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DTE Energy



April 28, 2006
NRC-06-0031

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington D C 20555-0001

- References: 1) Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43
- 2) Appendix A, Facility Operating License No.
NPF-43, Technical Specifications 5.6.2 and 5.6.3

Subject: Annual Radioactive Effluent Release and
Radiological Environmental Operating Reports

The 2005 Annual Radiological Effluent Release and Radiological Environmental Operating Reports for Fermi 2 are enclosed. This combined report is being transmitted in accordance with Reference 2 and Regulatory Guide 1.21, Revision 1. The enclosed report covers the period from January 1, 2005 through December 31, 2005.

Should you have any questions regarding this report, please contact Mr. Dan Craine, General Supervisor, Radiological Engineering at (734) 586-1516.

Sincerely,

A handwritten signature in black ink that reads "Donald K. Cobb". The signature is written in a cursive style.

Enclosure

cc: w/Enclosure
D. H. Jaffe
T. J. Kozak
NRC Resident Office
Regional Administrator, Region III
Supervisor, Electric Operators,
Michigan Public Service Commission

JE48
JE25

Appendix A
Sampling Locations

Direct Radiation Sample Locations

Table A-1

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|----------------|---|---------------------------------|--|----------------------|------|
| T1 | NE/38° | 1.3 mi. | Estral Beach, Pole on Lakeshore 23 Poles S of Lakeview. (Special Area) | Q | I |
| T2 | NNE/22° | 1.2 mi. | Pole at termination of Brancheau St. (Special Area) | Q | I |
| T3 | N/9° | 1.1 mi. | Pole, NW corner of Swan Boat Club fence. (Special Area) | Q | I |
| T4 | NNW/337° | 0.6 mi. | Site boundary and Toll Rd. on Site fence by API #2. | Q | I |
| T5 | NW/313° | 0.6 mi. | Site boundary and Toll Rd. on Site fence by API #3. | Q | I |
| T6 | WNW/294° | 0.6 mi. | On Site fence at south end of N. Bullet Rd. | Q | I |
| T7 | W/270° | 14.0 mi. | Pole, at Michigan Gas substation on N. Custer Rd., 0.66 miles west of Doty Rd. | Q | C |
| T8 | NW/305° | 1.9 mi. | Pole on Post Rd. near NE corner of Dixie Hwy. and Post Rd. | Q | I |
| T9 | NNW/334° | 1.5 mi. | Pole, NW corner of Trombley and Swan View Rd. | Q | I |
| T10 | N/6° | 2.1 mi. | Pole, S side of Massarant-2 poles W of Chinavare. | Q | I |

I = Indicator

C = Control

O = On-site

Q = Quarterly

Direct Radiation Sample Locations (Table A-1 continued)

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|----------------|---|---------------------------------|---|----------------------|------|
| T11 | NNE/23° | 6.2 mi. | Pole, NE corner of Milliman and Jefferson. | Q | I |
| T12 | NNE/29° | 6.3 mi. | Pointe Mouille Game Area Field Office, Pole near tree, N area of parking lot. | Q | I |
| T13 | N/356° | 4.1 mi. | Labo and Dixie Hwy. Pole on SW corner with light. | Q | I |
| T14 | NNW/337° | 4.4 mi. | Labo and Brandon Pole on SE corner near RR. | Q | I |
| T15 | NW/315° | 3.9 mi. | Pole, behind building at the corner of Swan Creek and Mill St. | Q | I |
| T16 | WNW/283° | 4.9 mi. | Pole, SE corner of War and Post Rd. | Q | I |
| T17 | W/271° | 4.9 mi. | Pole, NE corner of Nadeau and Laprad near mobile home park. | Q | I |
| T18 | WSW/247° | 4.8 mi. | Pole, NE corner of Mentel and Hurd Rd. | Q | I |
| T19 | SW/236° | 5.2 mi. | Fermi siren pole on Waterworks Rd. NE corner of intersection - Sterling State Park Rd. Entrance Drive/Waterworks. | Q | I |
| T20 | WSW/257° | 2.7 mi. | Pole, S side of Williams Rd, 9 poles W of Dixie Hwy. (Special Area) | Q | I |
| T21 | WSW/239° | 2.7 mi. | Pole, N side of Pearl at Parkview Woodland Beach. (Special Area) | Q | I |

I = Indicator

C = Control

O = On-site

Q = Quarterly

Direct Radiation Sample Locations (Table A-1 continued)

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|----------------|---|---------------------------------|---|----------------------|------|
| T22 | S/172° | 1.2 mi. | Pole, N side of Pointe Aux Peaux 2 poles W of Long - Site Boundary. | Q | I |
| T23 | SSW/195° | 1.1 mi. | Pole, S side of Pointe Aux Peaux 1 pole W of Huron next to Vent Pipe - Site Boundary. | Q | I |
| T24 | SW/225° | 1.2 mi. | Fermi Gate along Pointe Aux Peaux Rd. on fence wire W of gate Site Boundary. | Q | I |
| T25 | WSW/252° | 1.4 mi. | Pole, Toll Rd. - 12 poles S of Fermi Drive. | Q | I |
| T26 | WSW/259° | 1.1 mi. | Pole, Toll Rd. - 6 poles S of Fermi Drive. | Q | I |
| T27 | SW/225° | 6.8 mi. | Pole, NE corner of McMillan and East Front St. (Special Area) | Q | I |
| T28 | SW/229° | 10.7 mi. | Pole, SE corner of Mortar Creek and LaPlaisance. | Q | C |
| T29 | WSW/237° | 10.3 mi. | Pole, E side of S Dixie, 1 pole S of Albain. | Q | C |
| T30 | WSW/247° | 7.8 mi. | Pole, St. Mary's Park corner of Elm and Monroe St. (Special Area) | Q | I |
| T31 | WSW/255° | 9.6 mi. | 1st pole W of entrance drive Milton "Pat" Munson Recreational Reserve on North Custer Rd. | Q | C |

I = Indicator

C = Control

O = On-site

Q = Quarterly

Direct Radiation Sample Locations (Table A-1 continued)

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|----------------|---|---------------------------------|---|----------------------|------|
| T32 | WNW/295° | 10.3 mi. | Pole, corner of Stony Creek and Finzel Rd. | Q | I |
| T33 | NW/317° | 9.2 mi. | Pole, W side of Grafton Rd. 1 pole N of Ash and Grafton intersection. | Q | I |
| T34 | NNW/338° | 9.7 mi. | Pole, W side of Port Creek, 1 pole S of Will-Carleton Rd. | Q | I |
| T35 | N/359° | 6.9 mi. | Pole, S Side of S Huron River Dr. across from Race St. (Special Area) | Q | I |
| T36 | N/358° | 9.1 mi. | Pole, NE corner of Gibraltar and Cahill Rd. | Q | I |
| T37 | NNE/21° | 9.8 mi. | Pole, S corner of Adams and Gibraltar across from Humbug Marina. | Q | I |
| T38 | WNW/294° | 1.7 mi. | Residence - 6594 N. Dixie Hwy. | Q | I |
| T39* | S/176° | 0.3 mi. | SE corner of Protected Area Fence (PAF). | Q | O |
| T40* | S/170° | 0.3 mi. | Midway along OBA - PAF. | Q | O |
| T41* | SSE/161° | 0.2 mi. | Midway between OBA and Shield Wall on PAF. | Q | O |
| T42* | SSE/149° | 0.2 mi. | Midway along Shield Wall on PAF. | Q | O |
| T43* | SE/131° | 0.1 mi. | Midway between Shield Wall and Aux Boilers on PAF. | Q | O |
| T44* | ESE/109° | 0.1 mi. | Opposite OSSF door on PAF. | Q | O |

* = Onsite TLD

I = Indicator

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Q = Quarterly

Direct Radiation Sample Locations (Table A-1 continued)

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|----------------|---|---------------------------------|--|----------------------|------|
| T45* | E/86° | 0.1 mi. | NE Corner of PAF. | Q | O |
| T46* | ENE/67° | 0.2 mi. | NE side of barge slip on fence. | Q | O |
| T47* | S/185° | 0.1 mi. | South of Turbine Bldg. rollup door on PAF. | Q | O |
| T48* | SW/235° | 0.2 mi. | 30 ft. from corner of AAP on PAF. | Q | O |
| T49 | WSW/251° | 1.1 mi. | Corner of Site Boundary fence north of NOC along Critical Path Rd. | Q | I |
| T50 | W/270° | 0.9 mi. | Site Boundary fence near main gate by the south Bullet Street sign. | Q | I |
| T51 | N/3° | 0.4 mi. | Site Boundary fence north of north Cooling Tower. | Q | O |
| T52 | NNE/20° | 0.4 mi. | Site Boundary fence at the corner of Arson and Tower. | Q | O |
| T53* | NE/55° | 0.2 mi. | Site Boundary fence east of South Cooling Tower. | Q | O |
| T54* | S/189° | 0.3 mi. | Pole next to Fermi 2 Visitors Center. | Q | O |
| T55 | WSW/251° | 3.3 mi. | Pole, north side of Nadeau Rd. across from Sodt Elementary School Marquee. | Q | I |
| T56 | WSW/256° | 2.9 mi. | Pole, entrance to Jefferson Middle School on Stony Creek Rd. | Q | I |

* = Onsite TLD

I = Indicator

C = Control

O = On-site

Q = Quarterly

Direct Radiation Sample Locations (Table A-1 continued)

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|----------------|---|---------------------------------|--|----------------------|------|
| T57 | W/260° | 2.7 mi. | Pole, north side of Williams Rd. across from Jefferson High School entrance. | Q | I |
| T58 | WSW/249° | 4.9 mi. | Pole west of Hurd Elementary School Marquee. | Q | I |
| T59 | NW/325° | 2.6 mi. | Pole north of St. Charles Church entrance on Dixie Hwy. | Q | I |
| T60 | NNW/341° | 2.5 mi. | 1st pole north of North Elementary School entrance on Dixie Hwy. | Q | I |
| T61 | W/268° | 10.1 mi. | Pole, SW corner of Stewart and Raisinville Rd. | Q | I |
| T62 | SW/232° | 9.7 mi. | Pole, NE corner of Albain and Hull Rd. | Q | I |
| T63 | WSW/245° | 9.6 mi. | Pole, NE corner of Dunbar and Telegraph Rd. | Q | I |
| T64* | WNW/286° | 0.2 mi. | West of switchgear yard on PAF. | Q | O |
| T65* | NW/322° | 0.1 mi. | PAF switchgear yard area NW of RHR complex. | Q | O |
| T66* | NE/50° | 0.1 mi. | Behind Bldg. 42 on PAF. | Q | O |
| T67* | NNW/338° | 0.2 mi. | Site Boundary fence West of South Cooling Tower. | Q | O |

* = Onsite TLD

I = Indicator

C = Control

O = On-site

Q = Quarterly

Air Particulate and Air Iodine Sample Locations

Table A-2

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|----------------|---|---------------------------------|--|----------------------|------|
| API-1 | NE/39° | 1.4 mi. | Estral Beach Pole on Lakeshore, 18 Poles S of Lakeview (Nearest Community with highest X/Q). | W | I |
| API-2 | NNW/337° | 0.6 mi. | Site Boundary and Toll Road, on Site Fence by T-4. | W | I |
| API-3 | NW/313° | 0.6 mi. | Site Boundary and Toll Road, on Site Fence by T-5. | W | I |
| API-4 | W/270° | 14.0 mi. | Pole, at Michigan Gas substation on N. Custer Rd., 0.66 miles west of Doty Rd. | W | C |
| API-5 | S/188° | 1.2 mi. | Pole, N corner of Pointe Aux Peaux and Dewey Rd. | W | I |

I = Indicator C = Control W = Weekly

Milk Sample Locations

Table A-3

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|----------------|---|---------------------------------|--------------------------------|----------------------|------|
| M-2 | NW/319° | 5.4 mi. | Reaume Farm - 2705 E Labo. | M-SM | I |
| M-8 | WNW/289° | 9.9 mi. | Calder Dairy - 9334 Finzel Rd. | M-SM | C |

I = Indicator C = Control M = Monthly SM = Semimonthly

Garden Sample Locations

Table A-4

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|----------------|---|---------------------------------|-------------------------|----------------------|------|
| FP-1 | NNE/21° | 3.8 mi. | 9501 Turnpike Highway. | M | I |
| FP-9 | W/261° | 10.9 mi. | 4074 North Custer Road. | M | C |

I = Indicator

C = Control

M = Monthly (when available)

Drinking Water Sample Locations

Table A-5

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|----------------|---|---------------------------------|---|----------------------|------|
| DW-1 | S/174° | 1.1 mi. | Monroe Water Station N Side of Pointe Aux Peaux 1/2 Block W of Long Rd. | M | I |
| DW-2 | N/8° | 18.5 mi. | Detroit Water Station 14700 Moran Rd, Allen Park. | M | C |

I = Indicator

C = Control

M = Monthly

Surface Water Sample Locations

Table A-6

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|----------------|---|---------------------------------|---|----------------------|------|
| SW-2 | NNE/20° | 11.7 mi. | DECO's Trenton Channel Power Plant Intake Structure (Screenhouse #1). | M | C |
| SW-3 | SSE/160° | 0.2 mi. | DECO's Fermi 2 General Service Water Intake Structure. | M | I |

I = Indicator C = Control M = Monthly

Groundwater Sample Locations

Table A-7

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|----------------|---|---------------------------------|--|----------------------|------|
| GW-1 | S/175° | 0.4 mi. | Approx. 100 ft W of Lake Erie, EF-1 Parking lot near gas fired peakers. | Q | I |
| GW-2 | SSW/208° | 1.0 mi. | 4 ft S of Pointe Aux Peaux (PAP) Rd. Fence 427 ft W of where PAP crosses over Stoney Point's Western Dike. | Q | I |
| GW-3 | SW/226° | 1.0 mi. | 143 ft W of PAP Rd. Gate, 62 ft N of PAP Rd. Fence. | Q | I |
| GW-4 | WNW/299° | 0.6 mi. | 42 ft S of Langton Rd, 8 ft E of Toll Rd. Fence. | Q | C |

I = Indicator C = Control Q = Quarterly

Sediment Sample Locations

Table A-8

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|----------------|---|---------------------------------|---|----------------------|------|
| S-1 | SSE/165° | 0.9 mi. | Pointe Aux Peaux, Shoreline to 500 ft offshore sighting directly to Land Base Water Tower. | SA | I |
| S-2 | E/81° | 0.2 mi. | Fermi 2 Discharge, approx. 200 ft offshore. | SA | I |
| S-3 | NE/39° | 1.1 mi. | Estral Beach, approx. 200 ft offshore, off North shoreline where Swan Creek and Lake Erie meet. | SA | I |
| S-4 | WSW/241° | 3.0 mi. | Indian Trails Community Beach. | SA | I |
| S-5 | NNE/20° | 11.7 mi. | DECo's Trenton Channel Power Plant intake area. | SA | C |

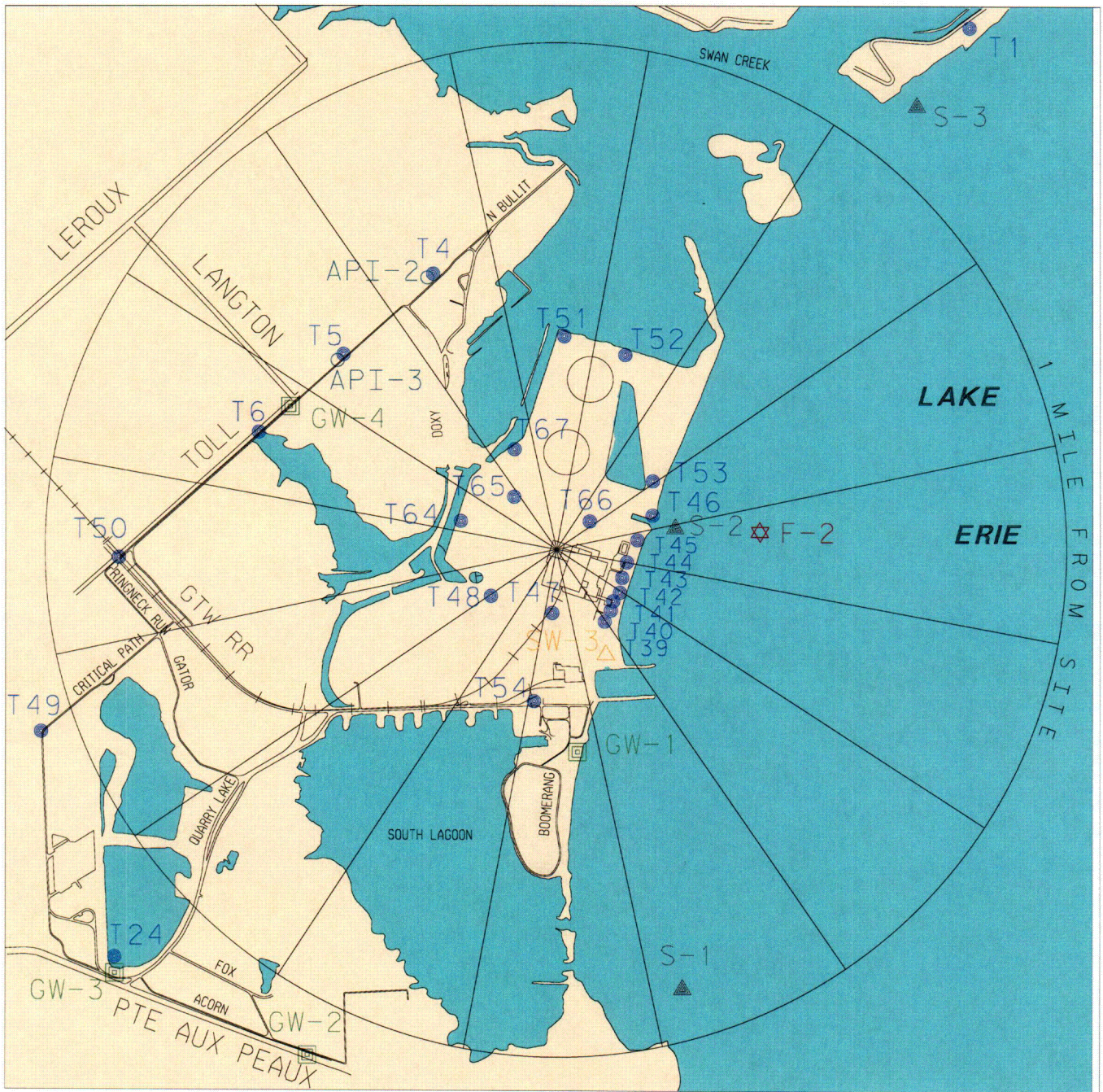
I = Indicator C = Control SA = Semiannually

Fish Sample Locations

Table A-9

| Station Number | Meteorological Sector/Azimuth (Degrees) | Distance from Reactor (Approx.) | Description | Collection Frequency | Type |
|----------------|---|---------------------------------|---|----------------------|------|
| F-1 | NNE/31° | 9.5 mi. | Near Celeron Island. | SA | C |
| F-2 | E/86° | 0.4 mi. | Fermi 2 Discharge (approx. 1200 ft offshore). | SA | I |
| F-3 | SW/227° | 3.5 mi. | Brest Bay. | SA | C |

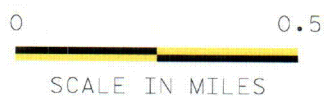
I = Indicator C = Control SA = Semiannually



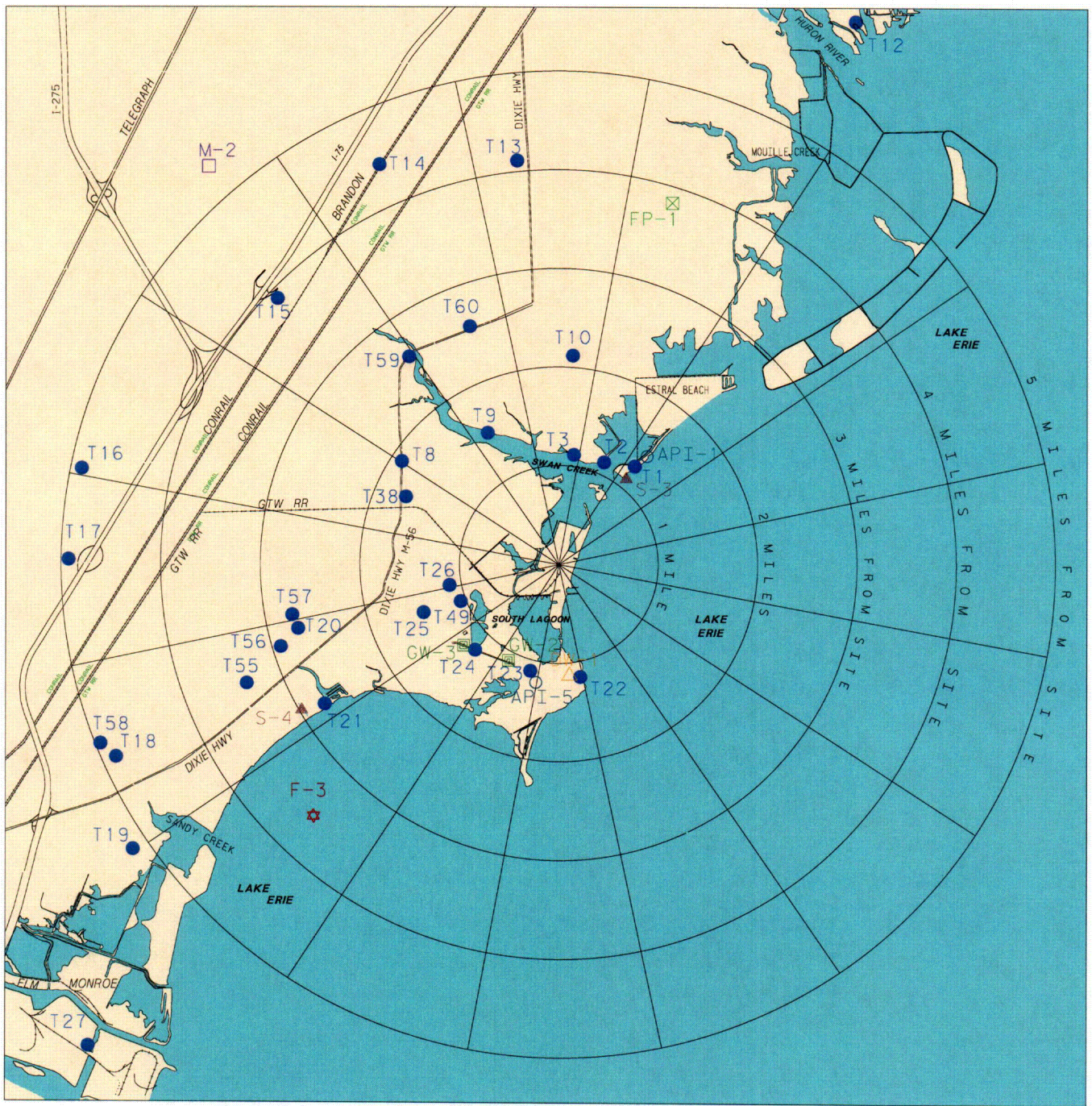
MAP - 1
 SAMPLING LOCATIONS
 BY STATION NUMBER
 WITHIN 1 MILE

LEGEND

- T- DIRECT RADIATION
- API- AIR PARTICULATES/AIR IODINE
- ▲ S- SEDIMENTS
- ▲ DW/SW- DRINKING WATER/SURFACE WATER
- GW- GROUND WATER
- M- MILK
- FP- FOOD PRODUCTS
- ★ F- FISH



C-01



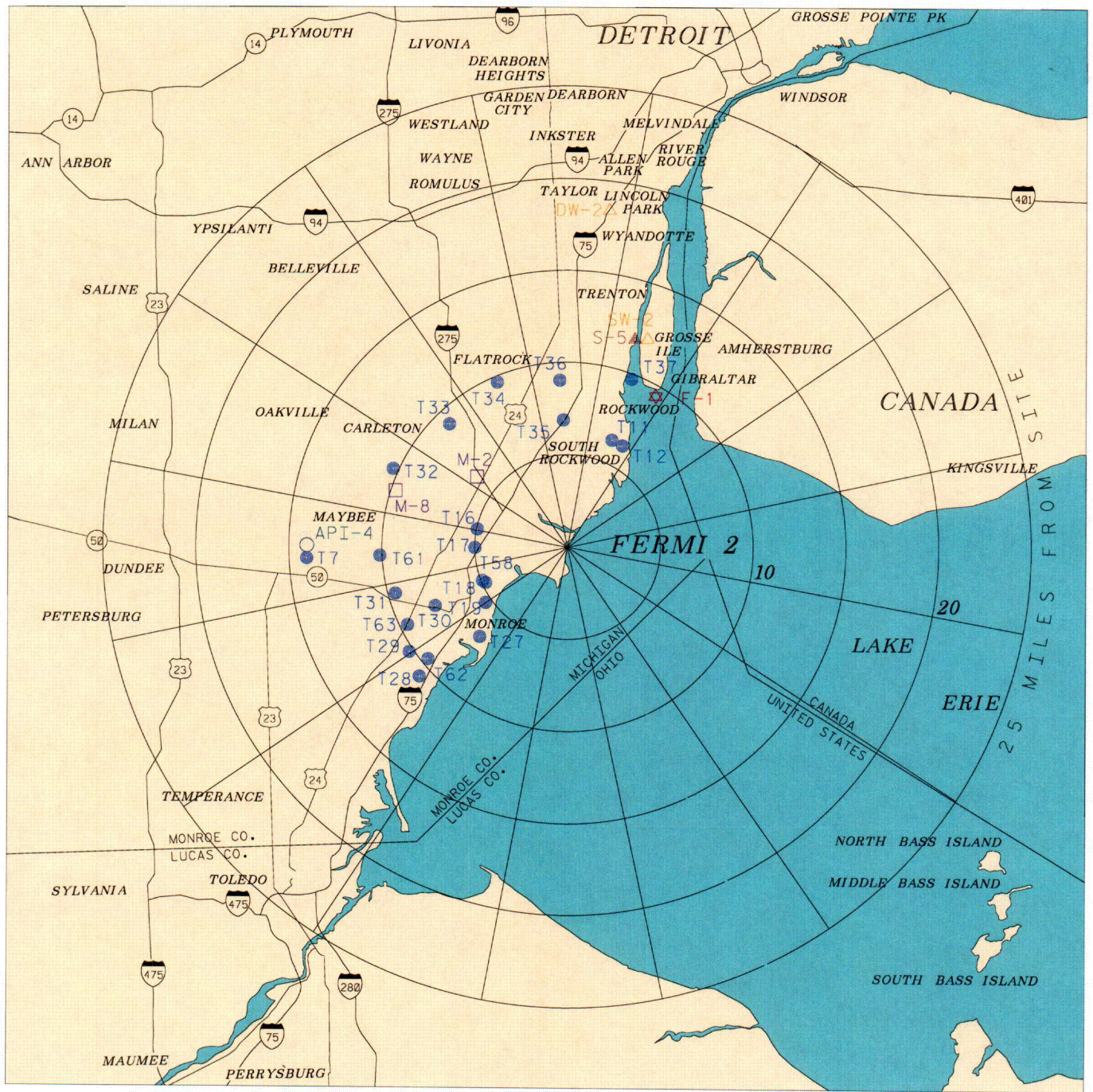
MAP - 2
 SAMPLING LOCATIONS
 BY STATION NUMBER
 (1 TO 5 MILES)

