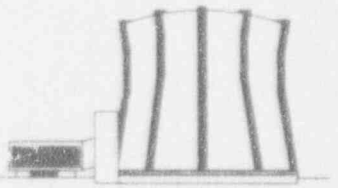
TEXAS ENGINEERING EXPERIMENT STATION

TEXAS A&M UNIVERSITY

COLLEGE STATION, TEXAS 77843-3575



NUCLEAR SCIENCE CENTER
409 845-7551

06 June 1994

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

94-0159

Reference: Facility Operating License No. R-83, Docket No. 50-128
Technical Specification 6.6.1

I have enclosed a copy of our "Thirtieth Annual Progress Report" for your information and review. I am also informing you that the licensee for the NRC license R-83 is now:

Dr. Raymond W Flumerfelt, Deputy Director
Texas Engineering Experiment Station
Texas A&M University System
College Station, Texas 77843

If you have any questions, please let me know.

Sincerely,

W. D. Reece

Warren D. Reece, Director
Nuclear Science Center

WDR/ph

Enclosure

xc: Chrono File

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THIRTIETH ANNUAL PROGRESS REPORT

of the

Nuclear Science Center
Texas Engineering Experiment Station
Texas A&M University System
College Station, Texas

January 1, 1993

Through

December 31, 1993

Prepared by

W. D. Reece, Director

May 1, 1994

I. Introduction

The Nuclear Science Center (NSC) is operated by the Texas Engineering Experiment Station (TEES) as a service to the Texas A&M University System (TAMU) and the State of Texas. The Nuclear Science Center reactor and laboratories are available to students, researchers, faculty and staff from Texas A&M University, other colleges and universities, government agencies, and private industry.

The Nuclear Science Center is comprised of a 1 mega-watt TRIGA reactor operating under license by the U.S. Nuclear Regulatory Commission (NRC); license R-83 currently extends through March, 2003. The nuclear fuel for the reactor is provided by the U.S. Department of Energy (DOE) under contract #DE-AC05-76ER04207 (formerly EY-76-C-05-4207).

II. REACTOR USE

The NSC reactor operated for 1944 hours in 1993 for a total integrated power of 81.0 MW-days. During this period, 610 requests for reactor services were fulfilled. These requests are classified as either Academic Use, Internal Research, External Research, or Commercial activities. Academic Use provides services for primary, secondary and higher education programs in the form of educational laboratories or research in pursuit of advance degrees. Internal Research provides services to TAMU system basic research. External Research provides access to the reactor facilities by other colleges or universities, government agencies and non-profit institutions for basic research. Commercial work is also performed for private firms in support of research and production.

The Department of Energy provides funding to the NSC under the Reactor Sharing Program to provide no cost or low cost access to researchers and teachers from outside the Texas A&M System. The state of Texas provides direct funding to provide access to all Texas academic and governmental agencies at reduced costs. Commercial firms are charged at full recovery rates for research and isotope production in accordance with published service fee schedules.

The reactor was used by students, faculty and staff from 5 departments at Texas A&M University. Access was also provided to the faculty and students from 12 other educational institutions during this year. Escorted tours were provided to 3,310 visitors during 1993. A summary listing of the NSC users is provided in the attached Tables 1-3:

Nuclear Science Center
Commercial Account Listing

Table 1

Company/Institution	User Name
AAE/BCS Traders	Mr. Helmut Zimmermann
American Biomed	Mr. Paul Skidham
Arco Exploration & Production Technology	Mr. Steven Bergman
Cardinal Survey Company	Mr. George Newman
Columbia Gem House, Inc.	Mr. Eric Braunwart
Donelick Analytical	Mr. Raymond Donelick
FRAC-MATE LTD.	Mr. Cam Carlson
Hughes Aircraft Company	Dr. Ron Hart
IsoTag	Mr. Fred Calaway
Isotech Laboratories	Mr. Lynn Williams
Lockheed Engineering	Mr. David Stanley
Lousiana State University	Dr. Ron Knaus
M.D. Anderson, University of Texas Cancer	Mr. Tim Ochran
Methodist Hospital	Dr. William Cole
Poretics Corporation	Mr. Greg Stasny
Protechnics/Spectratek	Mr. Mike Brewer
Schlumberger Well Services	Mr. J.F. Poupeau
Scientech, Inc.	Mr. Veryl Frahm
Scimed Life Systems, Inc.	Mr. Albert Your
Shell Development Company	Mr. Jay Postlewaite
Southwest Texas State University	Mr. Dwight Sitta

