realigned the fire header inlet valve tamper switch mounting bracket to clear a locked in tamper alarm.

February

1. Replaced expended Helium System supply bottle.

March

1. Replaced the failing Control System Console (CSC) Status monitor..
2. Replaced local readout for the Demineralizer Area Radiation Area Monitor (RAM) after failing a weekly source check. Retests SAT

April

1. Troubleshot failure to stop on the Rod Drop Timer following a rod scram. Adjusted the Transient Rod reed switch. Rod operability checks sat, rod drop time 0.44 seconds
2. Replaced EF-3 (Pneumatic Transfer System) ventilation pre-filter.

May

1. Adjusted the Reactor Room Radiation Area Monitor (RAM) remote readout.
2. Replaced one condenser fan motor that failed on AC-2 (Equipment Room)

June

1. Replaced depleted Helium System supply bottle.
2. Replaced damaged fan belt and blown fuse in EF-2 (Bay Ventilation) controller.
3. Replaced failed condenser fan motor and run capacitor on AC-1 (Reactor Room).
4. Rewired the Reactor Room Continuous Air Monitor (CAM) power supply to the spare contacts on the failed power switch. CAM pump and electronics retested SAT

July

1. Changed out depleted Helium System supply bottle

August

1. Replaced expended on service Make Up Water Demineralizer resin bottle.
2. Adjusted Shim 2 rod bottom foot switch to correct improper indications. Rod op checks sat, drop time 0.41 seconds

3. Replaced failed blower drive belt on AC-2 (Equipment Room).

September

1. Replaced burned wire and connector in the controller for HV-2 (Bay 2 Staging Area)
2. Replaced all 4 resin bottles in the Demineralizer System with new, placed South Set bottles on service.
3. Replaced the failed air compressor on the Dry Pipe Fire Sprinkler System.
4 Replaced failed Industrial Waste (IW) collection tank level control float sensors

October

1. Troubleshot non-operation of AC-4 (Bay 1). Replaced compressor run capacitor, unit retested sat.:
2. Replaced worn blower sheave and belts on AC-3 (Bay 1).

November

1. Changed out Helium System supply bottle
2. Replaced seized air compressor the Dry Pipe Fire Sprinkler System .
3. Trouble shoot/repair non-operation of the Regulating Rod in Automatic. See anomaly report.

December

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. Included were control rod and fuel inspections, and parametric verifications.

Parametric values noted during testing are as follows:

Control Rod Worth:

Transient Rod: $2.05	Shim 1: $2.43	Shim 2: $2.30
Shim 3: $2.26	Shim 4: $2.46	Regulating Rod: $2.44

Control Rod Scram Drop Times:

Transient Rod: 0.36 sec	Shim 1: 0.40 sec	Shim 2: 0.37 sec
Shim 3: 0.39 sec	Shim 4: 0.40 sec	Regulating Rod: 0.38 sec

Shutdown Margin: $7.05

At Power Scram values: NPP-1000: 106% indicated, NM-1000: 100% indicated.

A nuclear instrument calorimetric calibration was performed, and both channels of Nuclear Instruments were adjusted based on results.

2. AC-1 (Reactor Room) replaced by a contractor. All system operations and ventilation interlocks tested satisfactory.
3. All old iodine production ventilation piping removed from the Reactor Room, surveyed, released and disposed of.
4. Calibrated and replaced the 4 resin d/p gages in the Demineralizer System.

7.4 Training

January

1. All Operations personnel attended 2008 Emergency Drill debrief and NRC IA 09-01.
2. All Operations personnel completed training on the latest updates to MNRC procedures..

3. One Operations personnel completed Facility Design and Operating Characteristics training.

February

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

March

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

April

1. All MNRC personnel attended the Annual ALARA, Safety, and Security training

May

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

June

1. All licensed operators (5 SROs) successfully completed the Annual Operators Exam.
2. RSO attended a one day class on APEX operations for the HPGe detectors.

July

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

August

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

September

1. All qualified fork lift operators attended recertification training.
2. All Senior Reactor Operators provided with Tech Spec requalification training.