LEGEND

- T- DIRECT RADIATION
- API- AIR PARTICULATES/AIR IODINE
- ▲ S- SEDIMENTS
- △ DW/SW- DRINKING WATER/SURFACE WATER
- GW- GROUND WATER
- M- MILK
- ⊠ FP- FOOD PRODUCTS
- ★ F- FISH



C-02



MAP - 3
 SAMPLING LOCATIONS
 BY STATION NUMBER
 (GREATER THAN 5 MILES)

LEGEND

- T- DIRECT RADIATION
- API- AIR PARTICULATES OR AIR IODINE
- ▲ S- SEDIMENTS
- △ DW/SW- DRINKING WATER/SURFACE WATER
- ◻ CW- GROUND WATER
- M- MILK
- ⊠ FP- FOOD PRODUCTS
- ★ F- FISH



C-03

Appendix B
Environmental Data Summary

**Fermi 2 - 2005 Annual
Radioactive Effluent Release and
Radiological Environmental Operating Report**

Table B-1 Radiological Environmental Monitoring Program Summary

Name of Facility: Enrico Fermi Unit 2

Docket No.: 50-341

Reporting Period: January - December 2005

Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

| Sample Type (Units) | Type and Number of Analysis | LLD | Indicator Locations Mean and Range | Location with Highest Annual Mean | | Control Locations Mean and Range | Number of Non-routine Results |
|---|-----------------------------------|---------|--|--------------------------------------|---------------------------------------|--|-------------------------------------|
| | | | | Location | Mean and Range | | |
| Direct Radiation <i>mR/std qtr</i> | Gamma (TLD) 194 | 1.0 | 14.1 (178/178) 9.6 to 20.1 | T-49 (Indicator) | 18.5 (4/4) 15.4 to 20.1 | 13.7 (16/16) 10.5 to 15.1 | None |
| Airborne Particulates <i>pCi/cu. m.</i> | Gross Beta 257 | 1.00E-2 | 2.57E-2 (205/205) 7.20E-3 to 5.46E-2 | API-4 (Control) | 3.03E-2 (52/52) 8.10E-3 to 3.27E-1 | 3.03E-2 (52/52) 8.10E-3 to 3.27E-1 | None |
| | Gamma Spec. 20 Be-7 | N/A | 9.69E-2 (15/16) 7.50E-2 to 1.21E-1 | API-5 (Indicator) | 1.04E-1 (4/4) 8.40E-2 to 1.18E-1 | 9.80E-2 (3/4) 8.30E-2 to 1.14E-1 | None |
| | K-40 | N/A | <MDA | | | <MDA | None |
| | Mn-54 | N/A | <MDA | | | <MDA | None |
| | Co-58 | N/A | <MDA | | | <MDA | None |
| | Fe-59 | N/A | <MDA | | | <MDA | None |
| | Co-60 | N/A | <MDA | | | <MDA | None |
| | Zn-65 | N/A | <MDA | | | <MDA | None |
| | Zr-95 | N/A | <MDA | | | <MDA | None |
| | Ru-103 | N/A | <MDA | | | <MDA | None |
| | Ru-106 | N/A | <MDA | | | <MDA | None |
| | Cs-134 | 5.00E-2 | <MDA | | | <MDA | None |
| | Cs-137 | 6.00E-2 | <MDA | | | <MDA | None |
| | Ba-140 | N/A | <MDA | | | <MDA | None |
| | La-140 | N/A | <MDA | | | <MDA | None |
| Ce-141 | N/A | <MDA | | | <MDA | None | |
| Ce-144 | N/A | <MDA | | | <MDA | None | |
| Airborne Iodine <i>pCi/cu. m.</i> | I-131 257 | 7.00E-2 | <MDA | | | <MDA | None |

**Fermi 2 - 2005 Annual
Radioactive Effluent Release and
Radiological Environmental Operating Report**

Table B-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2

Docket No.: 50-341

Reporting Period: January - December 2005

Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

| Sample Type (Units) | Type and Number of Analysis | LLD | Indicator Locations Mean and Range | Location with Highest Annual Mean | | Control Locations Mean and Range | Number of Non-routine Results |
|---------------------------------|-----------------------------------|---------|--|--------------------------------------|---------------------------------------|--|-------------------------------------|
| | | | | Location | Mean and Range | | |
| Milk <i>pCi/l</i> | I-131 36 | 1.00E+0 | <MDA | M-2 (Indicator) | 2.55E+0 (2/18) 2.06E+0 to 3.04E+0 | 1.35E+0 (1/18) | None |
| | Sr-89 36 | N/A | <MDA | | | | None |
| | Sr-90 | N/A | 2.55E+0 (2/18) 2.06E+0 to 3.04E+0 | | | | None |
| | Gamma Spec. 36 | | | M-2 (Indicator) | 1.42E+3 (18/18) 1.27E+3 to 1.56E+3 | 1.41E+3 (18/18) 1.31E+3 to 1.56E+3 | None |
| | Be-7 | N/A | <MDA | | | | None |
| | K-40 | N/A | 1.42E+3 (18/18) 1.27E+3 to 1.56E+3 | | | | None |
| | Mn-54 | N/A | <MDA | | | | None |
| | Co-58 | N/A | <MDA | | | | None |
| | Fe-59 | N/A | <MDA | | | | None |
| | Co-60 | N/A | <MDA | | | | None |
| | Zn-65 | N/A | <MDA | | | | None |
| | Zr-95 | N/A | <MDA | | | | None |
| | Ru-103 | N/A | <MDA | | | | None |
| | Ru-106 | N/A | <MDA | | | | None |
| | Cs-134 | 1.50E+1 | <MDA | | | | None |
| | Cs-137 | 1.80E+1 | <MDA | | | | None |
| | Ba-140 | 1.50E+1 | <MDA | | | | None |
| | La-140 | 1.50E+1 | <MDA | | | | None |
| Ce-141 | N/A | <MDA | None | | | | |
| Ce-144 | N/A | <MDA | None | | | | |
| Vegetation <i>pCi/kg wet</i> | I-131 12 | 6.00E+1 | <MDA | FP-9 (Control) | 3.34E+3 (6/6) 1.74E+3 to 4.41E+3 | 3.34E+3 (6/6) 1.74E+3 to 4.41E+3 | None |
| | Gamma Spec. 12 | | | | | | 5.70E+2 (1/6) |
| | Be-7 | N/A | <MDA | | | | None |
| | K-40 | N/A | 2.72E+3 (6/6) 1.14E+3 to 3.88E+3 | | | | None |

*Fermi 2 - 2005 Annual
Radioactive Effluent Release and
Radiological Environmental Operating Report*

Table B-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2

Docket No.: 50-341

Reporting Period: January - December 2005

Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

| Sample Type (Units) | Type and Number of Analysis | LLD | Indicator Locations Mean and Range | Location with Highest Annual Mean | | Control Locations Mean and Range | Number of Non-routine Results |
|--|-----------------------------------|---------|--|--------------------------------------|----------------|--|-------------------------------------|
| | | | | Location | Mean and Range | | |
| Vegetation (cont.) <i>pCi/kg wet</i> | Mn-54 | N/A | <MDA | | | <MDA | None |
| | Co-58 | N/A | <MDA | | | <MDA | None |
| | Fe-59 | N/A | <MDA | | | <MDA | None |
| | Co-60 | N/A | <MDA | | | <MDA | None |
| | Zn-65 | N/A | <MDA | | | <MDA | None |
| | Zr-95 | N/A | <MDA | | | <MDA | None |
| | Ru-103 | N/A | <MDA | | | <MDA | None |
| | Ru-106 | N/A | <MDA | | | <MDA | None |
| | Cs-134 | 6.00E+1 | <MDA | | | <MDA | None |
| | Cs-137 | 8.00E+1 | <MDA | | | <MDA | None |
| | Ba-140 | N/A | <MDA | | | <MDA | None |
| | La-140 | N/A | <MDA | | | <MDA | None |
| | Ce-141 | N/A | <MDA | | | <MDA | None |
| | Ce-144 | N/A | <MDA | | | <MDA | None |
| Drinking Water <i>pCi/l</i> | Gross Beta 24 | 4.00E+0 | 3.84E+0 (6/12) 2.82E+0 to 5.30E+0 | DW-2 (Control) | 5.10E+0 (1/12) | 5.10E+0 (1/12) | None |
| | Sr-89 24 | N/A | <MDA | | | <MDA | None |
| | Sr-90 | N/A | <MDA | | | <MDA | None |
| | Gamma Spec. 24 | | | | | | |
| | Be-7 | N/A | <MDA | | | <MDA | None |
| | K-40 | N/A | <MDA | | | <MDA | None |
| | Cr-51 | N/A | <MDA | | | <MDA | None |
| | Mn-54 | 1.50E+1 | <MDA | | | <MDA | None |
| | Co-58 | 1.50E+1 | <MDA | | | <MDA | None |
| | Fe-59 | 3.00E+1 | <MDA | | | <MDA | None |
| | Co-60 | 1.50E+1 | <MDA | | | <MDA | None |
| | Zn-65 | 3.00E+1 | <MDA | | | <MDA | None |
| Zr-95 | 1.50E+1 | <MDA | | | <MDA | None | |

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Table B-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2

Docket No.: 50-341

Reporting Period: January - December 2005

Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

| Sample Type (Units) | Type and Number of Analysis | LLD | Indicator Locations Mean and Range | Location with Highest Annual Mean | | Control Locations Mean and Range | Number of Non-routine Results | |
|---------------------------------|-----------------------------------|---------|--|--------------------------------------|----------------|--|-------------------------------------|------|
| | | | | Location | Mean and Range | | | |
| Drinking Water (cont.) pCi/l | Ru-103 | N/A | <MDA | | | <MDA | None | |
| | Ru-106 | N/A | <MDA | | | <MDA | None | |
| | Cs-134 | 1.50E+1 | <MDA | | | <MDA | None | |
| | Cs-137 | 1.80E+1 | <MDA | | | <MDA | None | |
| | Ba-140 | 1.50E+1 | <MDA | | | <MDA | None | |
| | La-140 | 1.50E+1 | <MDA | | | <MDA | None | |
| | Ce-141 | N/A | <MDA | | | <MDA | None | |
| | Ce-144 | N/A | <MDA | | | <MDA | None | |
| H-3 | 8 | 2.00E+3 | <MDA | | | <MDA | None | |
| Surface Water pCi/l | Sr-89 | 24 | N/A | <MDA | | <MDA | None | |
| | Sr-90 | | N/A | <MDA | | <MDA | None | |
| | Gamma Spec. | 24 | | | | | | |
| | Be-7 | | N/A | <MDA | | <MDA | None | |
| | K-40 | | N/A | <MDA | SW-2(Control) | 9.10E+1 (1/12) | 9.10E+1 (1/12) | None |
| | Cr-51 | | N/A | <MDA | | <MDA | None | |
| | Mn-54 | | 1.50E+1 | <MDA | | <MDA | None | |
| | Co-58 | | 1.50E+1 | <MDA | | <MDA | None | |
| | Fe-59 | | 3.00E+1 | <MDA | | <MDA | None | |
| | Co-60 | | 1.50E+1 | <MDA | | <MDA | None | |
| | Zn-65 | | 3.00E+1 | <MDA | | <MDA | None | |
| | Zr-95 | | 1.50E+1 | <MDA | | <MDA | None | |
| | Ru-103 | | N/A | <MDA | | <MDA | None | |
| | Ru-106 | | N/A | <MDA | | <MDA | None | |
| | Cs-134 | | 1.50E+1 | <MDA | | <MDA | None | |
| | Cs-137 | | 1.80E+1 | <MDA | | <MDA | None | |
| | Ba-140 | | 1.50E+1 | <MDA | | <MDA | None | |
| La-140 | | 1.50E+1 | <MDA | | <MDA | None | | |
| Ce-141 | | N/A | <MDA | | <MDA | None | | |

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Table B-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2

Docket No.: 50-341

Reporting Period: January - December 2005

Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

| Sample Type (Units) | Type and Number of Analysis | LLD | Indicator Locations Mean and Range | Location with Highest Annual Mean | | Control Locations Mean and Range | Number of Non-routine Results |
|---------------------------------------|--|--|--|--------------------------------------|--|--|--|
| | | | | Location | Mean and Range | | |
| Surface Water (cont.) <i>pCi/l</i> | Ce-144 H-3 8 | N/A 2.00E+3 | <MDA <MDA | | | <MDA <MDA | None None |
| Groundwater <i>pCi/l</i> | Gamma Spec. 16 Be-7 K-40 Cr-51 Mn-54 Co-58 Fe-59 Co-60 Zn-65 Zr-95 Ru-103 Ru-106 Cs-134 Cs-137 Ba-140 La-140 Ce-141 Ce-144 H-3 16 | N/A N/A N/A 1.50E+1 1.50E+1 3.00E+1 1.50E+1 3.00E+1 1.50E+1 N/A N/A 1.50E+1 1.80E+1 1.50E+1 1.50E+1 N/A N/A 2.00E+3 | <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA | | | <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA <MDA | None |
| Sediment <i>pCi/kg dry</i> | Sr-89 10 Sr-90 Gamma Spec. 10 Be-7 K-40 | N/A N/A N/A N/A | <MDA <MDA <MDA 1.20E+4 (8/8) 9.68E+3 to 1.75E+4 | S-4 (Indicator) | 1.38E+4 (2/2) 1.01E+4 to 1.75E+4 | <MDA <MDA <MDA 1.11E+4 (2/2) 1.02E+4 to 1.19E+4 | None None None None |

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Table B-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2

Docket No.: 50-341

Reporting Period: January - December 2005

Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

| Sample Type (Units) | Type and Number of Analysis | LLD | Indicator Locations Mean and Range | Location with Highest Annual Mean | | Control Locations Mean and Range | Number of Non-routine Results |
|---------------------------------------|-----------------------------------|---------|--|--------------------------------------|-------------------------------------|--|-------------------------------------|
| | | | | Location | Mean and Range | | |
| Sediment (cont.) <i>pCi/kg dry</i> | Mn-54 | N/A | <MDA | S-3 (Indicator) | 1.39E+2 (1/8) | <MDA | None |
| | Co-58 | N/A | <MDA | | | <MDA | None |
| | Fe-59 | N/A | <MDA | | | <MDA | None |
| | Co-60 | N/A | <MDA | | | <MDA | None |
| | Zn-65 | N/A | <MDA | | | <MDA | None |
| | Zr-95 | N/A | <MDA | | | <MDA | None |
| | Ru-103 | N/A | <MDA | | | <MDA | None |
| | Ru-106 | N/A | <MDA | | | <MDA | None |
| | Cs-134 | 1.50E+2 | <MDA | | | <MDA | None |
| | Cs-137 | 1.80E+2 | 1.39E+2 (1/8) | | | 8.85E+1 (2/2) 7.90E+1 to 9.80E+1 | None |
| | Ba-140 | N/A | <MDA | | | <MDA | None |
| | La-140 | N/A | <MDA | | | <MDA | None |
| | Ce-141 | N/A | <MDA | | | <MDA | None |
| | Ce-144 | N/A | <MDA | | | <MDA | None |
| Fish <i>pCi/kg wet</i> | Sr-89 27 | N/A | <MDA | F-1 (Control) | 2.89E+3 (7/7) 2.37E+3 to 3.56E+3 | <MDA | None |
| | Sr-90 | N/A | <MDA | | | <MDA | None |
| | Gamma Spec. 27 | | | | | | |
| | Be-7 | N/A | <MDA | | | <MDA | None |
| | K-40 | N/A | 2.65E+3 (11/11) 2.02E+3 to 3.50E+3 | | | 2.82E+3 (16/16) 1.80E+3 to 3.56E+3 | None |
| | Mn-54 | 1.30E+2 | <MDA | | | <MDA | None |
| | Co-58 | 1.30E+2 | <MDA | | | <MDA | None |
| | Fe-59 | 2.60E+2 | <MDA | | | <MDA | None |
| | Co-60 | 1.30E+2 | <MDA | | | <MDA | None |
| | Zn-65 | 2.60E+2 | <MDA | | | <MDA | None |

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Table B-1 Radiological Environmental Monitoring Program Summary (cont.)

Name of Facility: Enrico Fermi Unit 2

Docket No.: 50-341

Reporting Period: January - December 2005

Location of Facility: 30 miles southeast of Detroit, Michigan (Frenchtown Township)

| Sample Type (Units) | Type and Number of Analysis | LLD | Indicator Locations Mean and Range | Location with Highest Annual Mean | | Control Locations Mean and Range | Number of Non-routine Results |
|-----------------------------------|-----------------------------------|---------|--|--------------------------------------|----------------|--|-------------------------------------|
| | | | | Location | Mean and Range | | |
| Fish (cont.) <i>pCi/kg wet</i> | Zr-95 | N/A | <MDA | | | <MDA | None |
| | Ru-103 | N/A | <MDA | | | <MDA | None |
| | Ru-106 | N/A | <MDA | | | <MDA | None |
| | Cs-134 | 1.30E+2 | <MDA | | | <MDA | None |
| | Cs-137 | 1.50E+2 | <MDA | | | <MDA | None |
| | Ba-140 | N/A | <MDA | | | <MDA | None |
| | La-140 | N/A | <MDA | | | <MDA | None |
| | Ce-141 | N/A | <MDA | | | <MDA | None |
| | Ce-144 | N/A | <MDA | | | <MDA | None |

Direct Radiation mean and range values are based on off-site TLDs

LLD = Fermi 2 ODCM LLD: nominal lower limit of detection based on 4.66 sigma error for background sample.

<MDA = Less than the lab's minimum detectable activity which is less than the LLD.

Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses (F).

Locations are specified by Fermi 2 code and are described in Appendix A Sampling Locations.

Non-routine results are those which are reportable according to Fermi 2 ODCM control 3.12.1.

Note: Other nuclides were considered in analysis results, but only those identifiable were reported in addition to ODCM listed nuclides.

Appendix C
Environmental Data Tables

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**FERMI 2
TLD ANALYSIS
(mR/Std Qtr)**

| STATION NUMBER | FIRST QUARTER | SECOND QUARTER | THIRD QUARTER | FOURTH QUARTER |
|----------------|---------------|----------------|---------------|----------------|
| T-1 | 10.98 | 12.91 | 12.80 | 14.47 |
| T-2 | 10.71 | 13.59 | 12.95 | 15.59 |
| T-3 | 9.55 | 11.09 | 10.83 | 12.07 |
| T-4 | 11.10 | 13.80 | 13.89 | 14.97 |
| T-5 | 11.78 | 15.72 | 14.20 | 16.21 |
| T-6 | 11.64 | 14.01 | 14.26 | 15.62 |
| T-7 | 10.46 | 14.05 | 13.08 | 14.21 |
| T-8 | 13.06 | 15.35 | 14.70 | 16.81 |
| T-9 | 11.39 | 14.35 | 13.75 | 15.12 |
| T-10 | 12.13 | 14.89 | 14.88 | 16.08 |
| T-11 | 10.88 | 14.23 | 12.49 | 14.84 |
| T-12 | 10.77 | 12.52 | 12.08 | 13.57 |
| T-13 | 13.03 | 16.15 | 15.93 | 15.88 |
| T-14 | 13.44 | 16.30 | 15.75 | 16.61 |
| T-15 | 10.89 | 13.39 | 12.16 | 14.15 |
| T-16 | 15.11 | 19.93 | 17.79 | 18.47 |
| T-17 | 11.46 | 13.61 | 12.46 | 13.88 |
| T-18 | 12.12 | 14.47 | 13.62 | 15.19 |
| T-19 | 13.14 | 16.12 | 15.66 | 16.18 |
| T-20 | 13.87 | 16.14 | 15.42 | 16.01 |
| T-21 | 10.98 | 13.94 | 16.21 | 13.22 |
| T-22 | 12.42 | 14.04 | 13.64 | 15.98 |
| T-23 | 11.20 | 13.83 | 13.66 | 14.54 |
| T-24 | 10.55 | 13.41 | 12.18 | 15.05 |
| T-25 | 14.05 | 17.06 | 15.88 | 17.35 |
| T-26 | 14.21 | 18.11 | 16.93 | 16.78 |
| T-27 | 10.35 | 11.64 | 10.89 | 12.96 |
| T-28 | 11.97 | 14.66 | 13.92 | 15.11 |
| T-29 | 12.90 | 14.71 | 13.85 | 14.51 |
| T-30 | 11.38 | (a) | 15.37 | 13.50 |
| T-31 | 11.92 | 14.76 | 13.82 | 14.69 |
| T-32 | 12.93 | 15.34 | 14.63 | 15.41 |
| T-33 | 10.29 | 12.86 | 12.26 | 13.97 |
| T-34 | 10.45 | 12.59 | 12.39 | 14.29 |
| T-35 | 11.56 | 13.32 | 12.66 | 13.49 |
| T-36 | 11.63 | 14.57 | 13.13 | 14.34 |
| T-37 | 12.55 | 15.13 | 14.36 | 15.05 |
| T-38 | 13.51 | 16.09 | 15.31 | 15.91 |
| T-39 | 42.35 | 45.16 | 52.43 | 53.26 |
| T-40 | 33.77 | 35.66 | 39.19 | 40.70 |
| T-41 | 65.38 | 70.97 | 76.69 | 78.37 |
| T-42 | 64.52 | 66.28 | 69.99 | 75.76 |
| T-43 | 72.01 | 73.30 | 69.96 | 81.30 |
| T-44 | 62.31 | 70.13 | 74.87 | 86.82 |
| T-45 | 40.22 | 44.52 | 46.69 | 46.58 |
| T-46 | 32.36 | 36.35 | 37.68 | 37.78 |
| T-47 | 67.18 | 72.62 | 69.64 | 84.55 |

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**FERMI 2
TLD ANALYSIS (CONT.)
(mR/Std Qtr)**

| STATION NUMBER | FIRST QUARTER | SECOND QUARTER | THIRD QUARTER | FOURTH QUARTER |
|----------------|---------------|----------------|---------------|----------------|
| T-48 | 32.82 | 37.30 | 38.62 | 34.94 |
| T-49 | 15.44 | 19.92 | 18.41 | 20.07 |
| T-50 | 12.99 | 15.61 | 14.31 | 15.37 |
| T-51 | 9.45 | 11.32 | 10.11 | 12.78 |
| T-52 | 12.42 | 14.16 | 13.67 | 16.40 |
| T-53 | 21.27 | 23.22 | 24.02 | 25.31 |
| T-54 | 13.74 | 16.48 | 14.18 | 18.33 |
| T-55 | 13.22 | 16.09 | 14.22 | 16.35 |
| T-56 | 12.11 | 14.48 | (a) | 15.07 |
| T-57 | 14.72 | 17.65 | 16.05 | 18.40 |
| T-58 | 11.35 | 13.80 | 11.70 | 13.95 |
| T-59 | 11.47 | 13.33 | 11.81 | 13.48 |
| T-60 | 13.15 | 15.46 | 13.68 | 16.76 |
| T-61 | 13.94 | 15.77 | 13.98 | 16.49 |
| T-62 | 12.96 | 16.56 | 14.82 | 17.08 |
| T-63 | 12.74 | 13.31 | 11.31 | 14.21 |
| T-64 | 18.23 | 19.67 | 19.06 | 23.75 |
| T-65 | 19.71 | 23.50 | 22.13 | 25.09 |
| T-66 | 103.71 | 112.95 | 130.31 | 144.98 |
| T-67 | 15.32 | 17.30 | 16.77 | 19.67 |

(a) TLD missing, see Appendix D - Program Execution.

**FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)**

API-1 FIRST QUARTER

| Date | Activity | | |
|-------------|-----------------|-----|----------|
| 1/4/2005 | 4.73E-02 | +/- | 2.80E-03 |
| 1/12/2005 | 3.06E-02 | +/- | 2.20E-03 |
| 1/18/2005 | 2.78E-02 | +/- | 2.80E-03 |
| 1/26/2005 | 2.80E-02 | +/- | 2.40E-03 |
| 2/1/2005 | 2.42E-02 | +/- | 2.70E-03 |
| 2/8/2005 | 4.18E-02 | +/- | 2.70E-03 |
| 2/15/2005 | 1.94E-02 | +/- | 2.50E-03 |
| 2/22/2005 | 3.24E-02 | +/- | 2.70E-03 |
| 3/1/2005 | 2.42E-02 | +/- | 2.60E-03 |
| 3/8/2005 | 2.42E-02 | +/- | 2.30E-03 |
| 3/15/2005 | 2.25E-02 | +/- | 2.30E-03 |
| 3/22/2005 | 2.20E-02 | +/- | 2.50E-03 |
| 3/29/2005 | 1.86E-02 | +/- | 2.50E-03 |

API-1 SECOND QUARTER

| Date | Activity | | |
|-------------|-----------------|-----|----------|
| 4/5/2005 | 2.03E-02 | +/- | 2.40E-03 |
| 4/12/2005 | 1.90E-02 | +/- | 2.50E-03 |
| 4/19/2005 | 2.36E-02 | +/- | 2.30E-03 |
| 4/26/2005 | 2.20E-02 | +/- | 2.40E-03 |
| 5/3/2005 | 1.36E-02 | +/- | 2.30E-03 |
| 5/10/2005 | 2.68E-02 | +/- | 2.40E-03 |
| 5/17/2005 | 2.03E-02 | +/- | 2.40E-03 |
| 5/24/2005 | 1.79E-02 | +/- | 2.40E-03 |
| 5/31/2005 | 1.15E-02 | +/- | 2.30E-03 |
| 6/7/2005 | 1.91E-02 | +/- | 2.50E-03 |
| 6/14/2005 | 2.33E-02 | +/- | 2.50E-03 |
| 6/21/2005 | 8.80E-03 | +/- | 2.10E-03 |
| 6/28/2005 | 3.52E-02 | +/- | 2.40E-03 |

**FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)**

API-1 THIRD QUARTER

| Date | Activity | | |
|-------------|-----------------|-----|----------|
| 7/5/2005 | 2.35E-02 | +/- | 2.30E-03 |
| 7/12/2005 | 2.06E-02 | +/- | 2.50E-03 |
| 7/19/2005 | 2.39E-02 | +/- | 2.40E-03 |
| 7/26/2005 | 2.90E-02 | +/- | 2.40E-03 |
| 8/2/2005 | (a) | | |
| 8/9/2005 | 3.85E-02 | +/- | 2.60E-03 |
| 8/16/2005 | 3.23E-02 | +/- | 2.40E-03 |
| 8/23/2005 | 2.43E-02 | +/- | 2.80E-03 |
| 8/30/2005 | 2.71E-02 | +/- | 2.40E-03 |
| 9/6/2005 | 1.91E-02 | +/- | 2.20E-03 |
| 9/13/2005 | 3.35E-02 | +/- | 2.70E-03 |
| 9/20/2005 | 2.83E-02 | +/- | 2.70E-03 |
| 9/27/2005 | 3.31E-02 | +/- | 2.40E-03 |

API-1 FOURTH QUARTER

| Date | Activity | | |
|-------------|-----------------|-----|----------|
| 10/4/2005 | 3.22E-02 | +/- | 2.40E-03 |
| 10/11/2005 | 2.35E-02 | +/- | 2.20E-03 |
| 10/18/2005 | 1.79E-02 | +/- | 2.20E-03 |
| 10/25/2005 | 1.21E-02 | +/- | 2.10E-03 |
| 11/1/2005 | 2.32E-02 | +/- | 2.30E-03 |
| 11/8/2005 | 3.15E-02 | +/- | 2.50E-03 |
| 11/15/2005 | 2.85E-02 | +/- | 2.50E-03 |
| 11/22/2005 | 2.36E-02 | +/- | 2.50E-03 |
| 11/29/2005 | 2.10E-02 | +/- | 2.30E-03 |
| 12/6/2005 | 2.79E-02 | +/- | 2.50E-03 |
| 12/13/2005 | 4.00E-02 | +/- | 2.80E-03 |
| 12/20/2005 | 3.48E-02 | +/- | 2.80E-03 |
| 12/27/2005 | 5.15E-02 | +/- | 3.00E-03 |

(a) Sample not collected; see Appendix D, Program Execution.

**FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)**

API-2 FIRST QUARTER

| Date | Activity | |
|-------------|-----------------|--------------|
| 1/4/2005 | 3.59E-02 | +/- 2.70E-03 |
| 1/12/2005 | 2.28E-02 | +/- 2.10E-03 |
| 1/18/2005 | 2.38E-02 | +/- 2.70E-03 |
| 1/26/2005 | 2.21E-02 | +/- 2.30E-03 |
| 2/1/2005 | 2.22E-02 | +/- 2.50E-03 |
| 2/8/2005 | 3.07E-02 | +/- 2.60E-03 |
| 2/15/2005 | 2.15E-02 | +/- 2.50E-03 |
| 2/22/2005 | 3.10E-02 | +/- 2.70E-03 |
| 3/1/2005 | 2.76E-02 | +/- 2.60E-03 |
| 3/8/2005 | 2.18E-02 | +/- 2.30E-03 |
| 3/15/2005 | 1.95E-02 | +/- 2.30E-03 |
| 3/22/2005 | 2.09E-02 | +/- 2.40E-03 |
| 3/29/2005 | 1.62E-02 | +/- 2.40E-03 |

API-2 SECOND QUARTER

| Date | Activity | |
|-------------|-----------------|--------------|
| 4/5/2005 | 2.02E-02 | +/- 2.40E-03 |
| 4/12/2005 | 2.15E-02 | +/- 2.50E-03 |
| 4/19/2005 | 2.20E-02 | +/- 2.30E-03 |
| 4/26/2005 | 2.01E-02 | +/- 2.40E-03 |
| 5/3/2005 | 1.67E-02 | +/- 2.30E-03 |
| 5/10/2005 | 2.86E-02 | +/- 2.40E-03 |
| 5/17/2005 | 1.98E-02 | +/- 2.30E-03 |
| 5/24/2005 | 1.54E-02 | +/- 2.40E-03 |
| 5/31/2005 | 1.79E-02 | +/- 2.40E-03 |
| 6/7/2005 | 2.32E-02 | +/- 2.50E-03 |
| 6/14/2005 | 2.35E-02 | +/- 2.50E-03 |
| 6/21/2005 | 7.20E-03 | +/- 2.10E-03 |
| 6/28/2005 | 3.65E-02 | +/- 2.50E-03 |

**FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)**

API-2 THIRD QUARTER

| Date | Activity | | |
|-------------|-----------------|-----|----------|
| 7/5/2005 | 2.21E-02 | +/- | 2.20E-03 |
| 7/12/2005 | 2.56E-02 | +/- | 2.50E-03 |
| 7/19/2005 | 2.81E-02 | +/- | 2.40E-03 |
| 7/26/2005 | 2.37E-02 | +/- | 2.30E-03 |
| 8/2/2005 | 1.89E-02 | +/- | 2.20E-03 |
| 8/9/2005 | 3.65E-02 | +/- | 2.50E-03 |
| 8/16/2005 | 3.42E-02 | +/- | 2.50E-03 |
| 8/23/2005 | 2.42E-02 | +/- | 2.80E-03 |
| 8/30/2005 | 2.61E-02 | +/- | 2.30E-03 |
| 9/6/2005 | 2.03E-02 | +/- | 2.20E-03 |
| 9/13/2005 | 3.67E-02 | +/- | 2.70E-03 |
| 9/20/2005 | 3.16E-02 | +/- | 2.60E-03 |
| 9/27/2005 | 3.20E-02 | +/- | 2.40E-03 |

API-2 FOURTH QUARTER

| Date | Activity | | |
|-------------|-----------------|-----|----------|
| 10/4/2005 | 3.45E-02 | +/- | 2.40E-03 |
| 10/11/2005 | 2.73E-02 | +/- | 2.20E-03 |
| 10/18/2005 | 1.66E-02 | +/- | 2.20E-03 |
| 10/25/2005 | 1.50E-02 | +/- | 2.20E-03 |
| 11/1/2005 | 2.41E-02 | +/- | 2.30E-03 |
| 11/8/2005 | (a) | | |
| 11/15/2005 | 2.52E-02 | +/- | 2.40E-03 |
| 11/22/2005 | 2.40E-02 | +/- | 2.50E-03 |
| 11/29/2005 | 2.31E-02 | +/- | 2.40E-03 |
| 12/6/2005 | 2.35E-02 | +/- | 2.40E-03 |
| 12/13/2005 | 3.83E-02 | +/- | 2.70E-03 |
| 12/20/2005 | 3.36E-02 | +/- | 2.80E-03 |
| 12/27/2005 | 4.95E-02 | +/- | 2.90E-03 |

(a) Sample not collected; see Appendix D, Program Execution.

**FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)**

API-3 FIRST QUARTER

| Date | Activity | | |
|-------------|-----------------|-----|----------|
| 1/4/2005 | 3.62E-02 | +/- | 2.70E-03 |
| 1/12/2005 | 2.28E-02 | +/- | 2.10E-03 |
| 1/18/2005 | 2.52E-02 | +/- | 2.70E-03 |
| 1/26/2005 | 2.52E-02 | +/- | 2.40E-03 |
| 2/1/2005 | 1.85E-02 | +/- | 2.50E-03 |
| 2/8/2005 | 3.51E-02 | +/- | 2.60E-03 |
| 2/15/2005 | 1.72E-02 | +/- | 2.50E-03 |
| 2/22/2005 | 2.71E-02 | +/- | 2.70E-03 |
| 3/1/2005 | 2.64E-02 | +/- | 2.60E-03 |
| 3/8/2005 | 2.32E-02 | +/- | 2.30E-03 |
| 3/15/2005 | 2.22E-02 | +/- | 2.30E-03 |
| 3/22/2005 | 2.24E-02 | +/- | 2.50E-03 |
| 3/29/2005 | 1.76E-02 | +/- | 2.40E-03 |

API-3 SECOND QUARTER

| Date | Activity | | |
|-------------|-----------------|-----|----------|
| 4/5/2005 | 2.08E-02 | +/- | 2.40E-03 |
| 4/12/2005 | 1.63E-02 | +/- | 2.40E-03 |
| 4/19/2005 | 2.75E-02 | +/- | 2.40E-03 |
| 4/26/2005 | 2.07E-02 | +/- | 2.40E-03 |
| 5/3/2005 | 1.45E-02 | +/- | 2.30E-03 |
| 5/10/2005 | 2.70E-02 | +/- | 2.40E-03 |
| 5/17/2005 | 1.93E-02 | +/- | 2.30E-03 |
| 5/24/2005 | 2.07E-02 | +/- | 2.50E-03 |
| 5/31/2005 | 1.54E-02 | +/- | 2.40E-03 |
| 6/7/2005 | 2.10E-02 | +/- | 2.50E-03 |
| 6/14/2005 | 2.19E-02 | +/- | 2.50E-03 |
| 6/21/2005 | 7.20E-03 | +/- | 2.10E-03 |
| 6/28/2005 | 3.76E-02 | +/- | 2.50E-03 |

**FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)**

API-3 THIRD QUARTER

| Date | Activity | | |
|-------------|-----------------|-----|----------|
| 7/5/2005 | 2.38E-02 | +/- | 2.30E-03 |
| 7/12/2005 | 2.16E-02 | +/- | 2.50E-03 |
| 7/19/2005 | 2.33E-02 | +/- | 2.40E-03 |
| 7/26/2005 | 2.74E-02 | +/- | 2.30E-03 |
| 8/2/2005 | 2.06E-02 | +/- | 2.20E-03 |
| 8/9/2005 | 3.39E-02 | +/- | 2.50E-03 |
| 8/16/2005 | 3.17E-02 | +/- | 2.40E-03 |
| 8/23/2005 | 2.34E-02 | +/- | 2.80E-03 |
| 8/30/2005 | 2.69E-02 | +/- | 2.40E-03 |
| 9/6/2005 | 2.48E-02 | +/- | 2.30E-03 |
| 9/13/2005 | 3.59E-02 | +/- | 2.70E-03 |
| 9/20/2005 | 3.42E-02 | +/- | 2.70E-03 |
| 9/27/2005 | 3.27E-02 | +/- | 2.40E-03 |

API-3 FOURTH QUARTER

| Date | Activity | | |
|-------------|-----------------|-----|----------|
| 10/4/2005 | 3.12E-02 | +/- | 2.40E-03 |
| 10/11/2005 | 2.14E-02 | +/- | 2.20E-03 |
| 10/18/2005 | 2.02E-02 | +/- | 2.30E-03 |
| 10/25/2005 | 1.34E-02 | +/- | 2.10E-03 |
| 11/1/2005 | 2.06E-02 | +/- | 2.30E-03 |
| 11/8/2005 | 3.30E-02 | +/- | 2.50E-03 |
| 11/15/2005 | 2.80E-02 | +/- | 2.50E-03 |
| 11/22/2005 | 2.29E-02 | +/- | 2.50E-03 |
| 11/29/2005 | 2.35E-02 | +/- | 2.40E-03 |
| 12/6/2005 | 2.26E-02 | +/- | 2.40E-03 |
| 12/13/2005 | 4.19E-02 | +/- | 2.80E-03 |
| 12/20/2005 | 3.10E-02 | +/- | 2.70E-03 |
| 12/27/2005 | 4.95E-02 | +/- | 2.90E-03 |

**FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)**

API-4 FIRST QUARTER

| Date | Activity | |
|-------------|-----------------|--------------|
| 1/4/2005 | 4.42E-02 | +/- 2.90E-03 |
| 1/12/2005 | 2.13E-02 | +/- 2.00E-03 |
| 1/18/2005 | 2.43E-02 | +/- 2.70E-03 |
| 1/26/2005 | 2.53E-02 | +/- 2.30E-03 |
| 2/1/2005 | 2.15E-02 | +/- 2.60E-03 |
| 2/8/2005 | 3.46E-02 | +/- 2.60E-03 |
| 2/15/2005 | 2.07E-02 | +/- 2.50E-03 |
| 2/22/2005 | 2.84E-02 | +/- 2.70E-03 |
| 3/1/2005 | 2.50E-02 | +/- 2.60E-03 |
| 3/8/2005 | 2.14E-02 | +/- 2.20E-03 |
| 3/15/2005 | 1.77E-02 | +/- 2.20E-03 |
| 3/22/2005 | 2.08E-02 | +/- 2.40E-03 |
| 3/29/2005 | 1.25E-02 | +/- 2.30E-03 |

API-4 SECOND QUARTER

| Date | Activity | |
|-------------|-----------------|--------------|
| 4/5/2005 | 1.97E-02 | +/- 2.40E-03 |
| 4/12/2005 | 2.05E-02 | +/- 2.40E-03 |
| 4/19/2005 | 2.51E-02 | +/- 2.40E-03 |
| 4/26/2005 | 1.83E-02 | +/- 2.30E-03 |
| 5/3/2005 | 1.21E-02 | +/- 2.30E-03 |
| 5/10/2005 | 2.93E-02 | +/- 2.50E-03 |
| 5/17/2005 | 2.06E-02 | +/- 2.40E-03 |
| 5/24/2005 | 1.89E-02 | +/- 2.40E-03 |
| 5/31/2005 | 1.44E-02 | +/- 2.30E-03 |
| 6/7/2005 | 2.15E-02 | +/- 2.50E-03 |
| 6/14/2005 | 2.30E-02 | +/- 2.50E-03 |
| 6/21/2005 | 8.10E-03 | +/- 2.10E-03 |
| 6/28/2005 | 3.57E-02 | +/- 2.50E-03 |

**FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)**

API-4 THIRD QUARTER

| Date | Activity | | |
|-------------|-----------------|-----|----------|
| 7/5/2005 | 2.24E-02 | +/- | 2.30E-03 |
| 7/12/2005 | 2.48E-02 | +/- | 2.50E-03 |
| 7/19/2005 | 2.56E-02 | +/- | 2.40E-03 |
| 7/26/2005 | 2.09E-02 | +/- | 2.20E-03 |
| 8/2/2005 | 2.16E-02 | +/- | 2.20E-03 |
| 8/9/2005 | 3.60E-02 | +/- | 2.60E-03 |
| 8/16/2005 | 3.16E-02 | +/- | 2.40E-03 |
| 8/23/2005 | 2.29E-02 | +/- | 2.80E-03 |
| 8/30/2005 | 2.47E-02 | +/- | 2.30E-03 |
| 9/6/2005 | 2.31E-02 | +/- | 2.30E-03 |
| 9/13/2005 | 3.66E-02 | +/- | 2.70E-03 |
| 9/20/2005 | 2.99E-02 | +/- | 2.60E-03 |
| 9/27/2005 | 2.66E-02 | +/- | 2.30E-03 |

API-4 FOURTH QUARTER

| Date | Activity | | |
|-------------|-----------------|-----|----------|
| 10/4/2005 | 3.27E-01 | +/- | 2.40E-03 |
| 10/11/2005 | 2.43E-02 | +/- | 2.20E-03 |
| 10/18/2005 | 1.78E-02 | +/- | 2.30E-03 |
| 10/25/2005 | 1.54E-02 | +/- | 2.20E-03 |
| 11/1/2005 | 2.31E-02 | +/- | 2.30E-03 |
| 11/8/2005 | 3.20E-02 | +/- | 2.50E-03 |
| 11/15/2005 | 2.46E-02 | +/- | 2.40E-03 |
| 11/22/2005 | 2.33E-02 | +/- | 2.50E-03 |
| 11/29/2005 | 2.38E-02 | +/- | 2.40E-03 |
| 12/6/2005 | 1.54E-02 | +/- | 2.30E-03 |
| 12/13/2005 | 3.68E-02 | +/- | 2.70E-03 |
| 12/20/2005 | 3.50E-02 | +/- | 2.80E-03 |
| 12/27/2005 | 4.38E-02 | +/- | 2.80E-03 |

**FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)**

API-5 FIRST QUARTER

| Date | Activity | |
|-------------|-----------------|--------------|
| 1/4/2005 | 5.44E-02 | +/- 3.00E-03 |
| 1/12/2005 | 3.41E-02 | +/- 2.20E-03 |
| 1/18/2005 | 3.21E-02 | +/- 2.90E-03 |
| 1/26/2005 | 3.71E-02 | +/- 2.50E-03 |
| 2/1/2005 | 2.75E-02 | +/- 2.70E-03 |
| 2/8/2005 | 5.46E-02 | +/- 4.50E-03 |
| 2/15/2005 | 2.75E-02 | +/- 2.70E-03 |
| 2/22/2005 | 3.31E-02 | +/- 2.80E-03 |
| 3/1/2005 | 2.50E-02 | +/- 2.60E-03 |
| 3/8/2005 | 2.84E-02 | +/- 2.40E-03 |
| 3/15/2005 | 2.33E-02 | +/- 2.30E-03 |
| 3/22/2005 | 1.76E-02 | +/- 2.40E-03 |
| 3/29/2005 | 1.53E-02 | +/- 2.40E-03 |

API-5 SECOND QUARTER

| Date | Activity | |
|-------------|-----------------|--------------|
| 4/5/2005 | 1.72E-02 | +/- 2.30E-03 |
| 4/12/2005 | 1.84E-02 | +/- 2.40E-03 |
| 4/19/2005 | 1.91E-02 | +/- 2.20E-03 |
| 4/26/2005 | 2.03E-02 | +/- 2.30E-03 |
| 5/3/2005 | 1.34E-02 | +/- 2.30E-03 |
| 5/10/2005 | 2.79E-02 | +/- 2.40E-03 |
| 5/17/2005 | 2.11E-02 | +/- 2.40E-03 |
| 5/24/2005 | 2.01E-02 | +/- 2.40E-03 |
| 5/31/2005 | 1.39E-02 | +/- 2.40E-03 |
| 6/7/2005 | 2.26E-02 | +/- 2.50E-03 |
| 6/14/2005 | 2.59E-02 | +/- 2.60E-03 |
| 6/21/2005 | 7.90E-03 | +/- 2.10E-03 |
| 6/28/2005 | 4.01E-02 | +/- 2.50E-03 |

**FERMI 2
AIR PARTICULATE GROSS BETA
(pCi/cubic meter)**

API-5 THIRD QUARTER

| Date | Activity | | |
|-------------|-----------------|-----|----------|
| 7/5/2005 | 2.57E-02 | +/- | 2.30E-03 |
| 7/12/2005 | 2.06E-02 | +/- | 2.50E-03 |
| 7/19/2005 | 2.43E-02 | +/- | 2.30E-03 |
| 7/26/2005 | 2.39E-02 | +/- | 2.30E-03 |
| 8/2/2005 | 2.08E-02 | +/- | 2.20E-03 |
| 8/9/2005 | 3.05E-02 | +/- | 2.40E-03 |
| 8/16/2005 | (a) | | |
| 8/23/2005 | 2.14E-02 | +/- | 2.80E-03 |
| 8/30/2005 | 2.33E-02 | +/- | 2.30E-03 |
| 9/6/2005 | 1.77E-02 | +/- | 2.10E-03 |
| 9/13/2005 | 3.18E-02 | +/- | 2.70E-03 |
| 9/20/2005 | 2.43E-02 | +/- | 2.60E-03 |
| 9/27/2005 | 2.96E-02 | +/- | 2.30E-03 |

API-5 FOURTH QUARTER

| Date | Activity | | |
|-------------|-----------------|-----|----------|
| 10/4/2005 | 3.31E-02 | +/- | 2.40E-03 |
| 10/11/2005 | 2.42E-02 | +/- | 2.20E-03 |
| 10/18/2005 | 1.94E-02 | +/- | 2.30E-03 |
| 10/25/2005 | 1.43E-02 | +/- | 2.20E-03 |
| 11/1/2005 | 2.16E-02 | +/- | 2.30E-03 |
| 11/8/2005 | 3.52E-02 | +/- | 2.50E-03 |
| 11/15/2005 | 2.59E-02 | +/- | 2.50E-03 |
| 11/22/2005 | 2.71E-02 | +/- | 2.60E-03 |
| 11/29/2005 | 2.25E-02 | +/- | 2.40E-03 |
| 12/6/2005 | 2.18E-02 | +/- | 2.40E-03 |
| 12/13/2005 | 4.27E-02 | +/- | 2.80E-03 |
| 12/20/2005 | 3.42E-02 | +/- | 2.80E-03 |
| 12/27/2005 | 4.89E-02 | +/- | 2.90E-03 |

(a) Sample not collected; see Appendix D, Program Execution.

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**FERMI 2
AIR IODINE - 131
(pCi/cubic meter)**

API-1 FIRST QUARTER

| Date | Activity |
|-------------|-----------------|
| 1/4/2005 | < 4.30E-02 |
| 1/12/2005 | < 4.40E-02 |
| 1/18/2005 | < 5.20E-02 |
| 1/26/2005 | < 4.20E-02 |
| 2/1/2005 | < 4.70E-02 |
| 2/8/2005 | < 3.90E-02 |
| 2/15/2005 | < 4.80E-02 |
| 2/22/2005 | < 5.00E-02 |
| 3/1/2005 | < 4.60E-02 |
| 3/8/2005 | < 4.20E-02 |
| 3/15/2005 | < 4.40E-02 |
| 3/22/2005 | < 4.60E-02 |
| 3/29/2005 | < 3.40E-02 |

API-1 SECOND QUARTER

| Date | Activity |
|-------------|-----------------|
| 4/5/2005 | < 4.30E-02 |
| 4/12/2005 | < 4.00E-02 |
| 4/19/2005 | < 5.60E-02 |
| 4/26/2005 | < 5.30E-02 |
| 5/3/2005 | < 3.90E-02 |
| 5/10/2005 | < 3.70E-02 |
| 5/17/2005 | < 3.60E-02 |
| 5/24/2005 | < 4.80E-02 |
| 5/31/2005 | < 3.20E-02 |
| 6/7/2005 | < 3.90E-02 |
| 6/14/2005 | < 4.50E-02 |
| 6/21/2005 | < 3.90E-02 |
| 6/28/2005 | < 5.40E-02 |

**FERMI 2
AIR IODINE - 131
(pCi/cubic meter)**

API-1 THIRD QUARTER

| Date | Activity |
|-------------|-----------------|
| 7/5/2005 | < 2.70E-02 |
| 7/12/2005 | < 4.60E-02 |
| 7/19/2005 | < 3.50E-02 |
| 7/26/2005 | < 5.40E-02 |
| 8/2/2005 | (a) |
| 8/9/2005 | < 4.90E-02 |
| 8/16/2005 | < 3.90E-02 |
| 8/23/2005 | < 2.50E-02 |
| 8/30/2005 | < 3.60E-02 |
| 9/6/2005 | < 4.20E-02 |
| 9/13/2005 | < 4.00E-02 |
| 9/20/2005 | < 5.40E-02 |
| 9/27/2005 | < 4.60E-02 |

API-1 FOURTH QUARTER

| Date | Activity |
|-------------|-----------------|
| 10/4/2005 | < 3.60E-02 |
| 10/11/2005 | < 5.40E-02 |
| 10/18/2005 | < 4.60E-02 |
| 10/25/2005 | < 4.50E-02 |
| 11/1/2005 | < 3.50E-02 |
| 11/8/2005 | < 3.70E-02 |
| 11/15/2005 | < 4.20E-02 |
| 11/22/2005 | < 3.90E-02 |
| 11/29/2005 | < 4.30E-02 |
| 12/6/2005 | < 4.40E-02 |
| 12/13/2005 | < 4.00E-02 |
| 12/20/2005 | < 4.80E-02 |
| 12/27/2005 | < 4.80E-02 |

(a) Sample not collected; see Appendix D, Program Execution.