Nuclear Science Center
Commercial Account Listing

Table 1

Company/Institution	User Name
Stanford University, Dept of Geology	Mr. Trevor A. Dumitru
TAMU, Research Foundation, Chemistry	Dr. Kenny Kennicutt
Texas Instuments Corporation	Ms. Cheryl Blackburn
TPL, INC.	Mr. Timothy C. Tierma
Tracer Services Ltd.	Mr. Norman Seely
Tracerco	Mr. Dave Bucior
Tru-Tec Division	Mr. Chuch Winfield
TruTag Systems	Mr. Wade Hutchinson
U.S. Dept. of Interior, Geological Survey	Mr. Roy Knight
University of California, LANL	Mr. Archie Velarde
Western Atlas, Inc.	Mr. Billie Dean Rose
Woodson-Tenent Labs, Inc.	Mr. Edward McCarthy

Nuclear Science Center
Texas Academic Accounts

Table 2

Company/Institution	User Name
Department of Anthropology	Dr. Harry J. Shafer
N.E./405/REECE	Dr. W. D. Reece
N.E./606/REECE	Dr. W. D. Reece
N.E./691/PARISH	Dr. Parish
TAMU, College of Geo Sciences, Oceanography Dept	Dr. Paul Boothe
TAMU, College of Sci, Dept of Animal Science	Dr. Ellis
TAMUS, College of Eng, Dept of Nuclear Engineering	Dr. W. D. Reece
TAMUS, College of Science, Dept of Chemistry	Dr. Marvin Rowe
TAMUS, College of Eng, Dept of Nuclear Engineering	Dr. John Poston
TAMUS, College of Eng, Dept of Nuclear Engineering	Dr. Ted Parish
TAMUS, College of Eng, Dept of Nuclear Engineering	Dr. Yassin Hassan
TAMUS, College of Eng, Dept of Nuclear Engineering	Dr. Wesley Bolch
Department of Anthropology (Archeology)	Dr. David L. Carlson
Department of Geology & Geophysics	Dr. Thomas T. Tieh
Horticultural Sciences Department	Dr. Edward L. McWilliams
Ocean Drilling Program (Coll. of Geosciences)	Dr. James F. Allen
Soil & Crop Sciences/Dept. Of Agriculture	Dr. Richard H. Loeppe
TAMU, College of A&LS, Dept of Animal Science	Dr. William Ellis
TAMU, College of Geo Sciences, Dept of Geology	Dr. John Spang
TAMU, College of Geo Sciences, Dept of Physics	Dr. Eugene Barasch

Nuclear Science Center
Texas Academic Accounts

Table 2

Company/Institution	User Name
TAMU, College of Sci, CCCA	Dr. Dennis James
TAMU, College of Sci, Dept of Chemistry	Dr. O. M. Bockris
TAMU, College of Sci, Dept of Physics	Dr. Eugene Barasch
TAMU, College of Vet Med, Dept of Physio & Pharm	Dr. Sheri Keele
TAMUS, College of Eng, Dept of Nuclear Engineering	Dr. Dan Reece
TAMUS, College of Eng, Dept of Nuclear Engineering	Dr. John Wagner
TAMUS, College of Eng, Dept of Nuclear Engineering	Dr. Ted Parish