October

1. All Operations personnel attended 4 sessions of Reactor Physics for requalification.
2. The Reactor Supervisor and the Facility Manager attended the annual Test Research and Training Reactors (TRTR) conference.

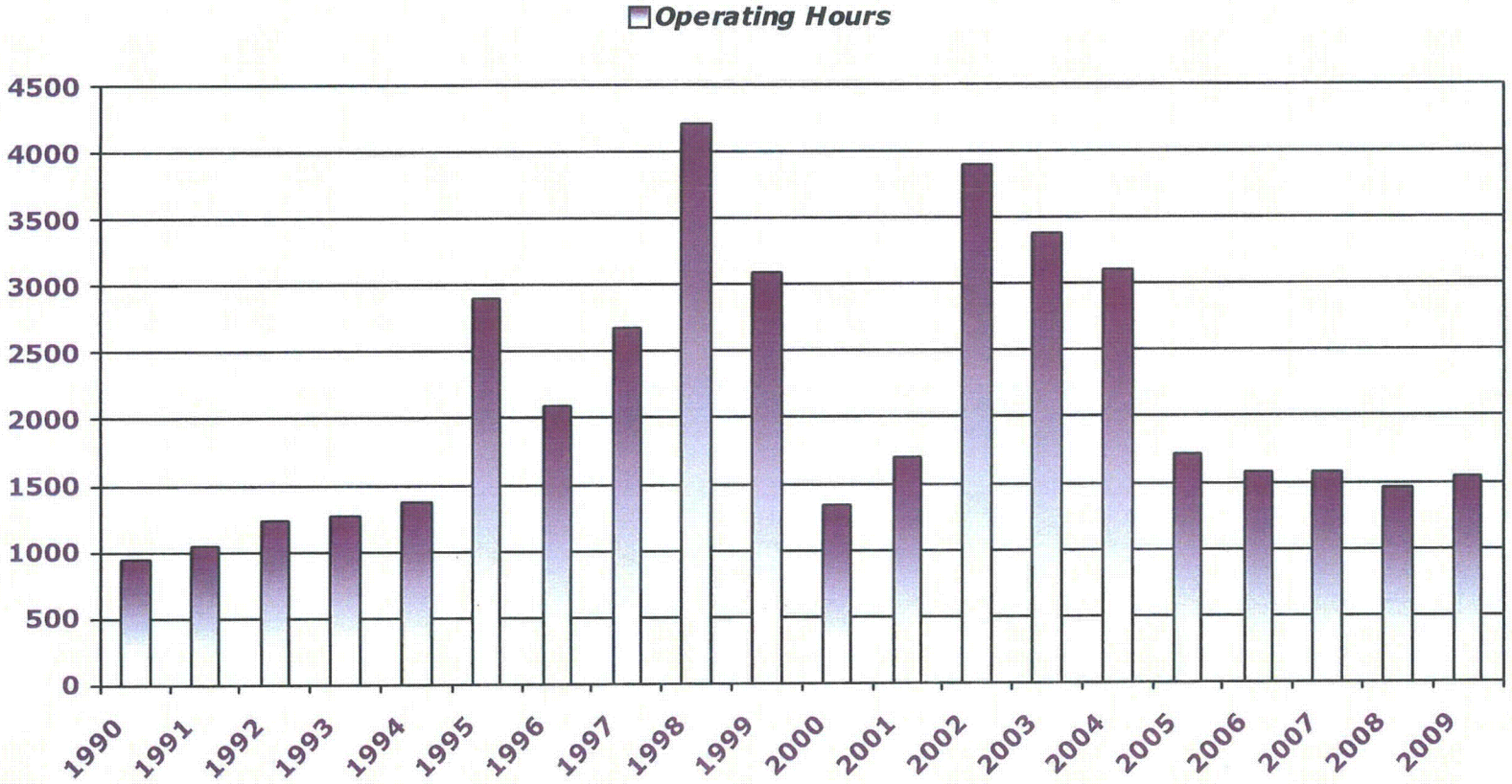
November

1. All Operations personnel completed their biennial physicals.
2. All Operations personnel attended sessions of Reactor Physics training.