**FERMI 2
AIR IODINE - 131
(pCi/cubic meter)**

API-2 FIRST QUARTER

| Date | Activity |
|-------------|-----------------|
| 1/4/2005 | < 4.20E-02 |
| 1/12/2005 | < 4.30E-02 |
| 1/18/2005 | < 4.70E-02 |
| 1/26/2005 | < 2.90E-02 |
| 2/1/2005 | < 3.80E-02 |
| 2/8/2005 | < 4.20E-02 |
| 2/15/2005 | < 5.20E-02 |
| 2/22/2005 | < 4.30E-02 |
| 3/1/2005 | < 4.40E-02 |
| 3/8/2005 | < 4.40E-02 |
| 3/15/2005 | < 4.10E-02 |
| 3/22/2005 | < 4.80E-02 |
| 3/29/2005 | < 3.40E-02 |

API-2 SECOND QUARTER

| Date | Activity |
|-------------|-----------------|
| 4/5/2005 | < 4.70E-02 |
| 4/12/2005 | < 3.90E-02 |
| 4/19/2005 | < 4.30E-02 |
| 4/26/2005 | < 3.20E-02 |
| 5/3/2005 | < 4.00E-02 |
| 5/10/2005 | < 4.50E-02 |
| 5/17/2005 | < 5.20E-02 |
| 5/24/2005 | < 5.70E-02 |
| 5/31/2005 | < 4.40E-02 |
| 6/7/2005 | < 4.20E-02 |
| 6/14/2005 | < 4.40E-02 |
| 6/21/2005 | < 4.80E-02 |
| 6/28/2005 | < 4.10E-02 |

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**FERMI 2
AIR IODINE – 131
(pCi/cubic meter)**

API-2 THIRD QUARTER

| Date | Activity |
|-------------|-----------------|
| 7/5/2005 | < 3.20E-02 |
| 7/12/2005 | < 4.90E-02 |
| 7/19/2005 | < 3.30E-02 |
| 7/26/2005 | < 4.80E-02 |
| 8/2/2005 | < 5.10E-02 |
| 8/9/2005 | < 3.70E-02 |
| 8/16/2005 | < 4.00E-02 |
| 8/23/2005 | < 3.40E-02 |
| 8/30/2005 | < 3.60E-02 |
| 9/6/2005 | < 4.40E-02 |
| 9/13/2005 | < 4.30E-02 |
| 9/20/2005 | < 5.00E-02 |
| 9/27/2005 | < 4.20E-02 |

API-2 FOURTH QUARTER

| Date | Activity |
|-------------|-----------------|
| 10/4/2005 | < 3.90E-02 |
| 10/11/2005 | < 4.90E-02 |
| 10/18/2005 | < 4.40E-02 |
| 10/25/2005 | < 5.10E-02 |
| 11/1/2005 | < 3.40E-02 |
| 11/8/2005 | (a) |
| 11/15/2005 | < 4.60E-02 |
| 11/22/2005 | < 4.50E-02 |
| 11/29/2005 | < 4.50E-02 |
| 12/6/2005 | < 4.80E-02 |
| 12/13/2005 | < 4.00E-02 |
| 12/20/2005 | < 4.60E-02 |
| 12/27/2005 | < 4.60E-02 |

(a) Sample not collected; see Appendix D, Program Execution.

**FERMI 2
AIR IODINE - 131
(pCi/cubic meter)**

API-3 FIRST QUARTER

| Date | Activity |
|-------------|-----------------|
| 1/4/2005 | < 4.10E-02 |
| 1/12/2005 | < 4.80E-02 |
| 1/18/2005 | < 4.90E-02 |
| 1/26/2005 | < 4.00E-02 |
| 2/1/2005 | < 4.10E-02 |
| 2/8/2005 | < 4.00E-02 |
| 2/15/2005 | < 4.60E-02 |
| 2/22/2005 | < 3.40E-02 |
| 3/1/2005 | < 4.50E-02 |
| 3/8/2005 | < 3.60E-02 |
| 3/15/2005 | < 4.00E-02 |
| 3/22/2005 | < 5.10E-02 |
| 3/29/2005 | < 3.60E-02 |

API-3 SECOND QUARTER

| Date | Activity |
|-------------|-----------------|
| 4/5/2005 | < 4.10E-02 |
| 4/12/2005 | < 3.80E-02 |
| 4/19/2005 | < 4.60E-02 |
| 4/26/2005 | < 3.80E-02 |
| 5/3/2005 | < 3.80E-02 |
| 5/10/2005 | < 4.60E-02 |
| 5/17/2005 | < 4.10E-02 |
| 5/24/2005 | < 4.60E-02 |
| 5/31/2005 | < 4.90E-02 |
| 6/7/2005 | < 4.50E-02 |
| 6/14/2005 | < 4.00E-02 |
| 6/21/2005 | < 4.30E-02 |
| 6/28/2005 | < 3.90E-02 |

**FERMI 2
AIR IODINE - 131
(pCi/cubic meter)**

API-3 THIRD QUARTER

| Date | Activity |
|-------------|-----------------|
| 7/5/2005 | < 3.10E-02 |
| 7/12/2005 | < 4.90E-02 |
| 7/19/2005 | < 2.80E-02 |
| 7/26/2005 | < 5.70E-02 |
| 8/2/2005 | < 6.60E-02 |
| 8/9/2005 | < 4.40E-02 |
| 8/16/2005 | < 3.90E-02 |
| 8/23/2005 | < 3.90E-02 |
| 8/30/2005 | < 4.20E-02 |
| 9/6/2005 | < 5.00E-02 |
| 9/13/2005 | < 3.80E-02 |
| 9/20/2005 | < 5.10E-02 |
| 9/27/2005 | < 3.60E-02 |

API-3 FOURTH QUARTER

| Date | Activity |
|-------------|-----------------|
| 10/4/2005 | < 4.60E-02 |
| 10/11/2005 | < 6.30E-02 |
| 10/18/2005 | < 5.50E-02 |
| 10/25/2005 | < 4.40E-02 |
| 11/1/2005 | < 4.20E-02 |
| 11/8/2005 | < 3.70E-02 |
| 11/15/2005 | < 4.90E-02 |
| 11/22/2005 | < 3.80E-02 |
| 11/29/2005 | < 5.00E-02 |
| 12/6/2005 | < 3.80E-02 |
| 12/13/2005 | < 3.70E-02 |
| 12/20/2005 | < 4.30E-02 |
| 12/27/2005 | < 4.30E-02 |

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**FERMI 2
AIR IODINE - 131
(pCi/cubic meter)**

API-4 FIRST QUARTER

| Date | Activity |
|-------------|-----------------|
| 1/4/2005 | < 4.20E-02 |
| 1/12/2005 | < 3.80E-02 |
| 1/18/2005 | < 6.40E-02 |
| 1/26/2005 | < 3.60E-02 |
| 2/1/2005 | < 4.30E-02 |
| 2/8/2005 | < 3.80E-02 |
| 2/15/2005 | < 4.10E-02 |
| 2/22/2005 | < 4.80E-02 |
| 3/1/2005 | < 4.30E-02 |
| 3/8/2005 | < 4.30E-02 |
| 3/15/2005 | < 4.10E-02 |
| 3/22/2005 | < 5.60E-02 |
| 3/29/2005 | < 2.70E-02 |

API-4 SECOND QUARTER

| Date | Activity |
|-------------|-----------------|
| 4/5/2005 | < 4.60E-02 |
| 4/12/2005 | < 3.70E-02 |
| 4/19/2005 | < 5.00E-02 |
| 4/26/2005 | < 3.70E-02 |
| 5/3/2005 | < 3.10E-02 |
| 5/10/2005 | < 4.20E-02 |
| 5/17/2005 | < 5.30E-02 |
| 5/24/2005 | < 5.30E-02 |
| 5/31/2005 | < 4.50E-02 |
| 6/7/2005 | < 5.00E-02 |
| 6/14/2005 | < 4.80E-02 |
| 6/21/2005 | < 5.00E-02 |
| 6/28/2005 | < 4.60E-02 |

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**FERMI 2
AIR IODINE - 131
(pCi/cubic meter)**

API-4 THIRD QUARTER

| Date | Activity |
|-------------|-----------------|
| 7/5/2005 | < 2.50E-02 |
| 7/12/2005 | < 4.60E-02 |
| 7/19/2005 | < 2.50E-02 |
| 7/26/2005 | < 4.80E-02 |
| 8/2/2005 | < 6.80E-02 |
| 8/9/2005 | < 3.20E-02 |
| 8/16/2005 | < 3.70E-02 |
| 8/23/2005 | < 3.50E-02 |
| 8/30/2005 | < 3.70E-02 |
| 9/6/2005 | < 3.80E-02 |
| 9/13/2005 | < 4.50E-02 |
| 9/20/2005 | < 3.80E-02 |
| 9/27/2005 | < 4.40E-02 |

API-4 FOURTH QUARTER

| Date | Activity |
|-------------|-----------------|
| 10/4/2005 | < 4.80E-02 |
| 10/11/2005 | < 4.70E-02 |
| 10/18/2005 | < 4.60E-02 |
| 10/25/2005 | < 4.30E-02 |
| 11/1/2005 | < 4.00E-02 |
| 11/8/2005 | < 4.10E-02 |
| 11/15/2005 | < 4.50E-02 |
| 11/22/2005 | < 3.90E-02 |
| 11/29/2005 | < 4.30E-02 |
| 12/6/2005 | < 4.90E-02 |
| 12/13/2005 | < 4.50E-02 |
| 12/20/2005 | < 3.70E-02 |
| 12/27/2005 | < 3.70E-02 |

**FERMI 2
AIR IODINE - 131
(pCi/cubic meter)**

API-5 FIRST QUARTER

| Date | Activity |
|-------------|-----------------|
| 1/4/2005 | < 4.30E-02 |
| 1/12/2005 | < 4.70E-02 |
| 1/18/2005 | < 5.00E-02 |
| 1/26/2005 | < 4.00E-02 |
| 2/1/2005 | < 4.20E-02 |
| 2/8/2005 | < 6.30E-02 |
| 2/15/2005 | < 4.30E-02 |
| 2/22/2005 | < 3.30E-02 |
| 3/1/2005 | < 4.10E-02 |
| 3/8/2005 | < 3.60E-02 |
| 3/15/2005 | < 4.50E-02 |
| 3/22/2005 | < 6.50E-02 |
| 3/29/2005 | < 4.20E-02 |

API-5 SECOND QUARTER

| Date | Activity |
|-------------|-----------------|
| 4/5/2005 | < 4.10E-02 |
| 4/12/2005 | < 3.70E-02 |
| 4/19/2005 | < 4.60E-02 |
| 4/26/2005 | < 4.80E-02 |
| 5/3/2005 | < 3.30E-02 |
| 5/10/2005 | < 3.90E-02 |
| 5/17/2005 | < 3.90E-02 |
| 5/24/2005 | < 5.00E-02 |
| 5/31/2005 | < 4.30E-02 |
| 6/7/2005 | < 3.80E-02 |
| 6/14/2005 | < 4.90E-02 |
| 6/21/2005 | < 3.80E-02 |
| 6/28/2005 | < 5.40E-02 |

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**FERMI 2
AIR IODINE - 131
(pCi/cubic meter)**

API-5 THIRD QUARTER

| Date | Activity |
|-------------|-----------------|
| 7/5/2005 | < 3.10E-02 |
| 7/12/2005 | < 3.20E-02 |
| 7/19/2005 | < 3.80E-02 |
| 7/26/2005 | < 4.30E-02 |
| 8/2/2005 | < 5.50E-02 |
| 8/9/2005 | < 4.10E-02 |
| 8/16/2005 | (a) |
| 8/23/2005 | < 3.10E-02 |
| 8/30/2005 | < 4.10E-02 |
| 9/6/2005 | < 4.50E-02 |
| 9/13/2005 | < 3.90E-02 |
| 9/20/2005 | < 5.00E-02 |
| 9/27/2005 | < 4.60E-02 |

API-5 FOURTH QUARTER

| Date | Activity |
|-------------|-----------------|
| 10/4/2005 | < 4.00E-02 |
| 10/11/2005 | < 4.70E-02 |
| 10/18/2005 | < 4.70E-02 |
| 10/25/2005 | < 5.10E-02 |
| 11/1/2005 | < 4.10E-02 |
| 11/8/2005 | < 3.10E-02 |
| 11/15/2005 | < 4.80E-02 |
| 11/22/2005 | < 3.50E-02 |
| 11/29/2005 | < 4.00E-02 |
| 12/6/2005 | < 4.00E-02 |
| 12/13/2005 | < 4.30E-02 |
| 12/20/2005 | < 4.40E-02 |
| 12/27/2005 | < 4.40E-02 |

(a) Sample not collected; see Appendix D, Program Execution.

FERMI 2 AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS

API-1 (indicator)
(pCi/cubic meter)

| Nuclide | First Quarter | | | Second Quarter | | |
|---------|---------------|----------|--------------|----------------|----------|--------------|
| | | | | | | |
| Be-7 | | 1.15E-01 | +/- 1.70E-02 | | 7.60E-02 | +/- 2.40E-02 |
| K-40 | < | 2.70E-02 | | < | 4.10E-02 | |
| Mn-54 | < | 5.70E-02 | | < | 8.70E-02 | |
| Co-58 | < | 2.20E-03 | | < | 2.20E-03 | |
| Fe-59 | < | 3.00E-03 | | < | 4.10E-03 | |
| Co-60 | < | 1.10E-02 | | < | 1.20E-02 | |
| Zn-65 | < | 1.80E-03 | | < | 7.70E-04 | |
| Zr-95 | < | 7.70E-03 | | < | 5.40E-03 | |
| Ru-103 | < | 6.30E-03 | | < | 7.40E-03 | |
| Ru-106 | < | 3.60E-03 | | < | 8.20E-03 | |
| Cs-134 | < | 1.50E-02 | | < | 2.20E-02 | |
| Cs-137 | < | 1.90E-03 | | < | 2.70E-03 | |
| Ba-140 | < | 2.10E-03 | | < | 2.60E-03 | |
| La-140 | < | 4.00E-02 | | < | 9.00E-02 | |
| Ce-141 | < | 4.60E-02 | | < | 1.00E-01 | |
| Ce-144 | < | 5.70E-03 | | < | 1.00E-02 | |

API-1 (indicator)
(pCi/cubic meter)

| Nuclide | Third Quarter (a) | | | Fourth Quarter | | |
|---------|-------------------|----------|--------------|----------------|----------|--------------|
| | | | | | | |
| Be-7 | | 1.19E-01 | +/- 2.30E-02 | | 7.50E-02 | +/- 2.20E-02 |
| K-40 | < | 4.30E-02 | | < | 2.80E-02 | |
| Mn-54 | < | 8.50E-02 | | < | 8.80E-02 | |
| Co-58 | < | 3.60E-03 | | < | 2.90E-03 | |
| Fe-59 | < | 4.50E-03 | | < | 4.30E-03 | |
| Co-60 | < | 1.20E-02 | | < | 9.80E-03 | |
| Zn-65 | < | 3.10E-03 | | < | 4.30E-03 | |
| Zr-95 | < | 8.30E-03 | | < | 7.70E-03 | |
| Ru-103 | < | 9.50E-03 | | < | 4.90E-03 | |
| Ru-106 | < | 7.70E-03 | | < | 1.00E-02 | |
| Cs-134 | < | 2.90E-02 | | < | 3.00E-02 | |
| Cs-137 | < | 3.20E-03 | | < | 3.60E-03 | |
| Ba-140 | < | 3.50E-03 | | < | 3.20E-03 | |
| La-140 | < | 5.90E-02 | | < | 1.10E-01 | |
| Ce-141 | < | 6.80E-02 | | < | 1.30E-01 | |
| Ce-144 | < | 1.40E-02 | | < | 1.30E-02 | |

(a) See Appendix D, Program Execution.

**FERMI 2
AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS**

**API-2 (indicator)
(pCi/cubic meter)**

| Nuclide | First Quarter | | Second Quarter | |
|---------|---------------|--------------|----------------|--------------|
| Be-7 | 7.90E-02 | +/- 1.70E-02 | 1.00E-01 | +/- 2.00E-02 |
| K-40 | < 3.00E-02 | | < 4.50E-02 | |
| Mn-54 | < 5.40E-02 | | < 9.70E-02 | |
| Co-58 | < 1.80E-03 | | < 3.20E-03 | |
| Fe-59 | < 3.30E-03 | | < 3.20E-03 | |
| Co-60 | < 3.70E-03 | | < 3.40E-03 | |
| Zn-65 | < 6.40E-04 | | < 2.80E-03 | |
| Zr-95 | < 4.30E-03 | | < 8.20E-03 | |
| Ru-103 | < 4.90E-03 | | < 8.70E-03 | |
| Ru-106 | < 5.70E-03 | | < 8.50E-03 | |
| Cs-134 | < 2.10E-02 | | < 2.00E-02 | |
| Cs-137 | < 2.10E-03 | | < 3.40E-03 | |
| Ba-140 | < 1.80E-03 | | < 2.30E-03 | |
| La-140 | < 4.70E-02 | | < 8.10E-02 | |
| Ce-141 | < 5.40E-02 | | < 9.30E-02 | |
| Ce-144 | < 5.50E-03 | | < 9.60E-03 | |

**API-2 (indicator)
(pCi/cubic meter)**

| Nuclide | Third Quarter (a) | | Fourth Quarter | |
|---------|-------------------|--------------|----------------|--------------|
| Be-7 | 7.90E-02 | +/- 2.00E-02 | 8.40E-02 | +/- 2.20E-02 |
| K-40 | < 3.50E-02 | | < 3.70E-02 | |
| Mn-54 | < 1.00E-01 | | < 1.10E-01 | |
| Co-58 | < 3.10E-03 | | < 3.60E-03 | |
| Fe-59 | < 5.90E-03 | | < 5.10E-03 | |
| Co-60 | < 1.30E-02 | | < 2.30E-02 | |
| Zn-65 | < 3.70E-03 | | < 3.10E-03 | |
| Zr-95 | < 7.00E-03 | | < 9.60E-03 | |
| Ru-103 | < 4.70E-03 | | < 1.10E-02 | |
| Ru-106 | < 8.80E-03 | | < 9.40E-03 | |
| Cs-134 | < 3.40E-02 | | < 2.90E-02 | |
| Cs-137 | < 3.50E-03 | | < 2.40E-03 | |
| Ba-140 | < 3.30E-03 | | < 2.00E-03 | |
| La-140 | < 8.00E-02 | | < 2.80E-02 | |
| Ce-141 | < 9.20E-02 | | < 3.20E-02 | |
| Ce-144 | < 1.20E-02 | | < 1.50E-02 | |

(a) See Appendix D, Program Execution.

**FERMI 2
AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS**

**API-3 (indicator)
(pCi/cubic meter)**

| Nuclide | First Quarter | | | Second Quarter | | |
|---------|---------------|----------|--------------|----------------|----------|--------------|
| Be-7 | | 1.07E-01 | +/- 1.60E-02 | | 8.10E-02 | +/- 1.80E-02 |
| K-40 | < | 2.50E-02 | | < | 3.70E-02 | |
| Mn-54 | < | 4.50E-02 | | < | 8.90E-02 | |
| Co-58 | < | 2.70E-03 | | < | 2.40E-03 | |
| Fe-59 | < | 2.30E-03 | | < | 3.70E-03 | |
| Co-60 | < | 1.50E-02 | | < | 1.30E-02 | |
| Zn-65 | < | 2.10E-03 | | < | 2.20E-03 | |
| Zr-95 | < | 6.30E-03 | | < | 5.40E-03 | |
| Ru-103 | < | 6.90E-03 | | < | 7.40E-03 | |
| Ru-106 | < | 3.40E-03 | | < | 5.40E-03 | |
| Cs-134 | < | 1.80E-02 | | < | 2.40E-02 | |
| Cs-137 | < | 5.10E-04 | | < | 2.90E-03 | |
| Ba-140 | < | 2.20E-03 | | < | 1.40E-03 | |
| La-140 | < | 4.60E-02 | | < | 7.00E-02 | |
| Ce-141 | < | 5.30E-02 | | < | 8.00E-02 | |
| Ce-144 | < | 5.20E-03 | | < | 1.20E-02 | |

**API-3 (indicator)
(pCi/cubic meter)**

| Nuclide | Third Quarter | | | Fourth Quarter | | |
|---------|---------------|----------|--------------|----------------|----------|--|
| Be-7 | | 1.21E-01 | +/- 2.30E-02 | < | 7.10E-02 | |
| K-40 | < | 4.40E-02 | | < | 2.80E-02 | |
| Mn-54 | < | 9.60E-02 | | < | 8.40E-02 | |
| Co-58 | < | 2.60E-03 | | < | 2.70E-03 | |
| Fe-59 | < | 3.70E-03 | | < | 5.40E-03 | |
| Co-60 | < | 9.10E-03 | | < | 1.40E-02 | |
| Zn-65 | < | 3.70E-03 | | < | 4.00E-03 | |
| Zr-95 | < | 6.30E-03 | | < | 8.30E-03 | |
| Ru-103 | < | 8.80E-03 | | < | 1.10E-02 | |
| Ru-106 | < | 8.40E-03 | | < | 8.20E-03 | |
| Cs-134 | < | 2.50E-02 | | < | 3.00E-02 | |
| Cs-137 | < | 1.60E-03 | | < | 2.50E-03 | |
| Ba-140 | < | 3.30E-03 | | < | 2.10E-03 | |
| La-140 | < | 8.90E-02 | | < | 7.10E-02 | |
| Ce-141 | < | 1.00E-01 | | < | 8.10E-02 | |
| Ce-144 | < | 1.10E-02 | | < | 1.20E-02 | |

**FERMI 2
AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS**

**API-4 (control)
(pCi/cubic meter)**

| Nuclide | First Quarter | | Second Quarter | |
|---------|---------------|-----------------------|----------------|-----------------------|
| | | | | |
| Be-7 | | 9.70E-02 +/- 1.60E-02 | | 8.30E-02 +/- 2.20E-02 |
| K-40 | < | 3.60E-02 | < | 4.10E-02 |
| Mn-54 | < | 6.00E-02 | < | 6.30E-02 |
| Co-58 | < | 2.10E-03 | < | 2.20E-03 |
| Fe-59 | < | 3.00E-03 | < | 2.50E-03 |
| Co-60 | < | 1.50E-02 | < | 1.50E-02 |
| Zn-65 | < | 3.40E-03 | < | 2.80E-03 |
| Zr-95 | < | 3.80E-03 | < | 6.20E-03 |
| Ru-103 | < | 9.80E-03 | < | 7.40E-03 |
| Ru-106 | < | 4.60E-03 | < | 7.90E-03 |
| Cs-134 | < | 2.60E-02 | < | 2.60E-02 |
| Cs-137 | < | 1.90E-03 | < | 2.50E-03 |
| Ba-140 | < | 2.20E-03 | < | 2.30E-03 |
| La-140 | < | 3.60E-02 | < | 8.10E-02 |
| Ce-141 | < | 4.20E-02 | < | 9.30E-02 |
| Ce-144 | < | 6.20E-03 | < | 1.20E-02 |

**API-4 (control)
(pCi/cubic meter)**

| Nuclide | Third Quarter | | Fourth Quarter | |
|---------|---------------|-----------------------|----------------|----------|
| | | | | |
| Be-7 | | 1.14E-01 +/- 2.30E-02 | < | 4.90E-02 |
| K-40 | < | 4.20E-02 | < | 2.80E-02 |
| Mn-54 | < | 8.40E-02 | < | 1.10E-01 |
| Co-58 | < | 2.90E-03 | < | 3.30E-03 |
| Fe-59 | < | 3.20E-03 | < | 4.30E-03 |
| Co-60 | < | 1.50E-02 | < | 2.10E-02 |
| Zn-65 | < | 2.80E-03 | < | 2.80E-03 |
| Zr-95 | < | 7.60E-03 | < | 1.00E-02 |
| Ru-103 | < | 8.80E-03 | < | 7.10E-03 |
| Ru-106 | < | 6.60E-03 | < | 8.20E-03 |
| Cs-134 | < | 3.10E-02 | < | 3.20E-02 |
| Cs-137 | < | 2.30E-03 | < | 2.00E-03 |
| Ba-140 | < | 2.70E-03 | < | 2.60E-03 |
| La-140 | < | 5.40E-02 | < | 7.00E-02 |
| Ce-141 | < | 6.20E-02 | < | 8.10E-02 |
| Ce-144 | < | 1.10E-02 | < | 1.30E-02 |

**FERMI 2
AIR PARTICULATE QUARTERLY COMPOSITE ANALYSIS**

**API-5 (Indicator)
(pCi/cubic meter)**

| Nuclide | First Quarter | | | Second Quarter | | |
|---------|---------------|----------|--------------|----------------|----------|--------------|
| Be-7 | | 1.04E-01 | +/- 1.80E-02 | | 1.18E-01 | +/- 2.30E-02 |
| K-40 | < | 3.20E-02 | | < | 3.40E-02 | |
| Mn-54 | < | 3.90E-02 | | < | 8.90E-02 | |
| Co-58 | < | 1.80E-03 | | < | 1.90E-03 | |
| Fe-59 | < | 3.60E-03 | | < | 4.10E-03 | |
| Co-60 | < | 2.00E-02 | | < | 1.70E-02 | |
| Zn-65 | < | 4.50E-03 | | < | 7.70E-04 | |
| Zr-95 | < | 6.70E-03 | | < | 8.10E-03 | |
| Ru-103 | < | 7.50E-03 | | < | 9.80E-03 | |
| Ru-106 | < | 4.10E-03 | | < | 5.90E-03 | |
| Cs-134 | < | 1.80E-02 | | < | 2.40E-02 | |
| Cs-137 | < | 2.30E-03 | | < | 1.90E-03 | |
| Ba-140 | < | 2.20E-03 | | < | 2.60E-03 | |
| La-140 | < | 1.60E-02 | | < | 6.90E-02 | |
| Ce-141 | < | 1.90E-02 | | < | 8.00E-02 | |
| Ce-144 | < | 5.20E-03 | | < | 1.00E-02 | |

**API-5 (Indicator)
(pCi/cubic meter)**

| Nuclide | Third Quarter (a) | | | Fourth Quarter | | |
|---------|-------------------|----------|--------------|----------------|----------|--------------|
| Be-7 | | 1.11E-01 | +/- 2.30E-02 | | 8.40E-02 | +/- 2.20E-02 |
| K-40 | < | 4.10E-02 | | < | 3.10E-02 | |
| Mn-54 | < | 1.00E-01 | | < | 1.00E-01 | |
| Co-58 | < | 4.40E-03 | | < | 1.60E-03 | |
| Fe-59 | < | 5.60E-03 | | < | 7.20E-03 | |
| Co-60 | < | 1.80E-02 | | < | 2.10E-02 | |
| Zn-65 | < | 2.40E-03 | | < | 2.20E-03 | |
| Zr-95 | < | 6.80E-03 | | < | 7.10E-03 | |
| Ru-103 | < | 7.30E-03 | | < | 9.20E-03 | |
| Ru-106 | < | 8.20E-03 | | < | 7.70E-03 | |
| Cs-134 | < | 3.10E-02 | | < | 3.20E-02 | |
| Cs-137 | < | 2.10E-03 | | < | 2.70E-03 | |
| Ba-140 | < | 3.00E-03 | | < | 2.40E-03 | |
| La-140 | < | 7.50E-02 | | < | 1.10E-01 | |
| Ce-141 | < | 8.60E-02 | | < | 1.30E-01 | |
| Ce-144 | < | 1.30E-02 | | < | 1.20E-02 | |

(a) See Appendix D, Program Execution.