Nuclear Science Center
External Academic and Research Accounts

Table 3

Company/Institution	User Name
Lousiana State University	Dr. Ron Knaus
McLennan Community College	Mr. Don Tatum
Miami University	Dr. Kevin Crowley
New Mexico Technical College	Dr. Phillip Kyle
Reactor Tours-DOE Funded	Various
Sam Houston State University	Dr. Bill Covington
Southern Methodist University	Dr. Shari Kelley
Stanford Univ., Dept of Geology, Research	Dr. Trevor Dumitru
Texas State Technical College	Ms. Georgia Martini
U.S. Dept of Agriculture	Dr. Al Hollister
Univ of Houston, Inst For Beam Particle Dynamics	Dr. In-Gann Chen
Univ of Texas At Austin, Dept of Geological Scie	Dr. Mark Cloos
Univ Of Texas At El Paso	Dr. Elizabeth Anthony
University of Houston	Dr. Liu
University of Southwest Lousiana	Dr. John Meriwether

III. FACILITY AND PROCEDURE CHANGES

In accordance with the requirements of 10CFR50.59, changes to the facility and procedures were reviewed and documented. During 1993 no changes were performed that required additional safety analysis or changes to the Technical Specifications. The

following changes were implemented as not representing an unreviewed safety question, and not increasing the probability of an accident previously analyzed in the Safety Analysis Report.

A. Facility Modification

Date	WR #	Facility Modification
01/93	93-003	Fuel Vault Ventilation
01/93	93-166	Secondary Treatment System Fill Valve Control
04/93	93-029	Upgraded Area Radiation Monitors
11/93	93-030	New Linear Flux Monitor Drawer
11/93	93-127	Upgrade Materials Handling Area

B. Procedure Changes

No procedures contained in the SAR were changed.

IV. FACILITY MAINTENANCE

All required maintenance as set forth in the Technical Specifications was performed annually, semi-annually, or weekly as required. Pre-startup checklists are performed daily prior to reactor operation to assure reactor facility readiness.

V. TECHNICAL SPECIFICATION SURVEILLANCE

The Technical Specification requirements for maintenance and surveillance were completed for all required channels as follows:

A. Calibrations

Fuel Element Temperature Measuring Channel

Linear Power Channel

Log Power Channel

High Power (Safety) Channels

Area Radiation Monitoring Channels

B. Compliance Testing

Control rod worth, and time measurements were performed in January, 1993. Total rod worth was measured at $6.39; providing a shutdown margin of $3.30. The rod scram time is within the Technical Specification limit of 1.2 seconds. The maximum allowable pulse reactivity insertion is $2.09 for Core VIII-A as determined by a pulse test program. An administrative limit of $1.90 is imposed for pulse operations.

The power level (linear) channel was calibrated by the calorimetric method on 01/08/93. The pulse measuring channel was calibrated on 01/29/93. Pulse operation parameters are verified

semi-annually by pulsing the reactor for comparison of pulse energy and fuel temperature to previous pulse operation values.

Nineteen fuel elements were inspected in January 1993. In addition, all control rods and fueled followers were visually inspected. All elements satisfied the inspection criteria.

The reactivity worth for each experiment was measured or estimated before initially performing an experiment. The most reactive ($0.98) fixed experiment are the East Face Stone Irradiator Boxes.

C. Readiness Review and Emergency Planning

A review of the NSC security plan and emergency plan was conducted by the NSC staff on 03/16/93. The annual facility evacuation drill and staff emergency response was conducted on 09/23/93. A review of the NSC ALARA program was conducted by the Office of Radiological Safety on 06/20/93.

VI. REACTOR OPERATIONS

A. Availability

The NSC reactor operates 3 days a week from 0800 to 1700 and 2 days a week from 0800 to 2300 hours. Performance statistics

for calendar year 1993 are as follows:

Number of Days Reactor Operated - 238

Reactor Operation (MW-Days) - 81.0

Number of Hours at Steady State - 1971

Average Number of Operating Hours Per Week - 37.9

Total Number of Pulses - 38

Number of Irradiations - 610

Beam Port Experiment-Hours - 32.7

Irradiation Cell Experiment-Hours - 0

Number of Visitors - 3310

B. Unscheduled Outages

A total of 8 unscheduled shutdowns occurred during 1993. The unscheduled shutdowns were caused by the following:

Loss of Facility Electrical Power - 5 occurrences

Operator Error - 3 occurrences

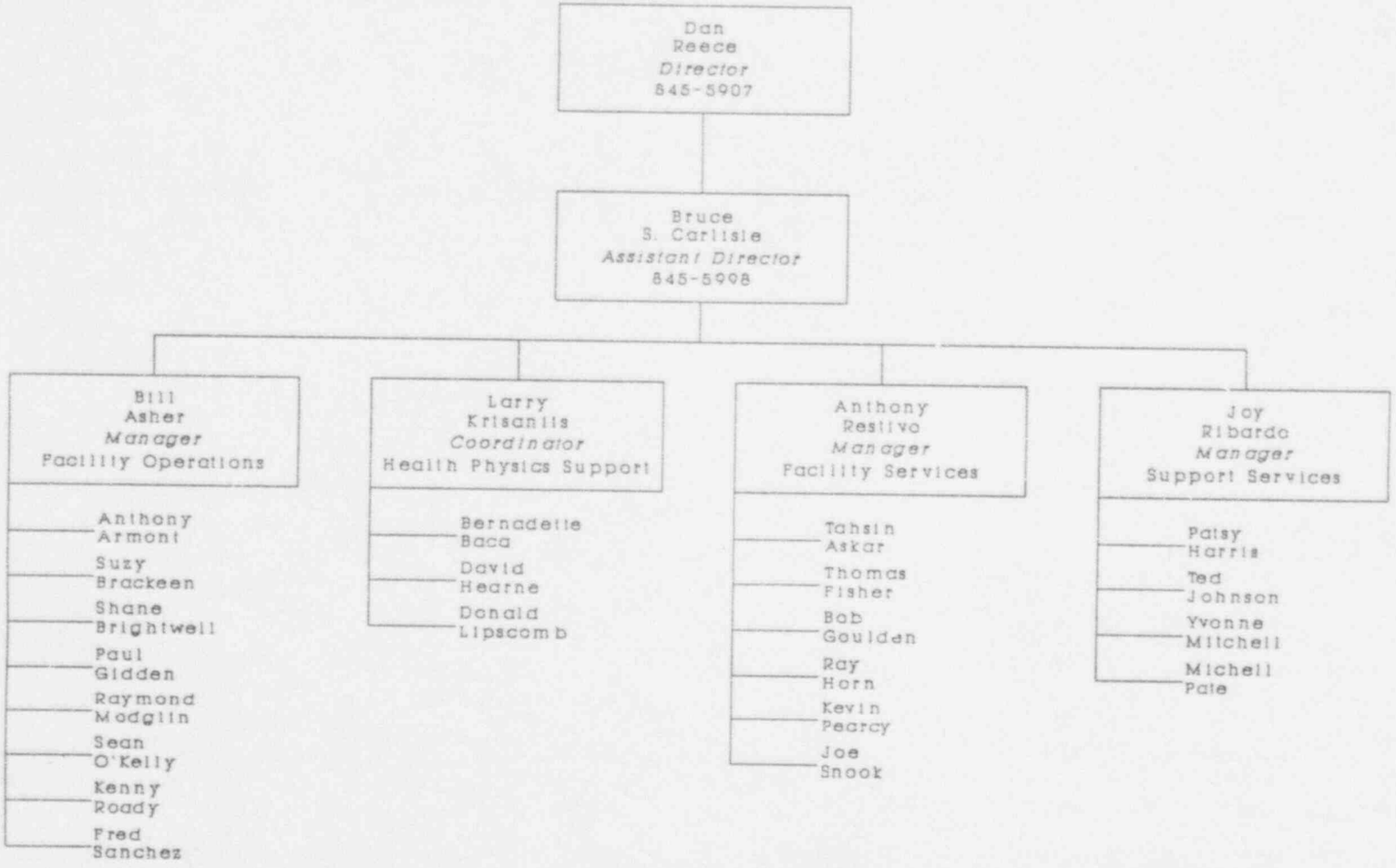
C. Reportable Occurrences

There were no reportable occurrences.

VII. ADMINISTRATION

The reporting structure and reactor organizational requirements are contained in the Technical Specifications. The complete Nuclear Science Center organization is identified in chart format on Figure 1.