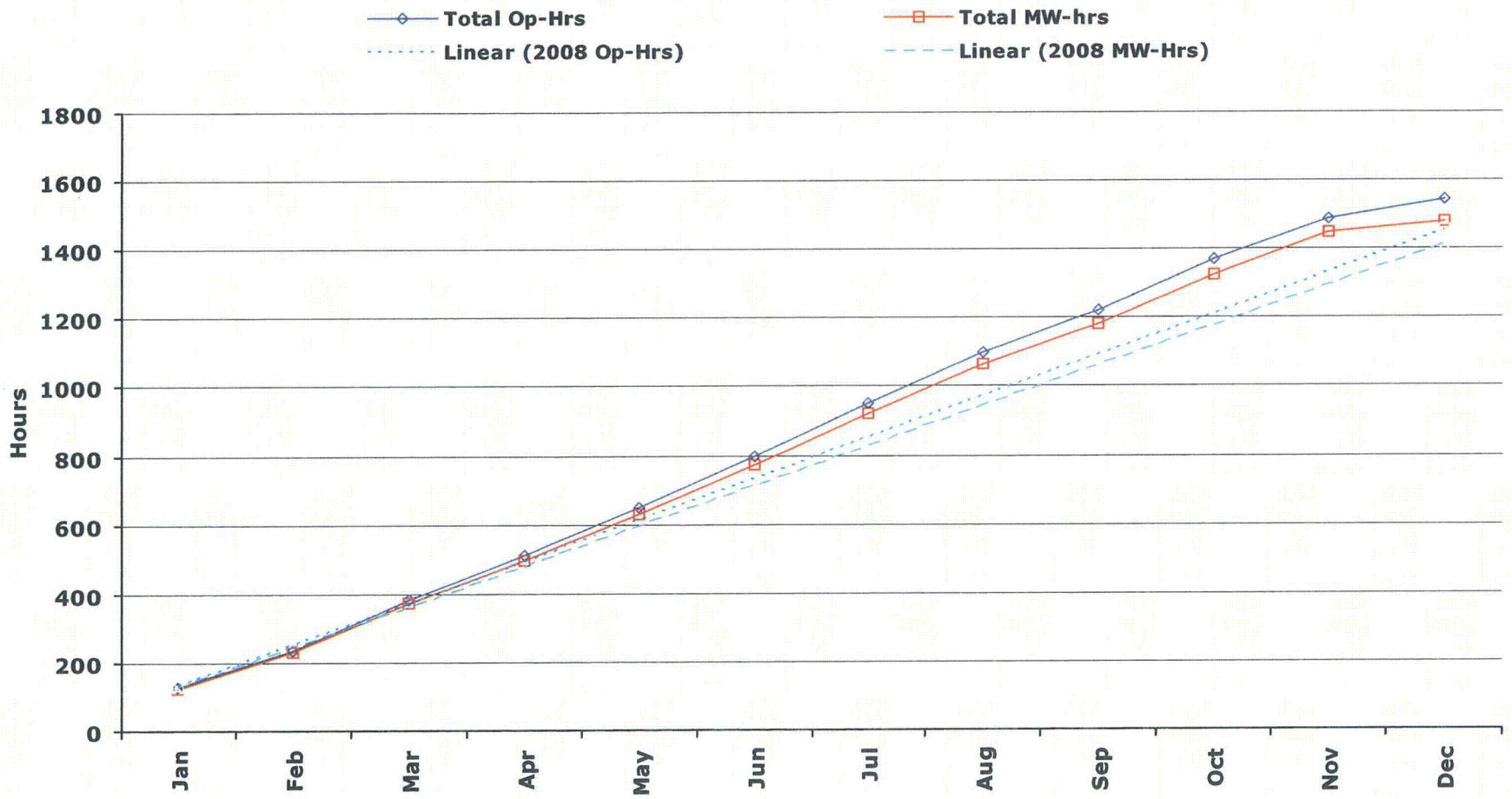
December

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.
4. Facility completed an Emergency Drill Exercise with the U.C. Davis Medical Center.