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FERMI 2 MILK ANALYSIS

M-2 (Indicator)
(pCi/liter)

| Nuclide | 20-JAN | | 24-FEB | | 24-MAR | |
|---------|----------|--------------|----------|--------------|----------|--------------|
| I-131 | < | 8.50E-01 | < | 5.60E-01 | < | 5.70E-01 |
| Sr-89 | < | 5.90E+00 | < | 7.90E+00 | < | 5.60E+00 |
| Sr-90 | < | 1.60E+00 | < | 1.70E+00 | < | 1.50E+00 |
| Be-7 | < | 4.00E+01 | < | 8.60E+01 | < | 5.00E+01 |
| K-40 | 1.50E+03 | +/- 5.40E+01 | 1.47E+03 | +/- 1.20E+02 | 1.27E+03 | +/- 6.10E+01 |
| Mn-54 | < | 4.90E+00 | < | 1.10E+01 | < | 6.40E+00 |
| Co-58 | < | 4.90E+00 | < | 1.10E+01 | < | 6.00E+00 |
| Fe-59 | < | 1.90E+01 | < | 4.10E+01 | < | 2.10E+01 |
| Co-60 | < | 5.50E+00 | < | 1.40E+01 | < | 6.50E+00 |
| Zn-65 | < | 1.30E+01 | < | 3.20E+01 | < | 2.60E+01 |
| Zr-95 | < | 9.10E+00 | < | 1.90E+01 | < | 1.00E+01 |
| Ru-103 | < | 5.30E+00 | < | 1.20E+01 | < | 6.40E+00 |
| Ru-106 | < | 4.20E+01 | < | 1.20E+02 | < | 5.40E+01 |
| Cs-134 | < | 4.40E+00 | < | 1.20E+01 | < | 6.50E+00 |
| Cs-137 | < | 4.90E+00 | < | 1.00E+01 | < | 5.70E+00 |
| Ba-140 | < | 9.20E+00 | < | 1.10E+01 | < | 1.20E+01 |
| La-140 | < | 1.10E+01 | < | 1.20E+01 | < | 1.40E+01 |
| Ce-141 | < | 7.30E+00 | < | 1.50E+01 | < | 8.90E+00 |
| Ce-144 | < | 2.40E+01 | < | 5.40E+01 | < | 2.90E+01 |

| Nuclide | 21-APR | | 12-MAY | | 26-MAY | |
|---------|----------|--------------|----------|--------------|----------|--------------|
| I-131 | < | 9.80E-01 | < | 9.20E-01 | < | 9.30E-01 |
| Sr-89 | < | 8.20E+00 | < | 6.40E+00 | < | 4.60E+01 |
| Sr-90 | < | 1.90E+00 | < | 1.70E+00 | < | 1.50E+00 |
| Be-7 | < | 7.00E+01 | < | 5.60E+01 | < | 6.50E+00 |
| K-40 | 1.34E+03 | +/- 9.50E+01 | 1.36E+03 | +/- 7.10E+01 | 1.49E+03 | +/- 6.70E+01 |
| Mn-54 | < | 1.10E+01 | < | 7.70E+00 | < | 2.20E+01 |
| Co-58 | < | 1.20E+01 | < | 7.20E+00 | < | 8.10E+00 |
| Fe-59 | < | 3.00E+01 | < | 2.00E+01 | < | 1.70E+01 |
| Co-60 | < | 1.10E+01 | < | 8.20E+00 | < | 1.20E+01 |
| Zn-65 | < | 2.80E+01 | < | 1.70E+01 | < | 7.00E+00 |
| Zr-95 | < | 2.00E+01 | < | 1.20E+01 | < | 5.10E+01 |
| Ru-103 | < | 1.10E+01 | < | 8.00E+00 | < | 7.10E+00 |
| Ru-106 | < | 8.20E+01 | < | 6.20E+01 | < | 6.50E+00 |
| Cs-134 | < | 1.20E+01 | < | 7.00E+00 | < | 1.20E+01 |
| Cs-137 | < | 1.10E+01 | < | 6.60E+00 | < | 1.40E+01 |
| Ba-140 | < | 1.20E+01 | < | 1.10E+01 | < | 9.10E+00 |
| La-140 | < | 1.40E+01 | < | 1.30E+01 | < | 2.90E+01 |
| Ce-141 | < | 1.40E+01 | < | 1.70E+01 | < | 9.30E-01 |
| Ce-144 | < | 5.60E+01 | < | 3.50E+01 | < | 4.60E+01 |

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Radiological Environmental Operating Report*

**FERMI 2
MILK ANALYSIS**

**M-2 (Indicator)
(pCi/liter)**

| Nuclide | 9-JUN | | 23-JUN | | 7-JUL | |
|---------|-------|-----------------------|--------|-----------------------|-------|-----------------------|
| I-131 | < | 8.50E-01 | < | 7.70E-01 | < | 6.70E-01 |
| Sr-89 | < | 4.80E+01 | < | 8.40E+00 | < | 8.60E+00 |
| Sr-90 | | 2.06E+00 +/- 4.00E-01 | < | 1.70E+00 | | 3.04E+00 +/- 5.20E-01 |
| Be-7 | < | 6.30E+00 | < | 5.60E+01 | < | 3.60E+01 |
| K-40 | | 1.39E+03 +/- 6.70E+01 | | 1.47E+03 +/- 7.00E+01 | | 1.34E+03 +/- 5.20E+01 |
| Mn-54 | < | 1.70E+01 | < | 7.10E+00 | < | 5.40E+00 |
| Co-58 | < | 8.30E+00 | < | 6.30E+00 | < | 5.00E+00 |
| Fe-59 | < | 1.40E+01 | < | 2.20E+01 | < | 1.60E+01 |
| Co-60 | < | 1.10E+01 | < | 6.70E+00 | < | 5.60E+00 |
| Zn-65 | < | 6.20E+00 | < | 1.60E+01 | < | 1.20E+01 |
| Zr-95 | < | 5.10E+01 | < | 1.10E+01 | < | 7.80E+00 |
| Ru-103 | < | 7.60E+00 | < | 7.30E+00 | < | 4.80E+00 |
| Ru-106 | < | 5.80E+00 | < | 5.80E+01 | < | 4.70E+01 |
| Cs-134 | < | 1.10E+01 | < | 5.90E+00 | < | 4.90E+00 |
| Cs-137 | < | 1.30E+01 | < | 6.30E+00 | < | 4.90E+00 |
| Ba-140 | < | 8.60E+00 | < | 1.20E+01 | < | 8.60E+00 |
| La-140 | < | 2.90E+01 | < | 1.40E+01 | < | 9.90E+00 |
| Ce-141 | < | 8.50E-01 | < | 9.00E+00 | < | 6.80E+00 |
| Ce-144 | < | 4.80E+01 | < | 3.10E+01 | < | 2.40E+01 |

| Nuclide | 21-JUL | | 11-AUG | | 25-AUG | |
|---------|--------|-----------------------|--------|-----------------------|--------|-----------------------|
| I-131 | < | 7.30E-01 | < | 9.00E-01 | < | 7.60E-01 |
| Sr-89 | < | 8.20E+00 | < | 8.70E+00 | < | 3.90E+01 |
| Sr-90 | < | 1.50E+00 | < | 1.80E+00 | < | 1.50E+00 |
| Be-7 | < | 3.10E+01 | < | 3.30E+01 | < | 4.30E+00 |
| K-40 | | 1.40E+03 +/- 4.30E+01 | | 1.42E+03 +/- 5.30E+01 | | 1.42E+03 +/- 5.30E+01 |
| Mn-54 | < | 3.90E+00 | < | 5.10E+00 | < | 1.80E+01 |
| Co-58 | < | 3.90E+00 | < | 4.70E+00 | < | 6.20E+00 |
| Fe-59 | < | 1.30E+01 | < | 1.60E+01 | < | 1.20E+01 |
| Co-60 | < | 4.40E+00 | < | 6.80E+00 | < | 8.60E+00 |
| Zn-65 | < | 1.00E+01 | < | 1.30E+01 | < | 5.00E+00 |
| Zr-95 | < | 7.20E+00 | < | 7.30E+00 | < | 4.40E+01 |
| Ru-103 | < | 4.10E+00 | < | 5.30E+00 | < | 4.90E+00 |
| Ru-106 | < | 3.50E+01 | < | 4.40E+01 | < | 4.40E+00 |
| Cs-134 | < | 3.80E+00 | < | 5.00E+00 | < | 8.00E+00 |
| Cs-137 | < | 4.10E+00 | < | 4.90E+00 | < | 9.20E+00 |
| Ba-140 | < | 8.30E+00 | < | 7.80E+00 | < | 6.40E+00 |
| La-140 | < | 9.50E+00 | < | 9.00E+00 | < | 2.30E+01 |
| Ce-141 | < | 5.00E+00 | < | 5.20E+00 | < | 7.60E-01 |
| Ce-144 | < | 1.70E+01 | < | 2.20E+01 | < | 3.90E+01 |

*Fermi 2 - 2005 Annual
Radioactive Effluent Release and
Radiological Environmental Operating Report*

**FERMI 2
MILK ANALYSIS**

**M-2 (Indicator)
(pCi/liter)**

| Nuclide | 8-SEP | | 22-SEP | | 13-OCT | |
|---------|-------|-----------------------|--------|-----------------------|--------|-----------------------|
| I-131 | < | 8.10E-01 | < | 6.70E-01 | < | 4.90E-01 |
| Sr-89 | < | 8.10E+00 | < | 4.50E+00 | < | 6.60E+00 |
| Sr-90 | < | 1.60E+00 | < | 1.70E+00 | < | 1.60E+00 |
| Be-7 | < | 6.10E+01 | < | 6.20E+01 | < | 6.90E+01 |
| K-40 | | 1.34E+03 +/- 7.00E+01 | | 1.48E+03 +/- 8.20E+01 | | 1.35E+03 +/- 6.80E+01 |
| Mn-54 | < | 7.30E+00 | < | 7.50E+00 | < | 7.20E+00 |
| Co-58 | < | 7.90E+00 | < | 8.20E+00 | < | 7.30E+00 |
| Fe-59 | < | 2.30E+01 | < | 2.80E+01 | < | 1.60E+01 |
| Co-60 | < | 8.60E+00 | < | 9.10E+00 | < | 8.40E+00 |
| Zn-65 | < | 1.90E+01 | < | 2.10E+01 | < | 1.80E+01 |
| Zr-95 | < | 1.20E+01 | < | 1.70E+01 | < | 1.20E+01 |
| Ru-103 | < | 8.80E+00 | < | 9.80E+00 | < | 7.90E+00 |
| Ru-106 | < | 6.40E+01 | < | 6.40E+01 | < | 6.40E+01 |
| Cs-134 | < | 8.40E+00 | < | 7.50E+00 | < | 6.80E+00 |
| Cs-137 | < | 6.10E+00 | < | 7.60E+00 | < | 6.60E+00 |
| Ba-140 | < | 1.20E+01 | < | 1.30E+01 | < | 9.20E+00 |
| La-140 | < | 1.30E+01 | < | 1.50E+01 | < | 1.10E+01 |
| Ce-141 | < | 1.20E+01 | < | 1.30E+01 | < | 1.00E+01 |
| Ce-144 | < | 3.60E+01 | < | 4.10E+01 | < | 3.40E+01 |

| Nuclide | 27-OCT | | 17-NOV | | 15-DEC | |
|---------|--------|-----------------------|--------|-----------------------|--------|-----------------------|
| I-131 | < | 7.30E-01 | < | 7.60E-01 | < | 8.60E-01 |
| Sr-89 | < | 9.00E+00 | < | 4.70E+01 | < | 6.40E+00 |
| Sr-90 | < | 1.70E+00 | < | 1.50E+00 | < | 1.60E+00 |
| Be-7 | < | 6.70E+01 | < | 5.90E+00 | < | 3.90E+01 |
| K-40 | | 1.56E+03 +/- 8.20E+01 | | 1.49E+03 +/- 6.80E+01 | | 1.50E+03 +/- 6.30E+01 |
| Mn-54 | < | 8.30E+00 | < | 1.30E+01 | < | 6.10E+00 |
| Co-58 | < | 8.70E+00 | < | 8.10E+00 | < | 5.70E+00 |
| Fe-59 | < | 2.10E+01 | < | 1.60E+01 | < | 1.40E+01 |
| Co-60 | < | 8.40E+00 | < | 1.10E+01 | < | 7.00E+00 |
| Zn-65 | < | 1.80E+01 | < | 6.30E+00 | < | 1.40E+01 |
| Zr-95 | < | 1.60E+01 | < | 5.40E+01 | < | 1.10E+01 |
| Ru-103 | < | 9.80E+00 | < | 6.90E+00 | < | 5.80E+00 |
| Ru-106 | < | 7.60E+01 | < | 6.10E+00 | < | 4.70E+01 |
| Cs-134 | < | 9.00E+00 | < | 1.10E+01 | < | 6.50E+00 |
| Cs-137 | < | 7.10E+00 | < | 1.30E+01 | < | 5.00E+00 |
| Ba-140 | < | 1.10E+01 | < | 8.20E+00 | < | 1.10E+01 |
| La-140 | < | 1.30E+01 | < | 2.90E+01 | < | 1.20E+01 |
| Ce-141 | < | 1.10E+01 | < | 7.60E-01 | < | 5.90E+00 |
| Ce-144 | < | 4.10E+01 | < | 4.70E+01 | < | 2.10E+01 |

*Fermi 2 - 2005 Annual
Radioactive Effluent Release and
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**FERMI 2
MILK ANALYSIS**

**M-8 (Control)
(pCi/liter)**

| Nuclide | 20-JAN | | 24-FEB | | 24-MAR | |
|---------|----------|--------------|----------|--------------|----------|--------------|
| I-131 | < | 8.30E-01 | < | 8.20E-01 | < | 5.50E-01 |
| Sr-89 | < | 4.30E+00 | < | 6.90E+00 | < | 6.90E+00 |
| Sr-90 | < | 1.30E+00 | < | 1.60E+00 | < | 1.60E+00 |
| Be-7 | < | 4.20E+01 | < | 4.60E+01 | < | 4.60E+01 |
| K-40 | 1.38E+03 | +/- 5.50E+01 | 1.44E+03 | +/- 5.80E+01 | 1.42E+03 | +/- 6.40E+01 |
| Mn-54 | < | 4.80E+00 | < | 6.10E+00 | < | 6.70E+00 |
| Co-58 | < | 5.20E+00 | < | 6.30E+00 | < | 6.30E+00 |
| Fe-59 | < | 1.90E+01 | < | 1.60E+01 | < | 1.60E+01 |
| Co-60 | < | 5.80E+00 | < | 6.20E+00 | < | 8.30E+00 |
| Zn-65 | < | 1.30E+01 | < | 1.50E+01 | < | 1.60E+01 |
| Zr-95 | < | 8.90E+00 | < | 1.00E+01 | < | 1.10E+01 |
| Ru-103 | < | 5.20E+00 | < | 6.70E+00 | < | 6.10E+00 |
| Ru-106 | < | 4.70E+01 | < | 5.10E+01 | < | 5.60E+01 |
| Cs-134 | < | 5.20E+00 | < | 5.90E+00 | < | 6.60E+00 |
| Cs-137 | < | 5.40E+00 | < | 5.10E+00 | < | 6.50E+00 |
| Ba-140 | < | 9.80E+00 | < | 1.10E+01 | < | 1.30E+01 |
| La-140 | < | 1.10E+01 | < | 1.20E+01 | < | 1.50E+01 |
| Ce-141 | < | 1.10E+01 | < | 6.70E+00 | < | 8.70E+00 |
| Ce-144 | < | 2.30E+01 | < | 2.90E+01 | < | 3.20E+01 |

| Nuclide | 21-APR | | 12-MAY | | 26-MAY | |
|---------|----------|--------------|----------|--------------|----------|--------------|
| I-131 | < | 6.80E-01 | < | 9.30E-01 | < | 7.30E-01 |
| Sr-89 | < | 8.00E+00 | < | 8.10E+00 | < | 8.50E+00 |
| Sr-90 | < | 1.80E+00 | < | 1.80E+00 | < | 1.50E+00 |
| Be-7 | < | 5.60E+01 | < | 5.20E+01 | < | 6.10E+01 |
| K-40 | 1.31E+03 | +/- 6.70E+01 | 1.44E+03 | +/- 7.00E+01 | 1.36E+03 | +/- 7.60E+01 |
| Mn-54 | < | 6.00E+00 | < | 6.20E+00 | < | 8.50E+00 |
| Co-58 | < | 7.40E+00 | < | 6.90E+00 | < | 9.70E+00 |
| Fe-59 | < | 1.70E+01 | < | 1.90E+01 | < | 2.30E+01 |
| Co-60 | < | 6.50E+00 | < | 7.20E+00 | < | 7.70E+00 |
| Zn-65 | < | 1.70E+01 | < | 1.90E+01 | < | 2.00E+01 |
| Zr-95 | < | 1.20E+01 | < | 1.30E+01 | < | 1.30E+01 |
| Ru-103 | < | 7.60E+00 | < | 7.90E+00 | < | 9.00E+00 |
| Ru-106 | < | 5.40E+01 | < | 5.80E+01 | < | 7.80E+01 |
| Cs-134 | < | 7.40E+00 | < | 7.30E+00 | < | 8.10E+00 |
| Cs-137 | < | 6.10E+00 | < | 6.30E+00 | < | 7.80E+00 |
| Ba-140 | < | 1.20E+01 | < | 1.10E+01 | < | 1.00E+01 |
| La-140 | < | 1.40E+01 | < | 1.20E+01 | < | 1.20E+01 |
| Ce-141 | < | 9.80E+00 | < | 1.00E+01 | < | 1.90E+01 |
| Ce-144 | < | 3.30E+01 | < | 3.60E+01 | < | 4.10E+01 |

*Fermi 2 - 2005 Annual
Radioactive Effluent Release and
Radiological Environmental Operating Report*

**FERMI 2
MILK ANALYSIS**

**M-8 (Control)
(pCi/liter)**

| Nuclide | 9-JUN | | 26-JUN | | 7-JUL | |
|---------|----------|--------------|----------|--------------|----------|--------------|
| I-131 | < | 9.40E-01 | < | 7.90E-01 | < | 7.50E-01 |
| Sr-89 | < | 8.90E+00 | < | 7.40E+00 | < | 8.80E+00 |
| Sr-90 | < | 1.70E+00 | < | 1.40E+00 | < | 1.70E+00 |
| Be-7 | < | 5.00E+01 | < | 5.80E+01 | < | 5.00E+01 |
| K-40 | 1.53E+03 | +/- 7.40E+01 | 1.32E+03 | +/- 7.30E+01 | 1.45E+03 | +/- 7.80E+01 |
| Mn-54 | < | 7.00E+00 | < | 7.60E+00 | < | 7.10E+00 |
| Co-58 | < | 6.70E+00 | < | 7.50E+00 | < | 7.50E+00 |
| Fe-59 | < | 2.20E+01 | < | 1.90E+01 | < | 2.60E+01 |
| Co-60 | < | 5.70E+00 | < | 8.90E+00 | < | 9.10E+00 |
| Zn-65 | < | 1.90E+01 | < | 1.80E+01 | < | 1.90E+01 |
| Zr-95 | < | 1.40E+01 | < | 1.30E+01 | < | 1.30E+01 |
| Ru-103 | < | 7.40E+00 | < | 7.60E+00 | < | 7.50E+00 |
| Ru-106 | < | 5.40E+01 | < | 5.70E+01 | < | 5.40E+01 |
| Cs-134 | < | 7.80E+00 | < | 7.60E+00 | < | 6.80E+00 |
| Cs-137 | < | 6.80E+00 | < | 6.80E+00 | < | 7.20E+00 |
| Ba-140 | < | 1.30E+01 | < | 1.30E+01 | < | 1.30E+01 |
| La-140 | < | 1.40E+01 | < | 1.50E+01 | < | 1.50E+01 |
| Ce-141 | < | 7.00E+00 | < | 9.60E+00 | < | 9.10E+00 |
| Ce-144 | < | 3.10E+01 | < | 3.20E+01 | < | 3.10E+01 |

| Nuclide | 21-JUL | | 11-AUG | | 25-AUG | |
|---------|----------|--------------|----------|--------------|----------|--------------|
| I-131 | < | 7.30E-01 | < | 9.00E-01 | < | 5.30E-01 |
| Sr-89 | < | 8.50E+00 | < | 8.90E+00 | < | 7.20E+00 |
| Sr-90 | < | 1.60E+00 | < | 1.80E+00 | < | 1.60E+00 |
| Be-7 | < | 3.20E+01 | < | 4.30E+01 | < | 3.10E+01 |
| K-40 | 1.48E+03 | +/- 4.80E+01 | 1.41E+03 | +/- 6.10E+01 | 1.35E+03 | +/- 4.10E+01 |
| Mn-54 | < | 5.00E+00 | < | 5.10E+00 | < | 3.50E+00 |
| Co-58 | < | 4.80E+00 | < | 5.80E+00 | < | 3.70E+00 |
| Fe-59 | < | 1.40E+01 | < | 2.30E+01 | < | 1.40E+01 |
| Co-60 | < | 5.60E+00 | < | 8.20E+00 | < | 5.30E+00 |
| Zn-65 | < | 1.00E+01 | < | 1.20E+01 | < | 8.90E+00 |
| Zr-95 | < | 7.60E+00 | < | 1.00E+01 | < | 6.70E+00 |
| Ru-103 | < | 4.50E+00 | < | 5.60E+00 | < | 4.20E+00 |
| Ru-106 | < | 3.70E+01 | < | 5.30E+01 | < | 3.30E+01 |
| Cs-134 | < | 5.00E+00 | < | 5.60E+00 | < | 3.50E+00 |
| Cs-137 | < | 3.90E+00 | < | 5.50E+00 | < | 3.70E+00 |
| Ba-140 | < | 9.30E+00 | < | 1.00E+01 | < | 8.90E+00 |
| La-140 | < | 1.10E+01 | < | 1.20E+01 | < | 1.00E+01 |
| Ce-141 | < | 3.90E+00 | < | 7.60E+00 | < | 6.30E+00 |
| Ce-144 | < | 2.00E+01 | < | 2.60E+01 | < | 1.70E+01 |

*Fermi 2 - 2005 Annual
Radioactive Effluent Release and
Radiological Environmental Operating Report*

FERMI 2 MILK ANALYSIS

M-8 (Control)
(pCi/liter)

| Nuclide | 8-SEP | | 22-SEP | | 13-OCT | |
|---------|----------|--------------|----------|--------------|----------|--------------|
| I-131 | < | 8.80E-01 | < | 5.90E-01 | < | 4.30E-01 |
| Sr-89 | < | 7.50E+00 | < | 9.10E+00 | < | 7.30E+00 |
| Sr-90 | < | 1.50E+00 | < | 1.70E+00 | < | 1.60E+00 |
| Be-7 | < | 6.80E+01 | < | 6.70E+01 | < | 4.80E+01 |
| K-40 | 1.38E+03 | +/- 7.40E+01 | 1.46E+03 | +/- 7.80E+01 | 1.56E+03 | +/- 6.00E+01 |
| Mn-54 | < | 8.60E+00 | < | 6.40E+00 | < | 5.60E+00 |
| Co-58 | < | 7.60E+00 | < | 7.40E+00 | < | 6.20E+00 |
| Fe-59 | < | 2.40E+01 | < | 2.40E+01 | < | 1.30E+01 |
| Co-60 | < | 1.10E+01 | < | 8.60E+00 | < | 7.20E+00 |
| Zn-65 | < | 3.40E+01 | < | 1.90E+01 | < | 1.50E+01 |
| Zr-95 | < | 1.60E+01 | < | 1.20E+01 | < | 1.00E+01 |
| Ru-103 | < | 8.00E+00 | < | 7.20E+00 | < | 6.30E+00 |
| Ru-106 | < | 6.50E+01 | < | 6.70E+01 | < | 5.40E+01 |
| Cs-134 | < | 7.20E+00 | < | 8.20E+00 | < | 5.60E+00 |
| Cs-137 | < | 8.00E+00 | < | 8.60E+00 | < | 5.20E+00 |
| Ba-140 | < | 1.10E+01 | < | 1.20E+01 | < | 1.00E+01 |
| La-140 | < | 1.30E+01 | < | 1.40E+01 | < | 1.20E+01 |
| Ce-141 | < | 1.30E+01 | < | 1.10E+01 | < | 9.40E+00 |
| Ce-144 | < | 3.90E+01 | < | 4.10E+01 | < | 2.90E+01 |

| Nuclide | 27-OCT | | 17-NOV | | 15-DEC | |
|---------|----------|--------------|----------|--------------|----------|--------------|
| I-131 | < | 8.20E-01 | < | 7.50E-01 | < | 8.60E-01 |
| Sr-89 | < | 8.20E+00 | < | 4.40E+01 | < | 6.90E+00 |
| Sr-90 | < | 1.60E+00 | 1.35E+00 | +/- 6.00E-01 | < | 1.70E+00 |
| Be-7 | < | 3.60E+01 | < | 5.50E+00 | < | 3.00E+01 |
| K-40 | 1.35E+03 | +/- 5.40E+01 | 1.35E+03 | +/- 6.00E+01 | 1.40E+03 | +/- 4.00E+01 |
| Mn-54 | < | 5.50E+00 | < | 1.60E+01 | < | 3.90E+00 |
| Co-58 | < | 5.60E+00 | < | 8.80E+00 | < | 3.70E+00 |
| Fe-59 | < | 1.20E+01 | < | 1.40E+01 | < | 9.70E+00 |
| Co-60 | < | 6.10E+00 | < | 9.10E+00 | < | 4.50E+00 |
| Zn-65 | < | 1.30E+01 | < | 5.70E+00 | < | 8.90E+00 |
| Zr-95 | < | 9.80E+00 | < | 4.80E+01 | < | 6.70E+00 |
| Ru-103 | < | 5.50E+00 | < | 5.40E+00 | < | 4.10E+00 |
| Ru-106 | < | 4.40E+01 | < | 5.30E+00 | < | 2.70E+01 |
| Cs-134 | < | 5.70E+00 | < | 1.00E+01 | < | 3.60E+00 |
| Cs-137 | < | 4.20E+00 | < | 1.20E+01 | < | 2.90E+00 |
| Ba-140 | < | 8.90E+00 | < | 7.60E+00 | < | 8.30E+00 |
| La-140 | < | 1.00E+01 | < | 2.50E+01 | < | 9.50E+00 |
| Ce-141 | < | 6.40E+00 | < | 7.50E-01 | < | 5.60E+00 |
| Ce-144 | < | 1.90E+01 | < | 4.40E+01 | < | 1.50E+01 |