Nuclear Science Center
Texas Engineering Experiment Station



VIII. HEALTH PHYSICS SURVEILLANCE

A dedicated Health Physics group is maintained at the NSC reactor facility as an integral part of the line organization. Additional support is provided on request by the TAMU Radiological Safety Office.

A. Irradiation Support

Health Physics monitoring and technical support provided both quality assurance and hazards reduction during the processing of over 665 irradiation requests and shipping 356 shipments of radioactive material. Of these, 93 shipments were sent to other locations on the Texas A&M campus.

B. Personnel Monitoring

Personnel Monitoring was provided to 49 NSC employees and 58 experimental personnel using the facilities. All of the radiation exposures to personnel were below the limits set forth in 10CFR20.101. Only two personnel recieved annual maximum exposure over 10% of the federal limits: 610 and 550 mrem. A total of 4.99 man-rem was recorded for 1993.

During 1993, 3,310 persons visited the Nuclear Science

Center. No detectable exposures were measured with film badges. Dosimetry results were provided by an NVLAP accredited supplier, Landauer.

C. Facility Monitoring

Surveys of the Nuclear Science Center facilities are performed to assess radiological hazards to NSC workers. Radiation levels and sources of radioactive contamination are frequently monitored. Approximately 350 smear samples were collected and evaluated each month. Radioactive effluent releases were monitored for isotopic content and activity; there were 26 planned releases of radioactive liquid effluents totalling 6.70×10^{5} liters.

D. Particulate Effluent Monitoring

Radioactive particulates are monitored at the base of the central exhaust stack and are summarized on a monthly basis. The annual average release rate was 1.3135×10^{-11} μCi/cc. Total activity of paticulate release for 1993 was 1.34×10^{-3} Ci.

The following table summarizes annual particulate effluent releases during 1993.

RADIOACTIVE PARTICULATE EFFLUENT RELEASES

Qtr	Month	Average Release Conc.*1 (µCi/cc)	Diluted Conc*2 (µCi/cc)	Exhaust Volume*3 (cc)	Total Release*4 (Ci)
I	January	1.60E-11	7.9800E-14	1.0117E+13	1.614604E-4
	February	3.37E-12	1.6850E-14	9.1377E+12	3.079405E-5
	March	<bkgd	<bkgd	1.0117E+13	<bkgd
	Average:	9.665E-12	4.8325E-14	9.7904E+12	9.612805E-5
			Total	2.9371E+13	1.922604E-4
II	April	<bkgd	<bkgd	9.7904E+12	<bkgd
	May	1.48E-11	7.410E-14	1.0117E+13	1.499304E-4
	June	1.41E-11	7.068E-14	9.7904E+12	1.384004E-4
	Average:	1.448E-11	7.239E-14	9.8992E+12	1.441604E-4
			Total	2.9697E+13	2.883304E-4
III	July	5.15E-12	2.575E-14	1.0117E+13	5.210105E-5
	August	2.65E-11	1.325E-13	1.0117E+13	2.680904E-4
	September	<bkgd	<bkgd	9.7904E+12	<bkgd
	Average:	1.055E-11	5.275E-14	1.0008E+13	1.067304kE-4
			Total	3.0024E+13	3.201904E-4
IV	October	4.80E-11	2.400E-13	1.0117E+13	4.856004E-4

November	2.40E-13	1.200E-15	9.7904E+12	2.349706E-6
December	5.30E-12	2.650E 14	1.0117E+13	5.361905E-5
Average:	1.7847E-11	8.923E-14	1.0008E+13	1.805204E-4
		Total	3.0024E+13	5.415704E-4

ANNUAL SUMMARY

Average:	1.3135e-11	6.5675e-14	9.9263E+12	1.318874E-4
		Total:	**1.1912E+14**	**1.342353E-3**

Notes: (1) Average Release Concentration data from Form 805, Channel 1 "Activity Released"

(2) Diluted Concentration equal to Average Release Concentration multiplied by 0.005(Technical Specification 3.5.2, dilution value for release concentration at exclusion boundary)

(3) Exhaust Volume equal to:(#days/month)*(24hrs/day)*(60min/hr)*(8000cfm)/(3.53E-5cfm/cc)

(4) Total Release equal to: (Average Release Concentration) *(Exhaust volume)/(1E6uCi/Ci)

Total Central Exhaust Air Volume: 1.19×10^{14} cc

Central Exhaust Annual Average Release Rate: 1.31×10^{-11} μCi/cc.