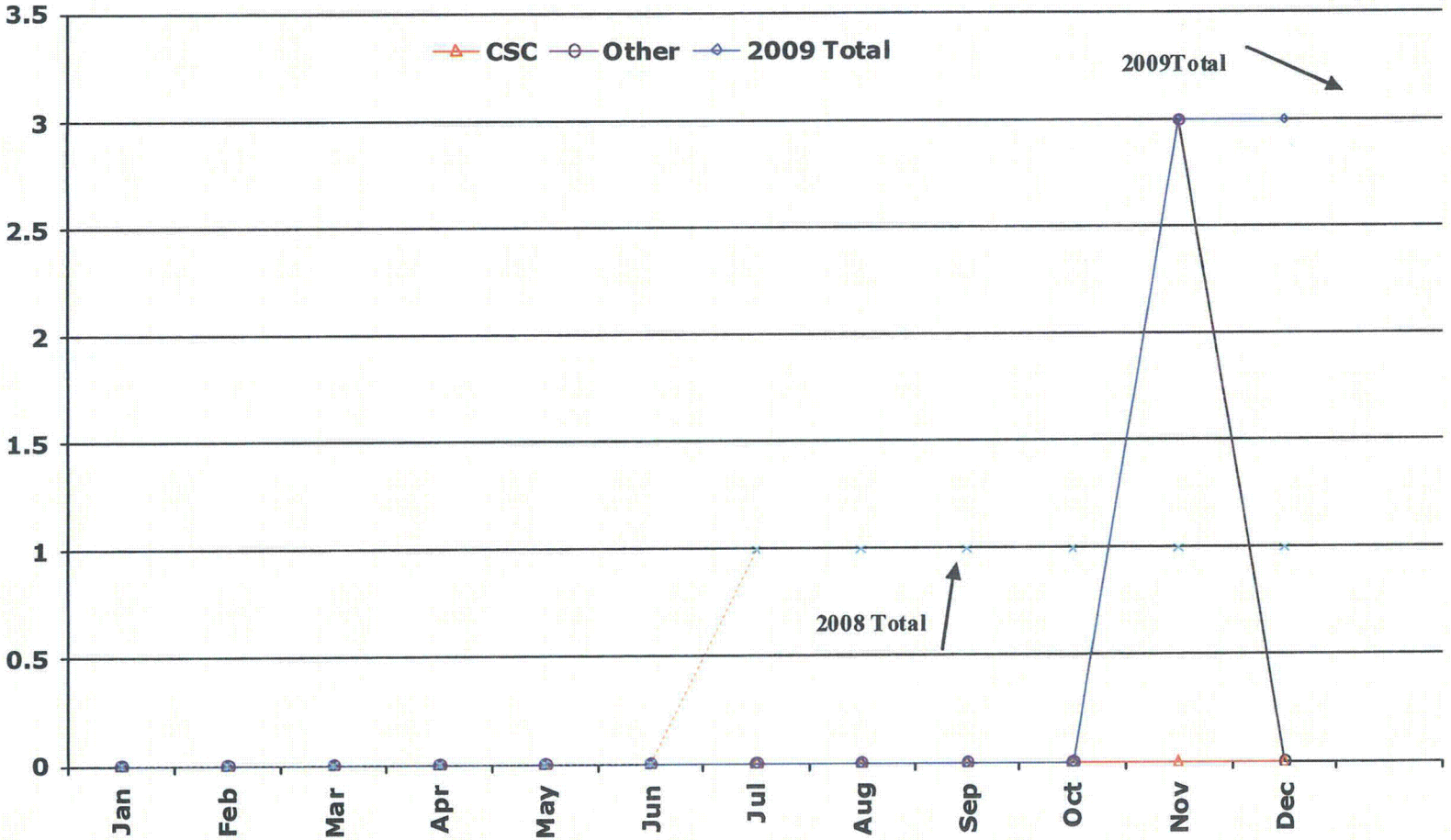
UCD/MNRC Operating History



Reactor Hours (2009)