*Fermi 2 - 2005 Annual
Radioactive Effluent Release and
Radiological Environmental Operating Report*

**FERMI 2
VEGETABLE ANALYSIS**

**FP-1 (Indicator)
(pCi/kg wet)**

| Nuclide | 28-JUL Cabbage | | 28-JUL Collards | | 28-JUL Red Cabbage | |
|---------|----------------|--------------|-----------------|--------------|--------------------|--------------|
| I-131 | < | 3.10E+01 | < | 3.60E+01 | < | 3.40E+01 |
| Be-7 | < | 1.90E+02 | < | 2.10E+02 | < | 1.70E+02 |
| K-40 | 1.14E+03 | +/- 1.60E+02 | 3.78E+03 | +/- 2.80E+02 | 2.56E+03 | +/- 1.70E+02 |
| Mn-54 | < | 2.30E+02 | < | 2.50E+02 | < | 2.00E+02 |
| Co-58 | < | 2.40E+01 | < | 2.60E+01 | < | 1.70E+01 |
| Fe-59 | < | 2.40E+01 | < | 2.90E+01 | < | 2.30E+01 |
| Co-60 | < | 9.70E+01 | < | 9.20E+01 | < | 5.80E+01 |
| Zn-65 | < | 2.80E+01 | < | 3.70E+01 | < | 2.20E+01 |
| Zr-95 | < | 6.60E+01 | < | 7.90E+01 | < | 5.10E+01 |
| Ru-103 | < | 4.20E+01 | < | 4.90E+01 | < | 3.50E+01 |
| Ru-106 | < | 2.70E+01 | < | 2.50E+01 | < | 1.90E+01 |
| Cs-134 | < | 2.10E+02 | < | 2.30E+02 | < | 1.80E+02 |
| Cs-137 | < | 2.20E+01 | < | 2.60E+01 | < | 2.40E+01 |
| Ba-140 | < | 4.90E+01 | < | 2.90E+01 | < | 2.10E+01 |
| La-140 | < | 5.60E+01 | < | 4.50E+01 | < | 3.10E+01 |
| Ce-141 | < | 3.20E+01 | < | 5.20E+01 | < | 3.60E+01 |
| Ce-144 | < | 3.10E+01 | < | 3.40E+01 | < | 4.20E+01 |

**FP-1 (Indicator)
(pCi/kg wet)**

| Nuclide | 30-AUG Broccoli | | 30-AUG Cabbage | | 30-AUG Collards | |
|---------|-----------------|--------------|----------------|--------------|-----------------|--------------|
| I-131 | < | 4.30E+01 | < | 3.40E+01 | < | 3.90E+02 |
| Be-7 | < | 3.10E+02 | < | 3.20E+02 | < | 4.60E+02 |
| K-40 | 2.27E+03 | +/- 2.70E+02 | 2.67E+03 | +/- 3.00E+02 | 3.88E+03 | +/- 3.90E+02 |
| Mn-54 | < | 3.40E+02 | < | 5.10E+02 | < | 3.60E+01 |
| Co-58 | < | 3.20E+01 | < | 3.40E+01 | < | 5.50E+01 |
| Fe-59 | < | 4.80E+01 | < | 4.00E+01 | < | 1.50E+02 |
| Co-60 | < | 1.60E+02 | < | 1.30E+02 | < | 5.80E+01 |
| Zn-65 | < | 3.70E+01 | < | 4.20E+01 | < | 9.70E+01 |
| Zr-95 | < | 9.10E+01 | < | 9.80E+01 | < | 7.80E+01 |
| Ru-103 | < | 6.30E+01 | < | 8.60E+01 | < | 4.80E+01 |
| Ru-106 | < | 3.10E+01 | < | 4.30E+01 | < | 3.40E+02 |
| Cs-134 | < | 3.10E+02 | < | 3.90E+02 | < | 4.80E+01 |
| Cs-137 | < | 3.80E+01 | < | 4.00E+01 | < | 5.60E+01 |
| Ba-140 | < | 2.70E+01 | < | 3.90E+01 | < | 1.60E+02 |
| La-140 | < | 1.10E+02 | < | 1.30E+02 | < | 1.80E+02 |
| Ce-141 | < | 1.20E+02 | < | 1.50E+02 | < | 7.10E+01 |
| Ce-144 | < | 4.60E+01 | < | 7.40E+01 | < | 2.30E+02 |

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**FERMI 2
VEGETABLE ANALYSIS**

**FP-9 (Control)
(pCi/kg wet)**

| Nuclide | 28-JUL Cabbage | | | 28-JUL Collards | | | 28-JUL Red Cabbage | | |
|---------|----------------|----------|--------------|-----------------|----------|--------------|--------------------|----------|--------------|
| I-131 | < | 3.40E+01 | | < | 3.50E+01 | | < | 3.70E+01 | |
| Be-7 | < | 1.80E+02 | | < | 3.50E+02 | | < | 2.20E+02 | |
| K-40 | | 3.16E+03 | +/- 1.90E+02 | | 3.49E+03 | +/- 2.20E+02 | | 3.15E+03 | +/- 2.50E+02 |
| Mn-54 | < | 2.20E+02 | | < | 2.80E+02 | | < | 2.60E+02 | |
| Co-58 | < | 2.10E+01 | | < | 3.10E+01 | | < | 2.40E+01 | |
| Fe-59 | < | 2.10E+01 | | < | 2.90E+01 | | < | 2.70E+01 | |
| Co-60 | < | 6.30E+01 | | < | 9.70E+01 | | < | 1.10E+02 | |
| Zn-65 | < | 2.10E+01 | | < | 3.50E+01 | | < | 4.10E+01 | |
| Zr-95 | < | 8.90E+01 | | < | 5.50E+01 | | < | 7.20E+01 | |
| Ru-103 | < | 3.10E+01 | | < | 2.90E+01 | | < | 4.90E+01 | |
| Ru-106 | < | 1.90E+01 | | < | 3.00E+02 | | < | 2.60E+01 | |
| Cs-134 | < | 1.80E+02 | | < | 3.00E+01 | | < | 2.40E+02 | |
| Cs-137 | < | 2.00E+01 | | < | 3.10E+01 | | < | 2.90E+01 | |
| Ba-140 | < | 2.10E+01 | | < | 5.10E+01 | | < | 3.00E+01 | |
| La-140 | < | 3.40E+01 | | < | 5.80E+01 | | < | 5.50E+01 | |
| Ce-141 | < | 3.90E+01 | | < | 1.30E+02 | | < | 6.40E+01 | |
| Ce-144 | < | 3.00E+01 | | < | 3.50E+01 | | < | 3.80E+01 | |

**FP-9 (Control)
(pCi/kg wet)**

| Nuclide | 30-AUG Cabbage | | | 30-AUG Collards | | | 30-AUG Horse Radish | | |
|---------|----------------|----------|--------------|-----------------|----------|--------------|---------------------|----------|--------------|
| I-131 | < | 3.80E+01 | | < | 4.30E+01 | | < | 3.40E+01 | |
| Be-7 | < | 4.60E+02 | | < | 3.80E+02 | | | 5.70E+02 | +/- 1.50E+02 |
| K-40 | | 1.74E+03 | +/- 3.20E+02 | | 4.11E+03 | +/- 3.40E+02 | | 4.41E+03 | +/- 3.40E+02 |
| Mn-54 | < | 4.80E+02 | | < | 4.50E+02 | | < | 4.70E+02 | |
| Co-58 | < | 4.50E+01 | | < | 2.80E+01 | | < | 4.20E+01 | |
| Fe-59 | < | 4.10E+01 | | < | 4.40E+01 | | < | 4.00E+01 | |
| Co-60 | < | 1.90E+02 | | < | 6.80E+01 | | < | 1.30E+02 | |
| Zn-65 | < | 5.80E+01 | | < | 5.40E+01 | | < | 4.30E+01 | |
| Zr-95 | < | 1.10E+02 | | < | 9.60E+01 | | < | 9.00E+01 | |
| Ru-103 | < | 9.40E+01 | | < | 7.90E+01 | | < | 5.50E+01 | |
| Ru-106 | < | 7.70E+01 | | < | 4.40E+01 | | < | 4.10E+01 | |
| Cs-134 | < | 2.70E+02 | | < | 3.50E+02 | | < | 3.60E+02 | |
| Cs-137 | < | 4.80E+01 | | < | 3.60E+01 | | < | 3.30E+01 | |
| Ba-140 | < | 4.90E+01 | | < | 3.80E+01 | | < | 4.10E+01 | |
| La-140 | < | 1.00E+02 | | < | 1.10E+02 | | < | 8.70E+01 | |
| Ce-141 | < | 1.20E+02 | | < | 1.30E+02 | | < | 1.00E+02 | |
| Ce-144 | < | 7.90E+01 | | < | 7.10E+01 | | < | 6.60E+01 | |

*Fermi 2 - 2005 Annual
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**FERMI 2
DRINKING WATER ANALYSIS**

**DW-1 (Indicator)
(pCi/liter)**

| Nuclide | 26-JAN | | | 22-FEB | | | 29-MAR | | |
|---------|--------|----------|--------------|--------|----------|--------------|--------|----------|--|
| GR-B | | 3.10E+00 | +/- 1.00E+00 | | 4.40E+00 | +/- 1.10E+00 | < | 3.00E+00 | |
| Sr-89 | < | 6.10E+00 | | < | 7.60E+00 | | < | 5.60E+00 | |
| Sr-90 | < | 1.70E+00 | | < | 1.90E+00 | | < | 1.80E+00 | |
| Be-7 | < | 3.50E+01 | | < | 3.50E+01 | | < | 4.60E+01 | |
| K-40 | < | 7.10E+01 | | < | 7.60E+01 | | < | 5.60E+01 | |
| Mn-54 | < | 4.50E+00 | | < | 4.70E+00 | | < | 4.10E+00 | |
| Co-58 | < | 3.80E+00 | | < | 5.50E+00 | | < | 4.90E+00 | |
| Fe-59 | < | 1.20E+01 | | < | 1.30E+01 | | < | 1.50E+01 | |
| Co-60 | < | 5.00E+00 | | < | 5.00E+00 | | < | 5.30E+00 | |
| Zn-65 | < | 9.20E+00 | | < | 1.20E+01 | | < | 1.30E+01 | |
| Zr-95 | < | 7.60E+00 | | < | 8.50E+00 | | < | 1.00E+01 | |
| Ru-103 | < | 4.20E+00 | | < | 5.80E+00 | | < | 6.70E+00 | |
| Ru-106 | < | 3.90E+01 | | < | 4.50E+01 | | < | 4.70E+01 | |
| Cs-134 | < | 3.80E+00 | | < | 5.10E+00 | | < | 4.90E+00 | |
| Cs-137 | < | 4.40E+00 | | < | 4.70E+00 | | < | 3.70E+00 | |
| Ba-140 | < | 6.60E+00 | | < | 7.30E+00 | | < | 1.10E+01 | |
| La-140 | < | 7.60E+00 | | < | 8.40E+00 | | < | 1.20E+01 | |
| Ce-141 | < | 6.00E+00 | | < | 1.10E+01 | | < | 9.30E+00 | |
| Ce-144 | < | 2.10E+01 | | < | 2.60E+01 | | < | 3.00E+01 | |

| Nuclide | 26-APR | | | 25-MAY | | | 28-JUN | | |
|---------|--------|----------|--|--------|----------|--|--------|----------|--|
| GR-B | < | 3.10E+00 | | < | 3.50E+00 | | < | 3.00E+00 | |
| Sr-89 | < | 5.30E+00 | | < | 7.90E+00 | | < | 8.30E+00 | |
| Sr-90 | < | 1.70E+00 | | < | 1.60E+00 | | < | 1.80E+00 | |
| Be-7 | < | 5.30E+01 | | < | 4.40E+01 | | < | 5.90E+01 | |
| K-40 | < | 9.80E+01 | | < | 7.40E+01 | | < | 9.70E+01 | |
| Mn-54 | < | 6.00E+00 | | < | 5.70E+00 | | < | 7.00E+00 | |
| Co-58 | < | 6.30E+00 | | < | 6.30E+00 | | < | 7.30E+00 | |
| Fe-59 | < | 1.90E+01 | | < | 1.80E+01 | | < | 2.20E+01 | |
| Co-60 | < | 7.80E+00 | | < | 5.90E+00 | | < | 8.40E+00 | |
| Zn-65 | < | 1.60E+01 | | < | 1.20E+01 | | < | 1.70E+01 | |
| Zr-95 | < | 1.20E+01 | | < | 8.40E+00 | | < | 1.40E+01 | |
| Ru-103 | < | 7.80E+00 | | < | 5.30E+00 | | < | 8.90E+00 | |
| Ru-106 | < | 7.00E+01 | | < | 3.90E+01 | | < | 6.90E+01 | |
| Cs-134 | < | 7.10E+00 | | < | 5.50E+00 | | < | 8.10E+00 | |
| Cs-137 | < | 7.00E+00 | | < | 4.60E+00 | | < | 7.20E+00 | |
| Ba-140 | < | 9.70E+00 | | < | 1.20E+01 | | < | 1.30E+01 | |
| La-140 | < | 1.10E+01 | | < | 1.30E+01 | | < | 1.40E+01 | |
| Ce-141 | < | 9.70E+00 | | < | 7.50E+00 | | < | 1.10E+01 | |
| Ce-144 | < | 3.80E+01 | | < | 2.10E+01 | | < | 3.70E+01 | |

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**FERMI 2
DRINKING WATER ANALYSIS**

**DW-1 (Indicator)
(pCi/liter)**

| Nuclide | 26-JUL | | 30-AUG | | 27-SEP | |
|---------|------------|--|-----------------------|------------|--------|--|
| GR-B | < 2.90E+00 | | 4.20E+00 +/- 1.10E+00 | < 3.00E+00 | | |
| Sr-89 | < 5.80E+00 | | < 7.60E+00 | < 7.90E+00 | | |
| Sr-90 | < 1.50E+00 | | < 1.60E+00 | < 1.60E+00 | | |
| Be-7 | < 2.90E+01 | | < 4.30E+01 | < 4.60E+01 | | |
| K-40 | < 5.90E+01 | | < 1.00E+02 | < 7.80E+01 | | |
| Mn-54 | < 3.50E+00 | | < 5.10E+00 | < 5.30E+00 | | |
| Co-58 | < 3.30E+00 | | < 5.90E+00 | < 5.20E+00 | | |
| Fe-59 | < 9.20E+00 | | < 1.50E+01 | < 1.60E+01 | | |
| Co-60 | < 3.70E+00 | | < 5.90E+00 | < 6.30E+00 | | |
| Zn-65 | < 8.10E+00 | | < 1.10E+01 | < 1.10E+01 | | |
| Zr-95 | < 6.50E+00 | | < 9.20E+00 | < 8.60E+00 | | |
| Ru-103 | < 3.90E+00 | | < 5.60E+00 | < 5.50E+00 | | |
| Ru-106 | < 3.60E+01 | | < 4.70E+01 | < 5.40E+01 | | |
| Cs-134 | < 3.60E+00 | | < 5.90E+00 | < 5.60E+00 | | |
| Cs-137 | < 3.20E+00 | | < 4.50E+00 | < 5.20E+00 | | |
| Ba-140 | < 4.60E+00 | | < 1.20E+01 | < 1.10E+01 | | |
| La-140 | < 5.30E+00 | | < 1.40E+01 | < 1.20E+01 | | |
| Ce-141 | < 5.80E+00 | | < 6.90E+00 | < 7.60E+00 | | |
| Ce-144 | < 2.00E+01 | | < 2.40E+01 | < 2.70E+01 | | |

| Nuclide | 25-OCT | | 29-NOV | | 20-DEC | |
|---------|-----------------------|--|-----------------------|-----------------------|--------|--|
| GR-B | 2.82E+00 +/- 7.30E-01 | | 5.30E+00 +/- 1.10E+00 | 3.20E+00 +/- 1.00E+00 | | |
| Sr-89 | < 7.60E+00 | | < 8.30E+00 | < 7.30E+00 | | |
| Sr-90 | < 1.40E+00 | | < 1.70E+00 | < 1.70E+00 | | |
| Be-7 | < 3.20E+01 | | < 3.80E+01 | < 6.60E+01 | | |
| K-40 | < 6.20E+01 | | < 8.00E+01 | < 1.00E+02 | | |
| Mn-54 | < 3.60E+00 | | < 4.50E+00 | < 8.00E+00 | | |
| Co-58 | < 3.70E+00 | | < 4.70E+00 | < 9.00E+00 | | |
| Fe-59 | < 8.90E+00 | | < 1.00E+01 | < 2.10E+01 | | |
| Co-60 | < 4.30E+00 | | < 4.60E+00 | < 7.30E+00 | | |
| Zn-65 | < 8.30E+00 | | < 1.10E+01 | < 1.90E+01 | | |
| Zr-95 | < 6.90E+00 | | < 8.60E+00 | < 1.50E+01 | | |
| Ru-103 | < 4.40E+00 | | < 5.30E+00 | < 1.10E+01 | | |
| Ru-106 | < 3.60E+01 | | < 4.40E+01 | < 6.90E+01 | | |
| Cs-134 | < 3.80E+00 | | < 5.00E+00 | < 8.30E+00 | | |
| Cs-137 | < 3.90E+00 | | < 5.20E+00 | < 6.40E+00 | | |
| Ba-140 | < 8.90E+00 | | < 7.80E+00 | < 1.20E+01 | | |
| La-140 | < 1.00E+01 | | < 9.00E+00 | < 1.40E+01 | | |
| Ce-141 | < 5.80E+00 | | < 6.70E+00 | < 1.30E+01 | | |
| Ce-144 | < 1.80E+01 | | < 3.80E+01 | < 4.30E+01 | | |

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**FERMI 2
DRINKING WATER ANALYSIS**

**DW-2 (Control)
(pCi/liter)**

| Nuclide | 26-JAN | | 22-FEB | | 29-MAR | |
|---------|--------|----------|--------|----------|--------|----------|
| GR-B | < | 2.80E+00 | < | 3.10E+00 | < | 3.00E+00 |
| Sr-89 | < | 6.30E+00 | < | 9.30E+00 | < | 5.50E+00 |
| Sr-90 | < | 1.70E+00 | < | 1.60E+00 | < | 1.80E+00 |
| Be-7 | < | 4.30E+01 | < | 4.70E+01 | < | 3.90E+01 |
| K-40 | < | 7.10E+01 | < | 8.70E+01 | < | 6.60E+01 |
| Mn-54 | < | 4.30E+00 | < | 7.50E+00 | < | 4.40E+00 |
| Co-58 | < | 4.60E+00 | < | 6.40E+00 | < | 4.70E+00 |
| Fe-59 | < | 1.20E+01 | < | 2.10E+01 | < | 1.50E+01 |
| Co-60 | < | 5.20E+00 | < | 8.60E+00 | < | 5.20E+00 |
| Zn-65 | < | 1.10E+01 | < | 1.60E+01 | < | 1.10E+01 |
| Zr-95 | < | 8.30E+00 | < | 1.40E+01 | < | 8.80E+00 |
| Ru-103 | < | 5.10E+00 | < | 7.80E+00 | < | 6.20E+00 |
| Ru-106 | < | 4.00E+01 | < | 5.30E+01 | < | 4.10E+01 |
| Cs-134 | < | 5.50E+00 | < | 8.30E+00 | < | 4.80E+00 |
| Cs-137 | < | 4.10E+00 | < | 6.30E+00 | < | 4.20E+00 |
| Ba-140 | < | 7.80E+00 | < | 1.10E+01 | < | 1.30E+01 |
| La-140 | < | 8.90E+00 | < | 1.20E+01 | < | 1.50E+01 |
| Ce-141 | < | 7.20E+00 | < | 9.70E+00 | < | 6.80E+00 |
| Ce-144 | < | 2.50E+01 | < | 3.40E+01 | < | 2.30E+01 |

| Nuclide | 26-APR | | 31-MAY | | 28-JUN | |
|---------|--------|----------|--------|----------|--------|----------|
| GR-B | < | 3.30E+00 | < | 2.90E+00 | < | 2.90E+00 |
| Sr-89 | < | 5.10E+00 | < | 7.70E+00 | < | 8.60E+00 |
| Sr-90 | < | 1.70E+00 | < | 1.50E+00 | < | 1.90E+00 |
| Be-7 | < | 5.70E+01 | < | 4.50E+01 | < | 4.80E+01 |
| K-40 | < | 9.60E+01 | < | 9.60E+01 | < | 7.30E+01 |
| Mn-54 | < | 5.90E+00 | < | 6.30E+00 | < | 5.40E+00 |
| Co-58 | < | 6.60E+00 | < | 6.00E+00 | < | 5.60E+00 |
| Fe-59 | < | 1.70E+01 | < | 2.00E+01 | < | 1.60E+01 |
| Co-60 | < | 7.10E+00 | < | 8.20E+00 | < | 6.20E+00 |
| Zn-65 | < | 1.20E+01 | < | 1.40E+01 | < | 1.30E+01 |
| Zr-95 | < | 1.10E+01 | < | 8.90E+00 | < | 7.20E+00 |
| Ru-103 | < | 6.20E+00 | < | 6.80E+00 | < | 5.90E+00 |
| Ru-106 | < | 6.00E+01 | < | 5.70E+01 | < | 4.30E+01 |
| Cs-134 | < | 7.30E+00 | < | 5.70E+00 | < | 4.90E+00 |
| Cs-137 | < | 7.00E+00 | < | 5.90E+00 | < | 5.70E+00 |
| Ba-140 | < | 1.20E+01 | < | 1.10E+01 | < | 1.30E+01 |
| La-140 | < | 1.40E+01 | < | 1.30E+01 | < | 1.50E+01 |
| Ce-141 | < | 1.10E+01 | < | 7.40E+00 | < | 8.20E+00 |
| Ce-144 | < | 3.30E+01 | < | 2.80E+01 | < | 2.80E+01 |

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**FERMI 2
DRINKING WATER ANALYSIS**

DW-2 (Control)
(pCi/liter)

| Nuclide | 26-JUL | | 30-AUG | | 27-SEP | |
|---------|--------|----------|--------|----------|--------|----------|
| GR-B | < | 2.80E+00 | < | 2.90E+00 | < | 3.00E+00 |
| Sr-89 | < | 6.80E+00 | < | 7.80E+00 | < | 7.50E+00 |
| Sr-90 | < | 1.80E+00 | < | 1.80E+00 | < | 1.50E+00 |
| Be-7 | < | 4.40E+01 | < | 4.70E+01 | < | 4.10E+01 |
| K-40 | < | 6.80E+01 | < | 7.10E+01 | < | 1.00E+02 |
| Mn-54 | < | 4.70E+00 | < | 5.40E+00 | < | 6.60E+00 |
| Co-58 | < | 5.40E+00 | < | 5.80E+00 | < | 5.80E+00 |
| Fe-59 | < | 1.40E+01 | < | 1.60E+01 | < | 1.80E+01 |
| Co-60 | < | 6.70E+00 | < | 5.60E+00 | < | 6.50E+00 |
| Zn-65 | < | 1.30E+01 | < | 1.20E+01 | < | 8.20E+00 |
| Zr-95 | < | 9.00E+00 | < | 9.10E+00 | < | 1.10E+01 |
| Ru-103 | < | 5.70E+00 | < | 5.90E+00 | < | 6.40E+00 |
| Ru-106 | < | 4.50E+01 | < | 4.80E+01 | < | 5.50E+01 |
| Cs-134 | < | 6.00E+00 | < | 5.90E+00 | < | 6.60E+00 |
| Cs-137 | < | 4.30E+00 | < | 6.50E+00 | < | 6.40E+00 |
| Ba-140 | < | 9.90E+00 | < | 1.00E+01 | < | 9.30E+00 |
| La-140 | < | 1.10E+01 | < | 1.20E+01 | < | 1.10E+01 |
| Ce-141 | < | 7.40E+00 | < | 8.60E+00 | < | 4.90E+00 |
| Ce-144 | < | 2.60E+01 | < | 2.90E+01 | < | 2.90E+01 |

| Nuclide | 25-OCT | | 29-NOV | | 28-DEC | |
|---------|--------|----------|----------|--------------|--------|----------|
| GR-B | < | 2.90E+00 | 5.10E+00 | +/- 1.10E+00 | < | 2.90E+00 |
| Sr-89 | < | 3.00E+01 | < | 7.40E+00 | < | 7.80E+00 |
| Sr-90 | < | 5.30E+01 | < | 1.50E+00 | < | 1.80E+00 |
| Be-7 | < | 3.50E+00 | < | 4.40E+01 | < | 4.10E+01 |
| K-40 | < | 3.80E+00 | < | 6.00E+01 | < | 7.10E+01 |
| Mn-54 | < | 7.70E+00 | < | 5.30E+00 | < | 5.00E+00 |
| Co-58 | < | 4.20E+00 | < | 4.90E+00 | < | 5.20E+00 |
| Fe-59 | < | 8.70E+00 | < | 1.10E+01 | < | 1.10E+01 |
| Co-60 | < | 6.90E+00 | < | 4.50E+00 | < | 5.40E+00 |
| Zn-65 | < | 4.10E+00 | < | 1.40E+01 | < | 1.60E+01 |
| Zr-95 | < | 3.30E+01 | < | 9.10E+00 | < | 9.10E+00 |
| Ru-103 | < | 3.50E+00 | < | 5.20E+00 | < | 6.30E+00 |
| Ru-106 | < | 3.50E+00 | < | 5.10E+01 | < | 4.80E+01 |
| Cs-134 | < | 6.40E+00 | < | 5.60E+00 | < | 5.90E+00 |
| Cs-137 | < | 7.30E+00 | < | 4.80E+00 | < | 5.20E+00 |
| Ba-140 | < | 6.20E+00 | < | 1.00E+01 | < | 1.10E+01 |
| La-140 | < | 2.00E+01 | < | 1.20E+01 | < | 1.30E+01 |
| Ce-141 | < | 2.90E+00 | < | 8.20E+00 | < | 9.10E+00 |
| Ce-144 | < | 3.00E+01 | < | 2.60E+01 | < | 2.70E+01 |