Total Central Exhaust Annual Release: 1.34×10^{-3} Ci.

E. Gaseous Effluents Monitoring

Argon-41 is the major gaseous effluent produced and released at the Nuclear Science Center. This effluent is monitored at the central exhaust stack. Total Argon-41 release during 1993 was 17.84 Ci with an annual release rate of 1.611×10^{-7} μCi/cc (no dilution factors applied). Release rates are also determined using the dilution factors for the release rate at the exclusion area boundary. The total amount released is determined from the undiluted release rate. These data are summarized below:

RADIOACTIVE GASEOUS EFFLUENT RELEASES

Qtr	Month	Average Release Conc.(1) (μCi/cc)	Diluted Conc.(2) (μCi/cc)	Exhaust Volume(3) (cc)	Total Release(4) (Ci)
I	January	1.39E-07	7.00E-10	1.0117E+13	1.4062
	February	<bkgd	<bkgd	9.1377E+12	<bkgd
	March	1.52E-07	7.60E-10	1.0117E+13	1.5418
	Average:	1.457E-07	7.285E-10	9.7904E+12	1.4740
			Total:	2.9371E+13	2.9480
II	April	2.33E-07	1.17E-9	9.7904E+12	2.2841
	May	1.83E-07	9.20E-10	1.0117E+13	1.8514
	June	4.95E-07	2.48E-9	9.7904E+12	4.8462
	Average:	3.038E-07	1.519e-9	9.8992E+12	2.9939
			Total:	2.9697E+13	8.9817
III	July	2.03E-07	1.02E-09	1.01167E+13	2.0537

	August	3.33E-07	1.67E-09	1.01167E+13	3.3689
	September	1.84E-08	9.00E-11	9.79037E+12	0.1801
	Average:	1.848E-07	9.24E-10	1.00080E+13	1.8676
			Total:	3.00238E+13	5.6027
IV	October	2.33E-08	1.2E-10	1.01167E+13	0.2357
	November	3.04E-10	1.52E-12	9.79037E+12	0.0030
	December	6.80E-09	3.0E-11	1.01167E+13	0.0688
	Average:	1.0135E-08	5.0673E-11	1.00080E+13	0.1025
			Total:	3.00238E+13	0.3075

ANNUAL SUMMARY

Average:	**1.6110E-07**	8.0550E-10	9.92635E+12	1.6095
		Total:	**1.1912E+14**	**17.840**

Notes:

(1) Average Release Concentration data from Form 805, Channel 3 "Activity Released"

(2) Diluted Concentration equal to Average Release Concentration multiplied by 0.005 (Technical Specification 3.5.2, dilution value for release concentration at exclusion boundary)

(3) Exhaust Volume is equal to: (#days/month)*(24hrs/day)*(60min/hr)*(8000cfm)/(3.53E-5cfm/cc)

(4) Total Release equal to: (Average Release Concentration) *(Exhaust Volume)/(1E6uCi/Ci)

Total Air Volume: 1.19×10^{14} cc

Central Exhaust Average Release Rate: 1.61×10^{-7} μCi/cc

Total Ar-41 Activity Released: 17.84 Ci

F. Liquid Effluents Monitoring

Radioactive Liquid effluents are collected in liquid holdup waste tanks prior to release from the confines of the Nuclear Science Center. Sample activity concentrations and isotope identification was determined prior to each release. There were 26 releases in 1993, totalling 6.70×10^{5} liters, excluding dilutents from the Nuclear Science Center. The total radioactivity released for 1993 was 3.69×10^{-3} Ci with an average concentration of 5.89×10^{-6} µCi/cc. Summaries of the radioisotopic data are presented below. Radioactivity concentrations for each isotope were below the limits specified in 10CFR20, Appendix B Table II, Column 2.