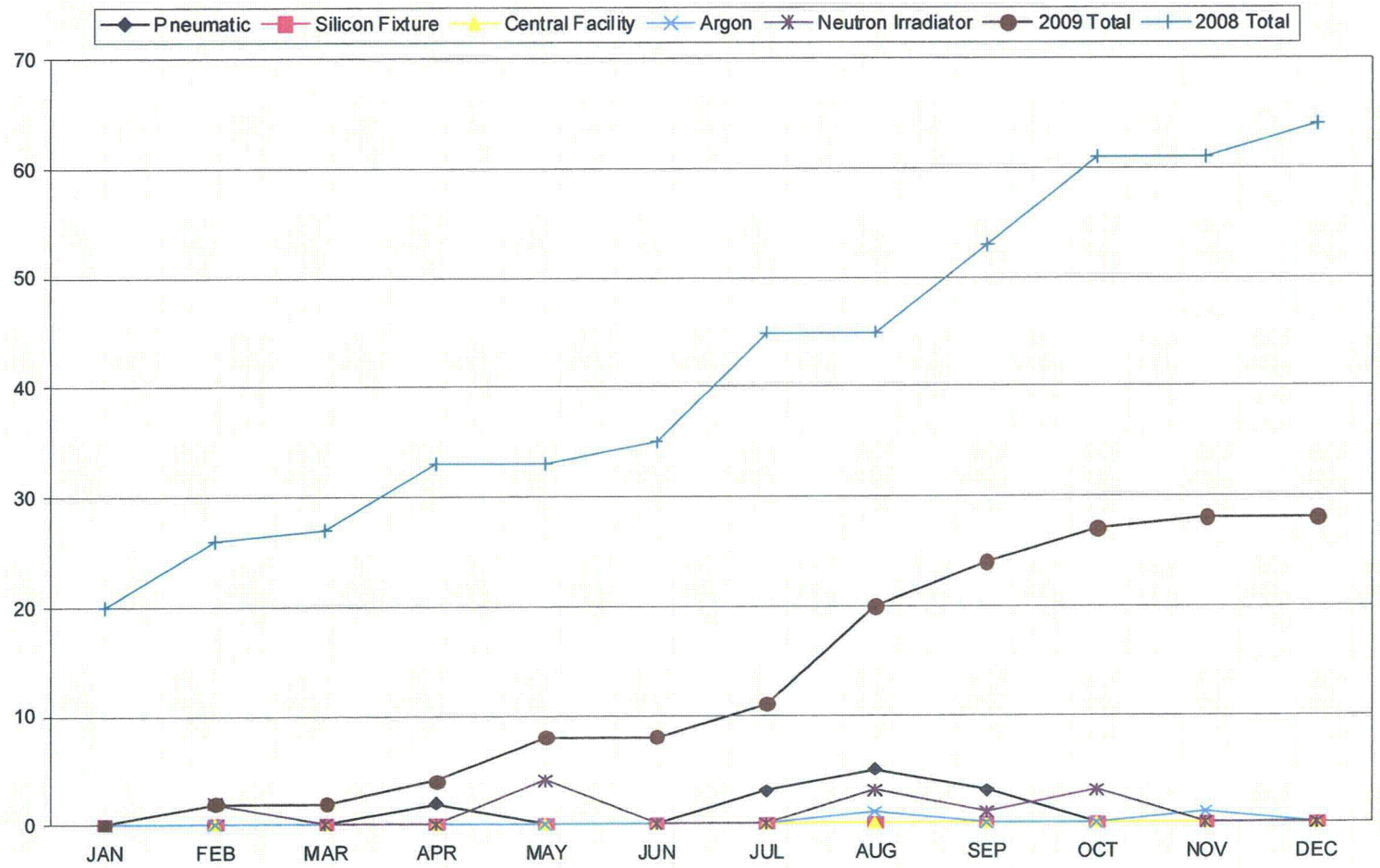


Unscheduled Shutdowns-- Total 2009

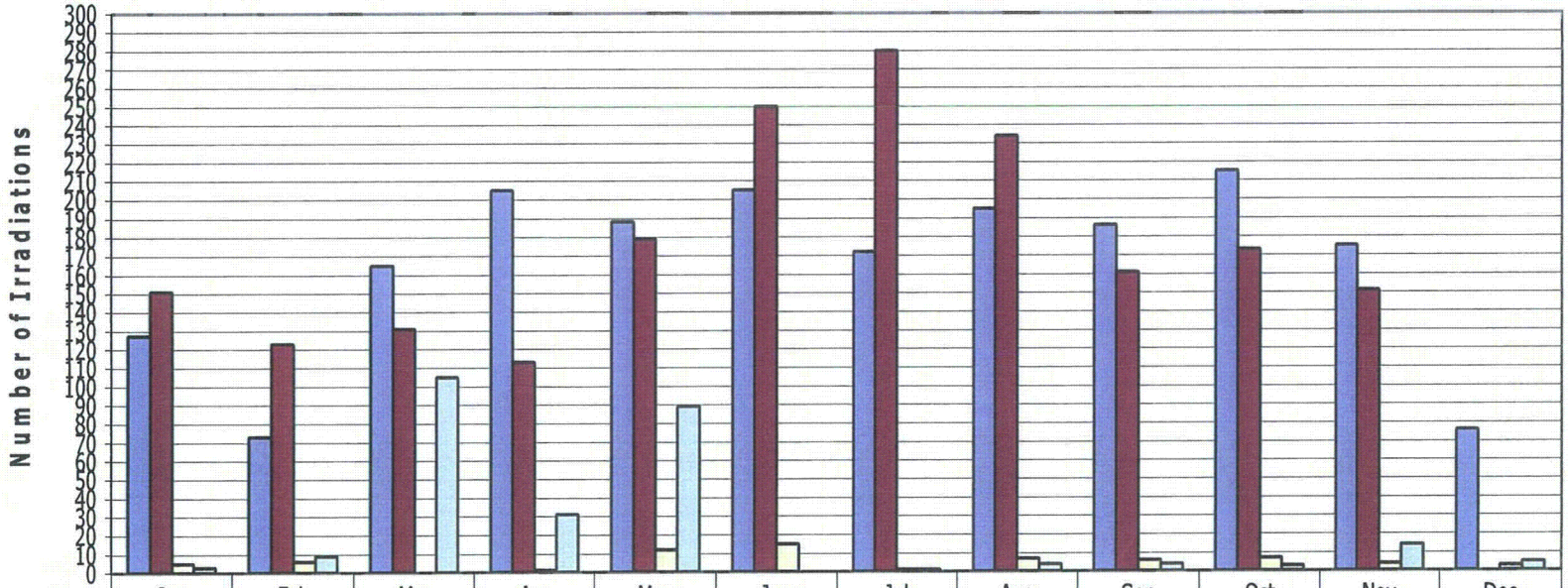


o

Reactor Tank Irradiation Facilities
Total Number of Irradiations Completed (2009)