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**FERMI 2
SURFACE WATER ANALYSIS**

**SW-2 (Control)
(pCi/liter)**

| Nuclide | 26-JAN | | 22-FEB | | 29-MAR | |
|---------|--------|----------|--------|----------|--------|----------|
| Sr-89 | < | 7.60E+00 | < | 8.50E+00 | < | 5.60E+00 |
| Sr-90 | < | 1.50E+00 | < | 1.70E+00 | < | 1.80E+00 |
| Be-7 | < | 4.40E+01 | < | 2.40E+01 | < | 4.60E+01 |
| K-40 | < | 7.80E+01 | < | 4.60E+01 | < | 6.40E+01 |
| Mn-54 | < | 4.80E+00 | < | 3.10E+00 | < | 5.20E+00 |
| Co-58 | < | 5.70E+00 | < | 3.10E+00 | < | 5.50E+00 |
| Fe-59 | < | 1.60E+01 | < | 8.40E+00 | < | 1.90E+01 |
| Co-60 | < | 5.10E+00 | < | 3.20E+00 | < | 6.10E+00 |
| Zn-65 | < | 1.30E+01 | < | 1.00E+01 | < | 9.50E+00 |
| Zr-95 | < | 7.90E+00 | < | 5.60E+00 | < | 9.90E+00 |
| Ru-103 | < | 5.60E+00 | < | 3.60E+00 | < | 6.40E+00 |
| Ru-106 | < | 4.70E+01 | < | 2.80E+01 | < | 4.80E+01 |
| Cs-134 | < | 5.40E+00 | < | 3.20E+00 | < | 5.90E+00 |
| Cs-137 | < | 4.50E+00 | < | 2.80E+00 | < | 5.30E+00 |
| Ba-140 | < | 9.30E+00 | < | 4.70E+00 | < | 1.20E+01 |
| La-140 | < | 1.10E+01 | < | 5.40E+00 | < | 1.40E+01 |
| Ce-141 | < | 8.20E+00 | < | 3.90E+00 | < | 9.50E+00 |
| Ce-144 | < | 2.70E+01 | < | 1.70E+01 | < | 2.80E+01 |

| Nuclide | 26-APR | | 31-MAY | | 28-JUN | |
|---------|--------|----------|--------|----------|--------|----------|
| Sr-89 | < | 5.40E+00 | < | 8.60E+00 | < | 8.40E+00 |
| Sr-90 | < | 1.70E+00 | < | 1.50E+00 | < | 1.80E+00 |
| Be-7 | < | 4.90E+01 | < | 3.60E+01 | < | 4.70E+01 |
| K-40 | < | 9.20E+01 | < | 6.90E+01 | < | 8.90E+01 |
| Mn-54 | < | 7.80E+00 | < | 4.40E+00 | < | 5.80E+00 |
| Co-58 | < | 6.40E+00 | < | 4.80E+00 | < | 6.30E+00 |
| Fe-59 | < | 2.10E+01 | < | 1.20E+01 | < | 2.00E+01 |
| Co-60 | < | 8.30E+00 | < | 4.90E+00 | < | 7.00E+00 |
| Zn-65 | < | 1.80E+01 | < | 1.00E+01 | < | 1.40E+01 |
| Zr-95 | < | 1.30E+01 | < | 9.20E+00 | < | 1.20E+01 |
| Ru-103 | < | 6.70E+00 | < | 5.50E+00 | < | 7.20E+00 |
| Ru-106 | < | 7.00E+01 | < | 4.20E+01 | < | 5.40E+01 |
| Cs-134 | < | 6.70E+00 | < | 4.90E+00 | < | 5.70E+00 |
| Cs-137 | < | 7.60E+00 | < | 4.60E+00 | < | 6.80E+00 |
| Ba-140 | < | 1.30E+01 | < | 7.40E+00 | < | 1.20E+01 |
| La-140 | < | 1.40E+01 | < | 8.50E+00 | < | 1.40E+01 |
| Ce-141 | < | 1.00E+01 | < | 7.50E+00 | < | 1.00E+01 |
| Ce-144 | < | 3.30E+01 | < | 2.50E+01 | < | 3.30E+01 |

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**FERMI 2
SURFACE WATER ANALYSIS**

**SW-2 (Control)
(pCi/liter)**

| Nuclide | 26-JUL | | 30-AUG | | 27-SEP | |
|---------|--------|----------|--------|----------|--------|----------|
| Sr-89 | < | 5.70E+00 | < | 7.20E+00 | < | 7.20E+00 |
| Sr-90 | < | 1.50E+00 | < | 1.60E+00 | < | 1.80E+00 |
| Be-7 | < | 3.60E+01 | < | 3.70E+01 | < | 4.30E+01 |
| K-40 | < | 6.70E+01 | < | 7.60E+01 | < | 9.10E+01 |
| Mn-54 | < | 4.40E+00 | < | 4.50E+00 | < | 5.80E+00 |
| Co-58 | < | 3.80E+00 | < | 4.80E+00 | < | 5.60E+00 |
| Fe-59 | < | 1.20E+01 | < | 1.50E+01 | < | 1.50E+01 |
| Co-60 | < | 4.30E+00 | < | 5.40E+00 | < | 6.70E+00 |
| Zn-65 | < | 1.10E+01 | < | 1.10E+01 | < | 1.20E+01 |
| Zr-95 | < | 7.40E+00 | < | 8.60E+00 | < | 9.70E+00 |
| Ru-103 | < | 4.40E+00 | < | 5.00E+00 | < | 6.30E+00 |
| Ru-106 | < | 4.00E+01 | < | 4.80E+01 | < | 5.50E+01 |
| Cs-134 | < | 4.80E+00 | < | 4.60E+00 | < | 5.40E+00 |
| Cs-137 | < | 4.40E+00 | < | 5.20E+00 | < | 5.90E+00 |
| Ba-140 | < | 8.20E+00 | < | 1.10E+01 | < | 1.10E+01 |
| La-140 | < | 9.40E+00 | < | 1.30E+01 | < | 1.30E+01 |
| Ce-141 | < | 6.10E+00 | < | 6.30E+00 | < | 8.20E+00 |
| Ce-144 | < | 2.20E+01 | < | 2.30E+01 | < | 2.70E+01 |

| Nuclide | 25-OCT | | 30-NOV | | 20-DEC | |
|---------|--------|----------|--------|----------|----------|--------------|
| Sr-89 | < | 5.00E+01 | < | 6.60E+00 | < | 8.20E+00 |
| Sr-90 | < | 8.60E+01 | < | 1.30E+00 | < | 1.80E+00 |
| Be-7 | < | 6.10E+00 | < | 5.00E+01 | < | 4.60E+01 |
| K-40 | < | 5.40E+00 | < | 8.40E+01 | 9.10E+01 | +/- 1.90E+01 |
| Mn-54 | < | 1.30E+01 | < | 5.60E+00 | < | 6.90E+00 |
| Co-58 | < | 5.60E+00 | < | 5.40E+00 | < | 5.90E+00 |
| Fe-59 | < | 1.30E+01 | < | 1.00E+01 | < | 1.20E+01 |
| Co-60 | < | 9.90E+00 | < | 5.20E+00 | < | 6.90E+00 |
| Zn-65 | < | 6.10E+00 | < | 1.80E+01 | < | 1.40E+01 |
| Zr-95 | < | 4.60E+01 | < | 1.20E+01 | < | 9.70E+00 |
| Ru-103 | < | 5.30E+00 | < | 6.90E+00 | < | 7.10E+00 |
| Ru-106 | < | 5.40E+00 | < | 5.30E+01 | < | 5.90E+01 |
| Cs-134 | < | 1.20E+01 | < | 6.90E+00 | < | 7.00E+00 |
| Cs-137 | < | 1.40E+01 | < | 5.90E+00 | < | 6.00E+00 |
| Ba-140 | < | 7.50E+00 | < | 1.00E+01 | < | 1.20E+01 |
| La-140 | < | 2.70E+01 | < | 1.20E+01 | < | 1.40E+01 |
| Ce-141 | < | 5.00E+01 | < | 8.10E+00 | < | 8.60E+00 |
| Ce-144 | < | 8.60E+01 | < | 2.90E+01 | < | 3.00E+01 |

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**FERMI 2
SURFACE WATER ANALYSIS**

**SW-3 (Indicator)
(pCi/liter)**

| Nuclide | 26-JAN | | 22-FEB | | 29-MAR | |
|---------|--------|----------|--------|----------|--------|----------|
| Sr-89 | < | 8.70E+00 | < | 6.60E+00 | < | 5.80E+00 |
| Sr-90 | < | 1.70E+00 | < | 1.80E+00 | < | 1.90E+00 |
| Be-7 | < | 4.10E+01 | < | 2.70E+01 | < | 4.20E+01 |
| K-40 | < | 7.80E+01 | < | 4.70E+01 | < | 5.80E+01 |
| Mn-54 | < | 5.10E+00 | < | 3.10E+00 | < | 4.20E+00 |
| Co-58 | < | 5.60E+00 | < | 3.20E+00 | < | 4.50E+00 |
| Fe-59 | < | 1.30E+01 | < | 7.50E+00 | < | 1.70E+01 |
| Co-60 | < | 5.20E+00 | < | 3.50E+00 | < | 5.20E+00 |
| Zn-65 | < | 1.50E+01 | < | 7.10E+00 | < | 6.80E+00 |
| Zr-95 | < | 8.90E+00 | < | 5.30E+00 | < | 8.30E+00 |
| Ru-103 | < | 6.70E+00 | < | 3.30E+00 | < | 6.10E+00 |
| Ru-106 | < | 5.90E+01 | < | 2.90E+01 | < | 3.70E+01 |
| Cs-134 | < | 5.90E+00 | < | 3.10E+00 | < | 4.40E+00 |
| Cs-137 | < | 4.80E+00 | < | 3.30E+00 | < | 5.60E+00 |
| Ba-140 | < | 9.80E+00 | < | 5.00E+00 | < | 1.10E+01 |
| La-140 | < | 1.10E+01 | < | 5.80E+00 | < | 1.30E+01 |
| Ce-141 | < | 8.50E+00 | < | 4.40E+00 | < | 8.30E+00 |
| Ce-144 | < | 2.90E+01 | < | 1.70E+01 | < | 2.50E+01 |

| Nuclide | 26-APR | | 31-MAY | | 28-JUN | |
|---------|--------|----------|--------|----------|--------|----------|
| Sr-89 | < | 5.60E+00 | < | 8.10E+00 | < | 7.60E+00 |
| Sr-90 | < | 1.80E+00 | < | 1.60E+00 | < | 1.60E+00 |
| Be-7 | < | 6.40E+01 | < | 3.50E+01 | < | 5.20E+01 |
| K-40 | < | 1.20E+02 | < | 5.90E+01 | < | 8.00E+01 |
| Mn-54 | < | 7.90E+00 | < | 4.40E+00 | < | 4.90E+00 |
| Co-58 | < | 8.50E+00 | < | 4.30E+00 | < | 5.30E+00 |
| Fe-59 | < | 1.70E+01 | < | 1.10E+01 | < | 1.50E+01 |
| Co-60 | < | 8.20E+00 | < | 5.00E+00 | < | 5.90E+00 |
| Zn-65 | < | 1.60E+01 | < | 1.10E+01 | < | 1.10E+01 |
| Zr-95 | < | 1.30E+01 | < | 7.50E+00 | < | 1.00E+01 |
| Ru-103 | < | 8.10E+00 | < | 4.80E+00 | < | 5.20E+00 |
| Ru-106 | < | 6.90E+01 | < | 3.80E+01 | < | 5.60E+01 |
| Cs-134 | < | 7.90E+00 | < | 4.70E+00 | < | 5.60E+00 |
| Cs-137 | < | 9.10E+00 | < | 4.40E+00 | < | 5.70E+00 |
| Ba-140 | < | 1.20E+01 | < | 7.20E+00 | < | 1.30E+01 |
| La-140 | < | 1.30E+01 | < | 8.20E+00 | < | 1.50E+01 |
| Ce-141 | < | 1.20E+01 | < | 9.20E+00 | < | 7.70E+00 |
| Ce-144 | < | 4.50E+01 | < | 2.30E+01 | < | 2.70E+01 |

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**FERMI 2
SURFACE WATER ANALYSIS**

**SW-3 (Indicator)
(pCi/liter)**

| Nuclide | 26-JUL | | 30-AUG | | 27-SEP | |
|---------|--------|----------|--------|----------|--------|----------|
| Sr-89 | < | 5.90E+00 | < | 7.60E+00 | < | 6.50E+00 |
| Sr-90 | < | 1.50E+00 | < | 1.60E+00 | < | 1.50E+00 |
| Be-7 | < | 3.50E+01 | < | 7.40E+01 | < | 4.50E+01 |
| K-40 | < | 7.20E+01 | < | 9.70E+01 | < | 8.50E+01 |
| Mn-54 | < | 4.60E+00 | < | 7.50E+00 | < | 5.70E+00 |
| Co-58 | < | 4.70E+00 | < | 7.60E+00 | < | 6.30E+00 |
| Fe-59 | < | 1.60E+01 | < | 2.10E+01 | < | 1.50E+01 |
| Co-60 | < | 5.40E+00 | < | 5.80E+00 | < | 6.70E+00 |
| Zn-65 | < | 9.90E+00 | < | 1.70E+01 | < | 1.50E+01 |
| Zr-95 | < | 8.50E+00 | < | 1.10E+01 | < | 1.20E+01 |
| Ru-103 | < | 5.20E+00 | < | 7.90E+00 | < | 6.30E+00 |
| Ru-106 | < | 3.30E+01 | < | 6.30E+01 | < | 4.30E+01 |
| Cs-134 | < | 4.60E+00 | < | 6.40E+00 | < | 6.20E+00 |
| Cs-137 | < | 4.20E+00 | < | 7.00E+00 | < | 6.50E+00 |
| Ba-140 | < | 8.70E+00 | < | 1.20E+01 | < | 1.10E+01 |
| La-140 | < | 1.00E+01 | < | 1.40E+01 | < | 1.30E+01 |
| Ce-141 | < | 6.70E+00 | < | 1.10E+01 | < | 7.40E+00 |
| Ce-144 | < | 2.10E+01 | < | 3.80E+01 | < | 2.80E+01 |

| Nuclide | 25-OCT | | 29-NOV | | 20-DEC | |
|---------|--------|----------|--------|----------|--------|----------|
| Sr-89 | < | 8.40E+00 | < | 6.30E+00 | < | 7.50E+00 |
| Sr-90 | < | 1.60E+00 | < | 1.20E+00 | < | 1.70E+00 |
| Be-7 | < | 3.00E+01 | < | 5.00E+01 | < | 5.00E+01 |
| K-40 | < | 6.30E+01 | < | 1.10E+02 | < | 8.60E+01 |
| Mn-54 | < | 3.90E+00 | < | 7.70E+00 | < | 5.90E+00 |
| Co-58 | < | 4.00E+00 | < | 6.70E+00 | < | 7.00E+00 |
| Fe-59 | < | 8.80E+00 | < | 1.50E+01 | < | 1.40E+01 |
| Co-60 | < | 4.50E+00 | < | 7.40E+00 | < | 5.60E+00 |
| Zn-65 | < | 7.70E+00 | < | 1.70E+01 | < | 1.40E+01 |
| Zr-95 | < | 6.90E+00 | < | 1.20E+01 | < | 1.00E+01 |
| Ru-103 | < | 4.20E+00 | < | 9.60E+00 | < | 5.90E+00 |
| Ru-106 | < | 3.70E+01 | < | 6.70E+01 | < | 4.80E+01 |
| Cs-134 | < | 3.70E+00 | < | 8.60E+00 | < | 6.00E+00 |
| Cs-137 | < | 3.90E+00 | < | 7.00E+00 | < | 5.40E+00 |
| Ba-140 | < | 8.50E+00 | < | 1.10E+01 | < | 1.20E+01 |
| La-140 | < | 9.80E+00 | < | 1.30E+01 | < | 1.40E+01 |
| Ce-141 | < | 5.80E+00 | < | 1.20E+01 | < | 6.90E+00 |
| Ce-144 | < | 2.00E+01 | < | 3.70E+01 | < | 2.50E+01 |

**FERMI 2
DRINKING AND SURFACE WATER
QUARTERLY COMPOSITE SAMPLES**

**Tritium
(pCi/liter)**

| Station | First Quarter | | | | Second Quarter | | | |
|---------|---------------|----------|--|--|----------------|----------|--|--|
| DW-1 | < | 1.10E+03 | | | < | 1.20E+03 | | |
| DW-2 | < | 1.10E+03 | | | < | 1.20E+03 | | |
| SW-2 | < | 1.10E+03 | | | < | 1.20E+03 | | |
| SW-3 | < | 1.10E+03 | | | < | 1.20E+03 | | |

| Station | Third Quarter | | | | Fourth Quarter | | | |
|---------|---------------|----------|--|--|----------------|----------|--|--|
| DW-1 | < | 1.40E+03 | | | < | 1.40E+03 | | |
| DW-2 | < | 1.40E+03 | | | < | 1.40E+03 | | |
| SW-2 | < | 1.20E+03 | | | < | 1.40E+03 | | |
| SW-3 | < | 1.20E+03 | | | < | 1.40E+03 | | |

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**FERMI 2
GROUNDWATER ANALYSIS**

**GW-1 (Indicator)
(pCi/liter)**

| Nuclide | First Quarter | | Second Quarter | |
|---------|---------------|----------|----------------|----------|
| Be-7 | < | 5.70E+01 | < | 5.00E+01 |
| K-40 | < | 8.20E+01 | < | 9.50E+01 |
| Mn-54 | < | 6.60E+00 | < | 6.20E+00 |
| Co-58 | < | 6.00E+00 | < | 6.30E+00 |
| Fe-59 | < | 1.70E+01 | < | 1.90E+01 |
| Co-60 | < | 7.00E+00 | < | 6.00E+00 |
| Zn-65 | < | 1.30E+01 | < | 1.40E+01 |
| Zr-95 | < | 9.40E+00 | < | 1.10E+01 |
| Ru-103 | < | 7.20E+00 | < | 7.10E+00 |
| Ru-106 | < | 4.20E+01 | < | 5.30E+01 |
| Cs-134 | < | 6.30E+00 | < | 6.10E+00 |
| Cs-137 | < | 6.30E+00 | < | 7.30E+00 |
| Ba-140 | < | 1.30E+01 | < | 1.20E+01 |
| La-140 | < | 1.50E+01 | < | 1.40E+01 |
| Ce-141 | < | 9.30E+00 | < | 8.90E+00 |
| Ce-144 | < | 3.30E+01 | < | 3.30E+01 |
| H-3 | < | 1.00E+03 | < | 1.30E+03 |

| Nuclide | Third Quarter | | Fourth Quarter | |
|---------|---------------|----------|----------------|----------|
| Be-7 | < | 4.40E+01 | < | 4.50E+01 |
| K-40 | < | 8.40E+01 | < | 8.50E+01 |
| Mn-54 | < | 5.00E+00 | < | 5.60E+00 |
| Co-58 | < | 5.30E+00 | < | 5.40E+00 |
| Fe-59 | < | 1.50E+01 | < | 1.40E+01 |
| Co-60 | < | 6.20E+00 | < | 6.80E+00 |
| Zn-65 | < | 1.20E+01 | < | 1.30E+01 |
| Zr-95 | < | 9.60E+00 | < | 9.90E+00 |
| Ru-103 | < | 5.50E+00 | < | 6.20E+00 |
| Ru-106 | < | 4.70E+01 | < | 5.90E+01 |
| Cs-134 | < | 4.60E+00 | < | 6.10E+00 |
| Cs-137 | < | 6.20E+00 | < | 6.10E+00 |
| Ba-140 | < | 9.50E+00 | < | 1.30E+01 |
| La-140 | < | 1.10E+01 | < | 1.50E+01 |
| Ce-141 | < | 7.60E+00 | < | 7.90E+00 |
| Ce-144 | < | 2.70E+01 | < | 2.70E+01 |
| H-3 | < | 1.40E+03 | < | 1.50E+03 |

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**FERMI 2
GROUNDWATER ANALYSIS**

**GW-2 (Indicator)
(pCi/liter)**

| Nuclide | | First Quarter | | | Second Quarter | |
|---------|---|---------------|--|---|----------------|--|
| Be-7 | < | 6.30E+01 | | < | 5.40E+01 | |
| K-40 | < | 7.90E+01 | | < | 8.80E+01 | |
| Mn-54 | < | 6.40E+00 | | < | 7.30E+00 | |
| Co-58 | < | 6.40E+00 | | < | 6.90E+00 | |
| Fe-59 | < | 2.40E+01 | | < | 1.10E+01 | |
| Co-60 | < | 6.30E+00 | | < | 6.20E+00 | |
| Zn-65 | < | 1.20E+01 | | < | 1.60E+01 | |
| Zr-95 | < | 1.50E+01 | | < | 1.00E+01 | |
| Ru-103 | < | 7.70E+00 | | < | 8.30E+00 | |
| Ru-106 | < | 6.10E+01 | | < | 6.50E+01 | |
| Cs-134 | < | 5.30E+00 | | < | 6.40E+00 | |
| Cs-137 | < | 8.70E+00 | | < | 5.60E+00 | |
| Ba-140 | < | 1.10E+01 | | < | 1.20E+01 | |
| La-140 | < | 1.30E+01 | | < | 1.40E+01 | |
| Ce-141 | < | 9.70E+00 | | < | 9.60E+00 | |
| Ce-144 | < | 3.20E+01 | | < | 3.20E+01 | |
| H-3 | < | 1.00E+03 | | < | 1.50E+03 | |

| Nuclide | | Third Quarter | | | Fourth Quarter | |
|---------|---|---------------|--|---|----------------|--|
| Be-7 | < | 4.00E+01 | | < | 4.80E+01 | |
| K-40 | < | 7.60E+01 | | < | 8.50E+01 | |
| Mn-54 | < | 4.90E+00 | | < | 5.20E+00 | |
| Co-58 | < | 5.70E+00 | | < | 6.00E+00 | |
| Fe-59 | < | 1.30E+01 | | < | 1.40E+01 | |
| Co-60 | < | 5.20E+00 | | < | 5.40E+00 | |
| Zn-65 | < | 1.10E+01 | | < | 2.30E+01 | |
| Zr-95 | < | 1.00E+01 | | < | 1.00E+01 | |
| Ru-103 | < | 4.60E+00 | | < | 6.50E+00 | |
| Ru-106 | < | 4.20E+01 | | < | 5.20E+01 | |
| Cs-134 | < | 5.10E+00 | | < | 6.10E+00 | |
| Cs-137 | < | 4.60E+00 | | < | 5.10E+00 | |
| Ba-140 | < | 1.20E+01 | | < | 1.10E+01 | |
| La-140 | < | 1.30E+01 | | < | 1.30E+01 | |
| Ce-141 | < | 6.60E+00 | | < | 1.10E+01 | |
| Ce-144 | < | 2.00E+01 | | < | 2.90E+01 | |
| H-3 | < | 1.40E+03 | | < | 1.50E+03 | |

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**FERMI 2
GROUNDWATER ANALYSIS**

**GW-3 (Indicator)
(pCi/liter)**

| Nuclide | First Quarter | | Second Quarter | |
|---------|---------------|----------|----------------|----------|
| Be-7 | < | 4.20E+01 | < | 2.10E+01 |
| K-40 | < | 6.70E+01 | < | 3.70E+01 |
| Mn-54 | < | 4.70E+00 | < | 2.30E+00 |
| Co-58 | < | 5.60E+00 | < | 2.50E+00 |
| Fe-59 | < | 1.40E+01 | < | 7.40E+00 |
| Co-60 | < | 5.70E+00 | < | 2.40E+00 |
| Zn-65 | < | 1.30E+01 | < | 5.20E+00 |
| Zr-95 | < | 5.80E+00 | < | 4.40E+00 |
| Ru-103 | < | 5.70E+00 | < | 2.80E+00 |
| Ru-106 | < | 4.20E+01 | < | 2.30E+01 |
| Cs-134 | < | 5.80E+00 | < | 2.40E+00 |
| Cs-137 | < | 3.70E+00 | < | 2.60E+00 |
| Ba-140 | < | 1.30E+01 | < | 5.70E+00 |
| La-140 | < | 1.40E+01 | < | 6.60E+00 |
| Ce-141 | < | 8.10E+00 | < | 4.10E+00 |
| Ce-144 | < | 2.40E+01 | < | 1.30E+01 |
| H-3 | < | 1.00E+03 | < | 1.30E+03 |

| Nuclide | Third Quarter | | Fourth Quarter | |
|---------|---------------|----------|----------------|----------|
| Be-7 | < | 4.90E+01 | < | 5.20E+01 |
| K-40 | < | 9.10E+01 | < | 9.90E+01 |
| Mn-54 | < | 5.60E+00 | < | 5.70E+00 |
| Co-58 | < | 5.60E+00 | < | 6.10E+00 |
| Fe-59 | < | 2.00E+01 | < | 1.40E+01 |
| Co-60 | < | 7.30E+00 | < | 8.30E+00 |
| Zn-65 | < | 1.50E+01 | < | 1.60E+01 |
| Zr-95 | < | 1.20E+01 | < | 1.30E+01 |
| Ru-103 | < | 6.20E+00 | < | 7.10E+00 |
| Ru-106 | < | 5.70E+01 | < | 5.40E+01 |
| Cs-134 | < | 6.20E+00 | < | 7.60E+00 |
| Cs-137 | < | 5.80E+00 | < | 5.10E+00 |
| Ba-140 | < | 1.20E+01 | < | 1.20E+01 |
| La-140 | < | 1.40E+01 | < | 1.40E+01 |
| Ce-141 | < | 7.50E+00 | < | 8.80E+00 |
| Ce-144 | < | 2.80E+01 | < | 3.00E+01 |
| H-3 | < | 1.40E+03 | < | 1.50E+03 |