RADIOACTIVE LIQUID EFFLUENT RELEASES

	Total of	**Monthly Isotopic Release Activity (Ci)**				
Month	Releases	Na-24	Sc-46	Cr-51	Mn-54	Co-57
January	1		5.11E-5		8.78E-5	
February	2		4.58E-6		5.23E-6	
March	1		5.39E-5		1.63E-4	
April	2		1.97E-5		6.81E-5	
May	2		2.52E-5	2.26E-4	1.11E-4	
June	1		3.55E-5		4.48E-5	
July	2		1.22E-5		1.47E-5	
August	5		6.85E-5	2.88E-4	1.93E-4	
September	2		2.38E-5		1.35E-4	
October	3	1.45E-7	3.59E-5		1.38E-4	
November	2		6.50E-6			2.78E-6
December	3		3.88E-5	3.57E-4	1.70E-4	

Totals:	26	1.45E-7	3.76E-4	8.71E-4	1.13E-3	2.78E-6

Monthly Iostopic Release Activity (Ci)

Month	Co-58	Co-60	Zn-65	Sb-124	Ir-192
January	9.9E-6	3.50E-5	8.28E-6	4.09E-5	1.77E-4
February		1.14E-6			1.05E-6
March	2.47E-5		9.96E-6		9.60E-6
April	7.66E-6	1.46E-5			1.28E-4
May	1.65E-5	2.19E-5	8.13E-6		7.74E-5
June	4.02E-6	8.22E-6			9.62E-5
July	1.73E-6	4.16E-6	2.78E-6		5.87E-5
August	2.48E-5	5.05E-5	8.60E-6		1.10E-4
September	1.48E-5	3.90E-5	6.43E-6		2.65E-5
Ocober	1.57E-5	3.90E-5	1.29E-5	8.33E-6	4.12E-5
November		5.29E-7			1.60E-5
December	1.90E-5	4.95E-5	2.00E-5	7.95E-7	3.95E-5
Totals:	**1.39E-4**	**2.64E-4**	**7.71E-5**	**5.00E-5**	**7.81E-4**

Month	Average Released (cc)	Activity (Ci)	Conc. (µCi/cc)
January	2.48E+7	4.10E-4	1.65E-5
February	3.26E+7	1.20E-5	3.68E-7
March	5.22E+7	2.61E-4	5.00E-6
April	3.73E+7	2.38E-4	6.38E-6
May	5.19E+7	4.86E-4	9.37E-6
June	5.00E+7	1.89E-4	3.77E-6
July	3.68E+7	9.43E-5	2.56E-6
August	1.48E+8	7.43E-4	5.02E-6
September	3.73E+7	2.46E-4	6.58E-6
October	7.11E+7	2.91E-4	4.10E-6
November	6.26E+7	2.58E-5	4.12E-7
December	6.58E+7	6.95E-4	1.06E-5

Annual Totals:	6.70E+8	3.96E-3	Annual Avg: 5.89E-6

The annual summary for liquid waste effluent is as follows:

Total Liquid Volume: 6.70×10^{5} **liters** (1.77×10^{5} **gallons**)

Average Release Rate: 5.89×10^{-6} µCi/cc

Total Activity: 3.69×10^{-3} Ci

IX. ENVIRONMENTAL MONITORING

In conjunction with representatives of the State of Texas Department of Health, a quarterly environmental survey program was implemented. This program consists of TLD monitors located around the NSC site and the collection, analysis, and evaluation of soil, water, vegetation and milk samples.

A. Environmental Survey Samples

The environmental survey samples were collected in accordance with the schedules of the cooperative surveillance program between the Texas State Department of Health and the Texas A&M University. These samples were analyzed using an intrinsic germanium detection system for isotopic identification. Data from these samples reflect the continued use of retention facilities and sample analysis for laboratory effluents prior to

their release.

Summaries of the environmental survey program for 1993 are presented in the four tables below for isotopic activity as reported to the NSC or as determined by the NSC when data from the state was unavailable.