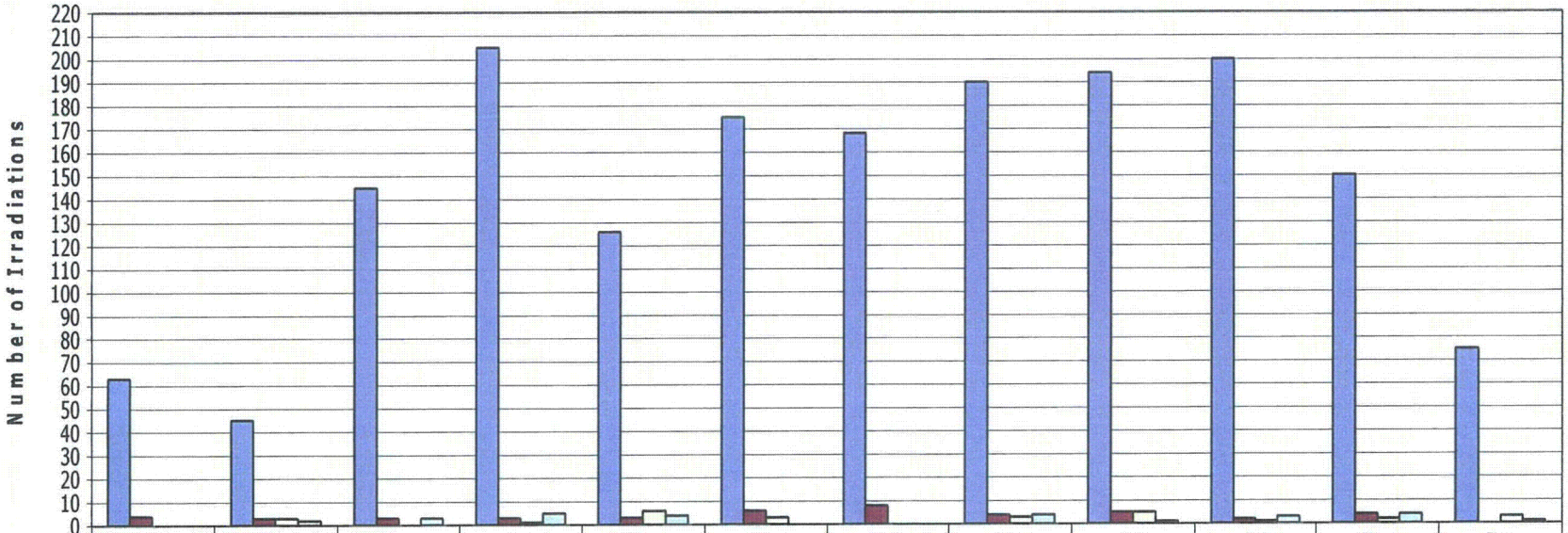
Bay Utilization (Shutter Operations) 2009



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bay 1	127	73	165	205	188	205	172	195	186	215	175	76
Bay 2	151	123	131	113	179	250	280	234	161	173	151	0
Bay 3	5	6	0	1	12	15	1	7	6	7	4	3
Bay 4	3	9	105	31	89	0	1	4	4	3	14	5

Months

Bay Irradiations Completed 2009



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bay 1	63	45	145	205	126	175	168	190	194	200	150	75
Bay 2	4	3	3	3	3	6	8	4	5	2	4	0
Bay 3	0	3	0	1	6	3	0	3	5	1	2	3
Bay 4	0	2	3	5	4	0	0	4	1	3	4	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

Liquid effluents released during 2009 are summarized on a monthly basis in Table 1 below.

TABLE 1

2009 SUMMARY OF LIQUID EFFLUENTS

MONTH	TOTAL ACT. RELEASED (Ci)	*DETECTABLE RADIO-NUCLIDE(S)*	SPECIFIC ACT. OF EACH DETECT-ABLE RADIO-NUCLIDE (uCi/ml)	TOTAL ACT. OF EACH DETECT-ABLE RADIO-NUCLIDE (Ci)	AVG. CONC. OF RAD. MATL. AT POINT OF RELEASE (uCi/ml)	FRACTION OF 10CFR20 LIMIT	TOTAL VOL. OF EFFLUENT WATER (INCLUDING DILUENT) RELEASED (gal)
JAN	0	NONE					
FEB	0	NONE					
MAR	0	NONE					
APR	0	NONE					
MAY	0	NONE					
JUN	0	NONE					
JUL	0	NONE					
AUG	0	NONE					
SEP	0	NONE					
OCT	0	NONE					
NOV	0	NONE					
DEC	0	NONE					

8.2 Airborne Effluents

Airborne radioactivity discharged during 2009 is tabulated in Table 2 below.

TABLE 2
2009 SUMMARY OF AIRBORNE EFFLUENTS

MONTH	TOTAL EST. QUAN. Ar-41 RELEASED (Ci)	EST. MAX AVG. CONC. OF Ar-41 IN UNRESTRICTED AREA (1) (uCi/ml)	FRACTION OF APPLICABLE 10CFR20 Ar-41 CONC. LIMIT FOR UNRESTRICTED AREA (1) (%)	EST. DOSE (2) FROM Ar-41 FOR UNRESTRICTED AREA (1) (mrem)	FRACTION OF APPLICABLE 10CFR20 DOSE LIMIT FOR UNRESTRICTED AREA (1) (%)	TOT. EST. QUANTITY OF ACT. IN PART. FORM WITH HALF-LIFE >8 DAYS (Ci)	AVERAGE CONC. OF PART. ACT. RELEASED WITH HALF-LIFE > 8 DAYS (uCi/ml)
JAN	2.32	3.15E-07	1.4%	8.44E-01	8.44%	NONE	NONE
FEB	1.72	2.34E-07	1.0%	6.26E-01	6.26%	NONE	NONE
MAR	2.19	2.97E-07	1.3%	7.96E-01	7.96%	NONE	NONE
APR	2.00	2.71E-07	1.2%	7.26E-01	7.26%	NONE	NONE
MAY	2.09	2.84E-07	1.2%	7.60E-01	7.60%	NONE	NONE
JUN	2.89	4.17E-07	1.8%	1.12E+00	11.18%	NONE	NONE
JUL	3.13	4.53E-07	2.0%	1.21E+00	12.14%	NONE	NONE
AUG	3.14	4.54E-07	2.0%	1.22E+00	12.17%	NONE	NONE
SEP	2.43	3.51E-07	1.5%	9.39E-01	9.39%	NONE	NONE
OCT	2.62	3.79E-07	1.7%	1.02E+00	10.16%	NONE	NONE
NOV	2.34	3.38E-07	1.5%	9.05E-01	9.05%	NONE	NONE
DEC	0.51	7.36E-08	0.3%	1.97E-01	1.97%	NONE	NONE
TOT	27.38	3.87E-06	-	10.36	-	NONE	NONE
AVG	2.28	3.22E-07	1.4%	0.86	8.63		

(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).

8.3 Solid Waste

No waste shipments were made in 2009

TABLE 3
2009 SUMMARY OF SOLID WASTE

TOTAL VOL. (cu. ft.)	TOTAL ACTIVITY (mCi)	DATE OF SHIPMENT	DISPOSITION
0	0	N/A	N/A

9.0 Radiation Exposure

Radiation exposure received by facility operations personnel, facility users, and visitors during 2009 is summarized in Table 4 below.

TABLE 4
2009 SUMMARY OF PERSONNEL RADIATION EXPOSURES

	NUMBER OF INDIVIDUALS	AVERAGE TEDE PER INDIVIDUAL (mrem)	GREATEST INDIVIDUAL TEDE (mrem)	AVERAGE EXTREMITY (mrem)	GREATEST EXTREMITY (mrem)
FACILITY PERSONNEL	7	28	63	29	168
FACILITY USERS	4	<0.1	1	*	*
VISITORS	862	0.24	5	*	*

* 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 2009 are summarized in Table 5 below.

TABLE 5
2009 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	91	<800(1)	<800(1)
DEMINERALIZER AREA	17.0	270	<800(1)	<800(1)
REACTOR RM	3.0	92	<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 2009 are summarized in Tables 6-9 below. The environmental survey program is described in the MNRC Facility Safety Analysis Report.

TABLE 6
2009 SUMMARY OF ENVIRONMENTAL TLD RESULTS
(WITH NATURAL BACKGROUND(1) SUBTRACTED)

	AVERAGE (mrem)	HIGHEST (mrem)
ON BASE (OFF SITE 1-20 & 64)	5	23
ON SITE (SITES 50 – 62 & 65-71)	13	32

(1) Natural background assumed to be the off base (Sites 27-42) average of 26mrem.

TABLE 7
2009 SUMMARY OF RADIOACTIVITY IN WELL WATER

	ALPHA (pCi/l)	BETA (pCi/l)	TRITIUM (pCi/l)	Cs-137 (pCi/l)
AVERAGE	<MDA	6.86E+00	<MDA	<MDA
HIGHEST		1.01E+01		

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

	MIN	MAX
Alpha	1.21E+00	1.46E+00
Beta	2.85E+00	3.31E+00
Tritium	2.92E+02	3.57E+02
Cs-137	3.15E+00	6.93E+00