Vegetation Samples

1993 Quarter	Sample Location	Concentration (µCi/ml)
1st	TAMU dairy	< MDA
2nd	TAMU dairy	< MDA
3rd	TAMU dairy	< MDA
4th	TAMU dairy	< MDA

Water Samples

1993 Quarter	Sample Location	Concentration (µCi/ml)
1st	Brazos River	< MDA
1st	NSC Creek	< MDA
2nd	Brazos River	< MDA

2nd	NSC Creek	< MDA
3rd	Brazos River	< MDA
3rd	NSC Creek	< MDA
4th	Brazos River	Not Analyzed
4th	NSC Creek	< MDA

Milk Samples

1992 Quarter	Sample Location	Concentration (µCi/ml)
1st	TAMU Dairy	< MDA
2nd	TAMU Dairy	< MDA
3rd	TAMU Dairy	Not Analyzed
4th	TAMU Dairy	< MDA

Soil Samples

1992 Quarter	Sample Location	Concentration (µCi/ml)
1st	NSC Soil	1.35×10^{-5} (Ir-192)
2nd	NSC Soil	9.83×10^{-7} (Pb-212, Pb-214)
3rd	NSC Soil	< MDA
4th	NSC Soil	1.79×10^{-6} (Co-60, Zn-65, Ir-192)

B. Site Boundary Dose Rate

The environmental survey program measures the integrated radiation exposures at the exclusion area boundaries. These measurements are made for periods of approximately 90 days, using TLDs. The dosimeters are provided and processed by Texas Department of Health, Bureau of Radiation Control, Division of Environmental Programs. The state background monitor (survey point 14A) is located at a point 5.25 miles west-southwest of the facility and generally at right angles to the prevailing southeasterly winds.

Site #	Location	Qrtly Exposure Rate (mR/91day)	Annual Exposure 1993 (mR)
2	300 ft. W of reactor building, near fence corner	17.7	48.6
3	250 ft W-SW of reactor building, on SW chain link fence	106.8	671.0
4	200 ft NW of reactor building, on chain link fence, near butane tank.	26.1	71.6
5	225 ft NE of reactor building, on fence N of driveway	10.8	28.8
6	300 ft N-NE reactor building, near fence corner	31.9	131.5

10	190 ft SE of reactor building, near fence corner	5.0	16.0
11	300 ft NE of reactor building, near fence corner	1.6	2.1
12	375 ft NE of reactor building, near waste storage shed	15.5	63.8
13	320 ft NE of reactor building, near waste storage shed	13.2	45.4
14A	5.25 miles W-SW of reactor building, at FM 60 bridge over Brazos River	0.0	0.0

The highest exposure point was determined to be at site #3 (**671.0** mR/yr) which is on the WSW corner of the reactor building. This radioactive material storage location was moved in December of 1993. The boundary readings for 1994 should be considerably less. The closest off-site point of extended occupancy is located just beyond the site boundary fence directly behind the site #10 monitoring location; those occupants continue to receive only background exposure.

Site #6 (131.5 mR/yr) located NNE of the Reactor Building is the second highest location. This dose may be attributed to normal operation of the facility calibration range. Current plans are to restrict access to this area of the site boundary in 1994. This will prevent public access and allow the dosimeter to be relocated further from the calibration range.

X. RADIOACTIVE WASTE

A. Solid Waste

During the 1993 year, there was no solid waste released from the NSC for disposal offsite.

XI. Reactor Safety Board

A. Membership

Chairman:

Feenan Jennings, Director, University Research Services

Members:

Dr. Ted Parish, Professor, Nuclear Engineering Department

Dr. Robert Kenefick, Professor, Physics Department

Dr. Roger Koppa, Associate Professor, Industrial Engineering Department

Dr. Earl Morris, Professor, Veterinary Medicine-Large Animal Clinic

Dr. Emile Schweikert, Professor, Chemistry Department

Ex-Officio Members:

Dr. Warren Reece, Director, Nuclear Science Center

Ms. Martha Brown, Assistant Director, Nuclear Science Center

Mr. Bruce Carlisle, Assistant Director, Nuclear Science Center

Dr. Milton McLain, Director, Radiological Safety Office

Dr. John Poston, Professor and Head, Nuclear Engineering Department

TEES:

Dr. Kenneth Hall, Deputy Director

Dr. Kenneth Peddicord, Director