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**FERMI 2
GROUNDWATER ANALYSIS**

**GW-4 (Control)
(pCi/liter)**

| Nuclide | First Quarter | | Second Quarter | |
|---------|---------------|----------|----------------|----------|
| Be-7 | < | 4.40E+01 | < | 4.90E+01 |
| K-40 | < | 5.20E+01 | < | 8.40E+01 |
| Mn-54 | < | 4.30E+00 | < | 4.90E+00 |
| Co-58 | < | 5.30E+00 | < | 7.00E+00 |
| Fe-59 | < | 1.60E+01 | < | 1.60E+01 |
| Co-60 | < | 5.00E+00 | < | 5.20E+00 |
| Zn-65 | < | 1.10E+01 | < | 1.50E+01 |
| Zr-95 | < | 8.80E+00 | < | 8.90E+00 |
| Ru-103 | < | 6.70E+00 | < | 6.30E+00 |
| Ru-106 | < | 4.70E+01 | < | 5.10E+01 |
| Cs-134 | < | 4.50E+00 | < | 6.10E+00 |
| Cs-137 | < | 3.30E+00 | < | 6.30E+00 |
| Ba-140 | < | 1.30E+01 | < | 1.30E+01 |
| La-140 | < | 1.50E+01 | < | 1.50E+01 |
| Ce-141 | < | 9.20E+00 | < | 9.40E+00 |
| Ce-144 | < | 3.00E+01 | < | 3.10E+01 |
| H-3 | < | 1.00E+03 | < | 1.60E+03 |

| Nuclide | Third Quarter | | Fourth Quarter | |
|---------|---------------|----------|----------------|----------|
| Be-7 | < | 6.50E+01 | < | 4.40E+01 |
| K-40 | < | 9.70E+01 | < | 7.00E+01 |
| Mn-54 | < | 5.90E+00 | < | 5.20E+00 |
| Co-58 | < | 7.10E+00 | < | 4.40E+00 |
| Fe-59 | < | 1.90E+01 | < | 1.30E+01 |
| Co-60 | < | 6.50E+00 | < | 5.30E+00 |
| Zn-65 | < | 2.00E+01 | < | 1.80E+01 |
| Zr-95 | < | 1.20E+01 | < | 1.00E+01 |
| Ru-103 | < | 8.10E+00 | < | 5.00E+00 |
| Ru-106 | < | 6.20E+01 | < | 5.00E+01 |
| Cs-134 | < | 7.10E+00 | < | 5.60E+00 |
| Cs-137 | < | 6.20E+00 | < | 5.20E+00 |
| Ba-140 | < | 1.30E+01 | < | 1.30E+01 |
| La-140 | < | 1.40E+01 | < | 1.50E+01 |
| Ce-141 | < | 1.10E+01 | < | 8.80E+00 |
| Ce-144 | < | 3.50E+01 | < | 3.00E+01 |
| H-3 | < | 1.40E+03 | < | 1.50E+03 |

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**FERMI 2
SEDIMENT ANALYSIS**

**S-1 (Indicator)
(pCi/kg dry)**

| Nuclide | 19-MAY | | 8-NOV | |
|---------|--------|-----------------------|-------|-----------------------|
| Sr-89 | < | 2.90E+02 | < | 1.60E+02 |
| Sr-90 | < | 2.90E+02 | < | 1.70E+02 |
| Be-7 | < | 3.60E+02 | < | 2.70E+02 |
| K-40 | | 1.36E+04 +/- 4.60E+02 | | 1.22E+04 +/- 4.10E+02 |
| Mn-54 | < | 3.00E+01 | < | 2.60E+01 |
| Co-58 | < | 4.30E+01 | < | 3.70E+01 |
| Fe-59 | < | 1.40E+02 | < | 1.10E+02 |
| Co-60 | < | 3.50E+01 | < | 3.70E+01 |
| Zn-65 | < | 9.70E+01 | < | 1.40E+02 |
| Zr-95 | < | 7.30E+01 | < | 7.10E+01 |
| Ru-103 | < | 4.60E+01 | < | 3.90E+01 |
| Ru-106 | < | 2.30E+02 | < | 2.00E+02 |
| Cs-134 | < | 2.10E+01 | < | 2.20E+01 |
| Cs-137 | < | 2.30E+01 | < | 2.70E+01 |
| Ba-140 | < | 1.20E+03 | < | 5.70E+02 |
| La-140 | < | 5.60E+02 | < | 3.30E+02 |
| Ce-141 | < | 8.40E+01 | < | 5.50E+01 |
| Ce-144 | < | 1.30E+02 | < | 1.10E+02 |

**S-2 (Indicator)
(pCi/kg dry)**

| Nuclide | 18-MAY | | 8-NOV | |
|---------|--------|-----------------------|-------|-----------------------|
| Sr-89 | < | 2.70E+02 | < | 2.70E+02 |
| Sr-90 | < | 2.50E+02 | < | 2.60E+02 |
| Be-7 | < | 2.20E+02 | < | 5.50E+02 |
| K-40 | | 9.68E+03 +/- 2.20E+02 | | 1.04E+04 +/- 4.90E+02 |
| Mn-54 | < | 1.80E+01 | < | 5.20E+01 |
| Co-58 | < | 2.80E+01 | < | 6.00E+01 |
| Fe-59 | < | 7.60E+01 | < | 1.60E+02 |
| Co-60 | < | 1.80E+01 | < | 5.50E+01 |
| Zn-65 | < | 9.50E+01 | < | 2.50E+02 |
| Zr-95 | < | 4.20E+01 | < | 1.00E+02 |
| Ru-103 | < | 3.70E+01 | < | 9.00E+01 |
| Ru-106 | < | 1.30E+02 | < | 4.30E+02 |
| Cs-134 | < | 1.60E+01 | < | 3.90E+01 |
| Cs-137 | < | 1.80E+01 | < | 4.40E+01 |
| Ba-140 | < | 8.20E+02 | < | 1.20E+03 |
| La-140 | < | 3.60E+02 | < | 6.30E+02 |
| Ce-141 | < | 1.50E+02 | < | 1.30E+02 |
| Ce-144 | < | 1.20E+02 | < | 2.60E+02 |

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**FERMI 2
SEDIMENT ANALYSIS**

**S-3 (Indicator)
(pCi/kg dry)**

| Nuclide | 17-MAY | | 8-NOV | |
|---------|--------|-----------------------|-------|-----------------------|
| Sr-89 | < | 2.20E+02 | < | 2.70E+02 |
| Sr-90 | < | 2.10E+02 | < | 2.70E+02 |
| Be-7 | < | 2.90E+02 | < | 8.10E+02 |
| K-40 | | 1.06E+04 +/- 4.20E+02 | | 1.23E+04 +/- 7.30E+02 |
| Mn-54 | < | 2.70E+01 | < | 5.70E+01 |
| Co-58 | < | 4.60E+01 | < | 8.50E+01 |
| Fe-59 | < | 1.30E+02 | < | 2.20E+02 |
| Co-60 | < | 3.20E+01 | < | 7.90E+01 |
| Zn-65 | < | 9.40E+01 | < | 3.60E+02 |
| Zr-95 | < | 7.60E+01 | < | 1.90E+02 |
| Ru-103 | < | 4.70E+01 | < | 9.80E+01 |
| Ru-106 | < | 2.10E+02 | < | 6.80E+02 |
| Cs-134 | < | 1.80E+01 | < | 6.00E+01 |
| Cs-137 | < | 2.20E+01 | | 1.39E+02 +/- 2.90E+01 |
| Ba-140 | < | 1.10E+03 | < | 2.10E+03 |
| La-140 | < | 1.90E+03 | < | 1.10E+03 |
| Ce-141 | < | 7.80E+01 | < | 2.10E+02 |
| Ce-144 | < | 1.20E+02 | < | 3.80E+02 |

**S-4 (Indicator)
(pCi/kg dry)**

| Nuclide | 1-JUN | | 19-OCT | |
|---------|-------|-----------------------|--------|-----------------------|
| Sr-89 | < | 2.60E+02 | < | 2.70E+02 |
| Sr-90 | < | 2.40E+02 | < | 2.50E+02 |
| Be-7 | < | 3.20E+02 | < | 8.10E+02 |
| K-40 | | 1.01E+04 +/- 4.30E+02 | | 1.75E+04 +/- 6.10E+02 |
| Mn-54 | < | 2.90E+01 | < | 5.30E+01 |
| Co-58 | < | 4.00E+01 | < | 9.20E+01 |
| Fe-59 | < | 1.10E+02 | < | 2.60E+02 |
| Co-60 | < | 3.50E+01 | < | 6.60E+01 |
| Zn-65 | < | 1.50E+02 | < | 2.60E+02 |
| Zr-95 | < | 7.30E+01 | < | 1.70E+02 |
| Ru-103 | < | 4.00E+01 | < | 1.40E+02 |
| Ru-106 | < | 2.50E+02 | < | 4.90E+02 |
| Cs-134 | < | 1.20E+02 | < | 6.10E+01 |
| Cs-137 | < | 2.90E+01 | < | 4.70E+01 |
| Ba-140 | < | 6.30E+02 | < | 1.40E+03 |
| La-140 | < | 2.60E+02 | < | 1.60E+03 |
| Ce-141 | < | 7.30E+01 | < | 2.80E+02 |
| Ce-144 | < | 1.70E+02 | < | 3.80E+02 |

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**FERMI 2
SEDIMENT ANALYSIS**

**S-5 (Control)
(pCi/kg dry)**

| Nuclide | 17-MAY | | | 8-NOV | | |
|---------|--------|----------|--------------|-------|----------|--------------|
| Sr-89 | < | 2.60E+02 | | < | 2.70E+02 | |
| Sr-90 | < | 2.30E+02 | | < | 2.50E+02 | |
| Be-7 | < | 4.80E+02 | | < | 6.60E+02 | |
| K-40 | | 1.02E+04 | +/- 4.40E+02 | | 1.19E+04 | +/- 5.30E+02 |
| Mn-54 | < | 3.90E+01 | | < | 4.60E+01 | |
| Co-58 | < | 5.70E+01 | | < | 7.80E+01 | |
| Fe-59 | < | 1.40E+02 | | < | 2.00E+02 | |
| Co-60 | < | 3.30E+01 | | < | 5.10E+01 | |
| Zn-65 | < | 2.10E+02 | | < | 2.40E+02 | |
| Zr-95 | < | 8.90E+01 | | < | 1.30E+02 | |
| Ru-103 | < | 6.90E+01 | | < | 8.70E+01 | |
| Ru-106 | < | 2.70E+02 | | < | 4.20E+02 | |
| Cs-134 | < | 2.90E+01 | | < | 4.20E+01 | |
| Cs-137 | | 7.90E+01 | +/- 1.80E+01 | | 9.80E+01 | +/- 2.00E+01 |
| Ba-140 | < | 1.70E+03 | | < | 1.50E+03 | |
| La-140 | < | 7.40E+02 | | < | 7.90E+02 | |
| Ce-141 | < | 1.30E+02 | | < | 1.90E+02 | |
| Ce-144 | < | 1.90E+02 | | < | 3.80E+02 | |

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**FERMI 2
FISH ANALYSIS**

**F-1 (Control)
(pCi/kg wet)**

| Nuclide | 17-MAY Rock Bass | | 17-MAY Walleye | | 17-MAY White Bass | |
|---------|------------------|-----------------------|----------------|-----------------------|-------------------|-----------------------|
| Sr-89 | < | 1.60E+02 | < | 2.20E+02 | < | 2.30E+02 |
| Sr-90 | < | 2.10E+02 | < | 1.50E+02 | < | 2.30E+02 |
| Be-7 | < | 6.70E+02 | < | 3.30E+02 | < | 2.90E+02 |
| K-40 | | 3.09E+03 +/- 4.40E+02 | | 3.56E+03 +/- 2.90E+02 | | 2.37E+03 +/- 3.20E+02 |
| Mn-54 | < | 7.80E+01 | < | 2.90E+01 | < | 4.00E+01 |
| Co-58 | < | 8.20E+01 | < | 2.70E+01 | < | 3.50E+01 |
| Fe-59 | < | 2.60E+02 | < | 1.10E+02 | < | 1.30E+02 |
| Co-60 | < | 8.80E+01 | < | 3.40E+01 | < | 5.10E+01 |
| Zn-65 | < | 2.00E+02 | < | 9.10E+01 | < | 1.00E+02 |
| Zr-95 | < | 1.40E+02 | < | 5.60E+01 | < | 6.90E+01 |
| Ru-103 | < | 7.70E+01 | < | 3.40E+01 | < | 4.50E+01 |
| Ru-106 | < | 7.10E+02 | < | 2.70E+02 | < | 3.50E+02 |
| Cs-134 | < | 8.30E+01 | < | 3.90E+01 | < | 4.80E+01 |
| Cs-137 | < | 7.50E+01 | < | 3.60E+01 | < | 3.40E+01 |
| Ba-140 | < | 2.30E+02 | < | 8.90E+01 | < | 1.10E+02 |
| La-140 | < | 2.60E+02 | < | 1.00E+02 | < | 1.30E+02 |
| Ce-141 | < | 1.10E+02 | < | 5.70E+01 | < | 6.20E+01 |
| Ce-144 | < | 3.30E+02 | < | 1.50E+02 | < | 1.90E+02 |

| Nuclide | 17-MAY White Perch | | 17-MAY Yellow Perch | | 5-OCT Sucker | |
|---------|--------------------|-----------------------|---------------------|-----------------------|--------------|-----------------------|
| Sr-89 | < | 2.80E+02 | < | 1.90E+02 | < | 2.70E+02 |
| Sr-90 | < | 2.60E+02 | < | 1.80E+02 | < | 2.50E+02 |
| Be-7 | < | 4.60E+02 | < | 3.30E+02 | < | 5.00E+02 |
| K-40 | | 2.39E+03 +/- 4.20E+02 | | 2.80E+03 +/- 3.00E+02 | | 2.88E+03 +/- 1.90E+02 |
| Mn-54 | < | 7.10E+01 | < | 4.40E+01 | < | 3.20E+01 |
| Co-58 | < | 6.60E+01 | < | 3.10E+01 | < | 5.10E+01 |
| Fe-59 | < | 2.50E+02 | < | 1.60E+02 | < | 1.70E+02 |
| Co-60 | < | 6.50E+01 | < | 4.50E+01 | < | 3.00E+01 |
| Zn-65 | < | 1.10E+02 | < | 8.10E+01 | < | 6.90E+01 |
| Zr-95 | < | 1.30E+02 | < | 6.40E+01 | < | 9.50E+01 |
| Ru-103 | < | 6.60E+01 | < | 4.40E+01 | < | 8.80E+01 |
| Ru-106 | < | 7.00E+02 | < | 3.70E+02 | < | 3.10E+02 |
| Cs-134 | < | 6.30E+01 | < | 4.10E+01 | < | 3.00E+01 |
| Cs-137 | < | 7.30E+01 | < | 3.90E+01 | < | 2.80E+01 |
| Ba-140 | < | 2.00E+02 | < | 1.10E+02 | < | 2.00E+03 |
| La-140 | < | 2.30E+02 | < | 1.30E+02 | < | 2.30E+03 |
| Ce-141 | < | 9.90E+01 | < | 6.00E+01 | < | 1.20E+02 |
| Ce-144 | < | 3.00E+02 | < | 1.60E+02 | < | 1.20E+02 |

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**FERMI 2
FISH ANALYSIS**

**F-1 (Control)
(pCi/kg wet)**

| Nuclide | 5-OCT Walleye | | |
|---------|---------------|----------|--------------|
| Sr-89 | < | 2.50E+02 | |
| Sr-90 | < | 2.30E+02 | |
| Be-7 | < | 8.70E+02 | |
| K-40 | | 3.15E+03 | +/- 4.30E+02 |
| Mn-54 | < | 5.70E+01 | |
| Co-58 | < | 1.00E+02 | |
| Fe-59 | < | 2.50E+02 | |
| Co-60 | < | 6.00E+01 | |
| Zn-65 | < | 1.50E+02 | |
| Zr-95 | < | 1.80E+02 | |
| Ru-103 | < | 1.60E+02 | |
| Ru-106 | < | 5.90E+02 | |
| Cs-134 | < | 5.60E+01 | |
| Cs-137 | < | 4.10E+01 | |
| Ba-140 | < | 3.60E+03 | |
| La-140 | < | 4.20E+03 | |
| Ce-141 | < | 2.60E+02 | |
| Ce-144 | < | 2.60E+02 | |

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FISH ANALYSIS**

**F-2 (Indicator)
(pCi/kg wet)**

| Nuclide | 18-MAY Catfish | | 18-MAY Quillback | | 18-MAY Sucker | |
|---------|----------------|-----------------------|------------------|-----------------------|---------------|-----------------------|
| Sr-89 | < | 1.50E+02 | < | 2.30E+02 | < | 2.20E+02 |
| Sr-90 | < | 2.80E+02 | < | 2.30E+02 | < | 1.70E+02 |
| Be-7 | < | 3.80E+02 | < | 2.80E+02 | < | 3.10E+02 |
| K-40 | | 2.03E+03 +/- 3.10E+02 | | 2.12E+03 +/- 2.70E+02 | | 3.47E+03 +/- 3.40E+02 |
| Mn-54 | < | 5.00E+01 | < | 2.80E+01 | < | 2.90E+01 |
| Co-58 | < | 5.60E+01 | < | 3.70E+01 | < | 4.00E+01 |
| Fe-59 | < | 1.50E+02 | < | 1.10E+02 | < | 1.60E+02 |
| Co-60 | < | 3.90E+01 | < | 4.80E+01 | < | 4.70E+01 |
| Zn-65 | < | 1.40E+02 | < | 7.30E+01 | < | 8.10E+01 |
| Zr-95 | < | 6.20E+01 | < | 6.10E+01 | < | 8.60E+01 |
| Ru-103 | < | 4.70E+01 | < | 4.50E+01 | < | 4.00E+01 |
| Ru-106 | < | 3.20E+02 | < | 2.50E+02 | < | 3.60E+02 |
| Cs-134 | < | 4.30E+01 | < | 3.00E+01 | < | 3.70E+01 |
| Cs-137 | < | 4.10E+01 | < | 3.10E+01 | < | 3.70E+01 |
| Ba-140 | < | 8.80E+01 | < | 1.60E+02 | < | 1.30E+02 |
| La-140 | < | 1.00E+02 | < | 1.80E+02 | < | 1.50E+02 |
| Ce-141 | < | 5.70E+01 | < | 4.90E+01 | < | 6.20E+01 |
| Ce-144 | < | 1.50E+02 | < | 1.10E+02 | < | 1.60E+02 |

| Nuclide | 18-MAY Walleye | | 18-MAY White Bass | | 18-MAY White Perch | |
|---------|----------------|-----------------------|-------------------|-----------------------|--------------------|-----------------------|
| Sr-89 | < | 1.60E+02 | < | 2.20E+02 | < | 2.60E+02 |
| Sr-90 | < | 1.20E+02 | < | 1.50E+02 | < | 1.90E+02 |
| Be-7 | < | 3.70E+02 | < | 3.50E+02 | < | 3.30E+02 |
| K-40 | | 3.15E+03 +/- 3.90E+02 | | 2.39E+03 +/- 2.40E+02 | | 2.06E+03 +/- 2.30E+02 |
| Mn-54 | < | 3.50E+01 | < | 3.10E+01 | < | 3.10E+01 |
| Co-58 | < | 5.70E+01 | < | 3.30E+01 | < | 3.30E+01 |
| Fe-59 | < | 1.60E+02 | < | 8.50E+01 | < | 1.20E+02 |
| Co-60 | < | 4.90E+01 | < | 2.90E+01 | < | 3.80E+01 |
| Zn-65 | < | 1.10E+02 | < | 8.40E+01 | < | 8.20E+01 |
| Zr-95 | < | 7.50E+01 | < | 7.40E+01 | < | 6.80E+01 |
| Ru-103 | < | 5.60E+01 | < | 3.70E+01 | < | 4.20E+01 |
| Ru-106 | < | 4.00E+02 | < | 3.20E+02 | < | 2.90E+02 |
| Cs-134 | < | 5.10E+01 | < | 3.10E+01 | < | 2.60E+01 |
| Cs-137 | < | 4.90E+01 | < | 2.70E+01 | < | 3.60E+01 |
| Ba-140 | < | 1.20E+02 | < | 1.10E+02 | < | 1.10E+02 |
| La-140 | < | 1.40E+02 | < | 1.30E+02 | < | 1.30E+02 |
| Ce-141 | < | 6.00E+01 | < | 5.90E+01 | < | 6.50E+01 |
| Ce-144 | < | 1.90E+02 | < | 1.70E+02 | < | 1.60E+02 |

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**FERMI 2
FISH ANALYSIS**

**F-2 (Indicator)
(pCi/kg wet)**

| Nuclide | 18-MAY Yellow Perch | | 6-OCT Bluegill | | 6-OCT Drum | |
|---------|---------------------|-----------------------|----------------|-----------------------|------------|-----------------------|
| Sr-89 | < | 2.30E+02 | < | 2.60E+02 | < | 2.70E+02 |
| Sr-90 | < | 2.30E+02 | < | 2.40E+02 | < | 2.70E+02 |
| Be-7 | < | 5.40E+02 | < | 4.70E+02 | < | 6.90E+02 |
| K-40 | | 3.50E+03 +/- 4.30E+02 | | 2.02E+03 +/- 1.70E+02 | | 2.28E+03 +/- 2.60E+02 |
| Mn-54 | < | 5.40E+01 | < | 3.50E+01 | < | 5.10E+01 |
| Co-58 | < | 7.30E+01 | < | 5.30E+01 | < | 8.90E+01 |
| Fe-59 | < | 2.40E+02 | < | 1.60E+02 | < | 2.40E+02 |
| Co-60 | < | 8.20E+01 | < | 2.90E+01 | < | 4.30E+01 |
| Zn-65 | < | 1.30E+02 | < | 1.00E+02 | < | 1.70E+02 |
| Zr-95 | < | 1.20E+02 | < | 9.70E+01 | < | 1.50E+02 |
| Ru-103 | < | 6.50E+01 | < | 9.10E+01 | < | 1.40E+02 |
| Ru-106 | < | 5.70E+02 | < | 3.00E+02 | < | 4.90E+02 |
| Cs-134 | < | 6.70E+01 | < | 3.10E+01 | < | 4.80E+01 |
| Cs-137 | < | 6.30E+01 | < | 2.60E+01 | < | 5.00E+01 |
| Ba-140 | < | 2.20E+02 | < | 1.50E+03 | < | 2.40E+03 |
| La-140 | < | 2.50E+02 | < | 1.70E+03 | < | 2.80E+03 |
| Ce-141 | < | 9.10E+01 | < | 1.80E+02 | < | 2.10E+02 |
| Ce-144 | < | 2.60E+02 | < | 1.40E+02 | < | 2.20E+02 |

| Nuclide | 6-OCT Walleye | | 6-OCT White Bass | |
|---------|---------------|-----------------------|------------------|-----------------------|
| Sr-89 | < | 2.30E+02 | < | 2.70E+02 |
| Sr-90 | < | 2.00E+02 | < | 2.90E+02 |
| Be-7 | < | 6.30E+02 | < | 4.90E+02 |
| K-40 | | 3.09E+03 +/- 2.70E+02 | | 3.01E+03 +/- 2.30E+02 |
| Mn-54 | < | 3.00E+01 | < | 3.40E+01 |
| Co-58 | < | 6.70E+01 | < | 5.20E+01 |
| Fe-59 | < | 2.50E+02 | < | 1.80E+02 |
| Co-60 | < | 4.20E+01 | < | 4.00E+01 |
| Zn-65 | < | 9.90E+01 | < | 9.00E+01 |
| Zr-95 | < | 1.20E+02 | < | 9.60E+01 |
| Ru-103 | < | 1.40E+02 | < | 9.30E+01 |
| Ru-106 | < | 3.80E+02 | < | 2.30E+02 |
| Cs-134 | < | 3.20E+01 | < | 2.60E+01 |
| Cs-137 | < | 3.10E+01 | < | 3.20E+01 |
| Ba-140 | < | 4.30E+03 | < | 1.90E+03 |
| La-140 | < | 4.90E+03 | < | 2.20E+03 |
| Ce-141 | < | 2.00E+02 | < | 1.50E+02 |
| Ce-144 | < | 1.60E+02 | < | 1.30E+02 |

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**FERMI 2
FISH ANALYSIS**

**F-3 (Control)
(pCi/kg wet)**

| Nuclide | 1-JUN Catfish | | 1-JUN Sucker | | 1-JUN Walleye | |
|---------|---------------|-----------------------|--------------|-----------------------|---------------|-----------------------|
| Sr-89 | < | 9.90E+01 | < | 1.10E+02 | < | 2.80E+02 |
| Sr-90 | < | 2.60E+02 | < | 1.10E+02 | < | 2.60E+02 |
| Be-7 | < | 4.80E+02 | < | 6.10E+02 | < | 4.30E+02 |
| K-40 | | 1.80E+03 +/- 2.80E+02 | | 3.29E+03 +/- 3.70E+02 | | 3.05E+03 +/- 3.60E+02 |
| Mn-54 | < | 4.20E+01 | < | 6.00E+01 | < | 4.10E+01 |
| Co-58 | < | 4.40E+01 | < | 6.90E+01 | < | 6.50E+01 |
| Fe-59 | < | 2.00E+02 | < | 2.50E+02 | < | 2.30E+02 |
| Co-60 | < | 4.80E+01 | < | 5.90E+01 | < | 4.80E+01 |
| Zn-65 | < | 8.90E+01 | < | 1.50E+02 | < | 1.10E+02 |
| Zr-95 | < | 9.70E+01 | < | 1.40E+02 | < | 7.60E+01 |
| Ru-103 | < | 5.90E+01 | < | 8.30E+01 | < | 5.20E+01 |
| Ru-106 | < | 3.60E+02 | < | 5.40E+02 | < | 3.40E+02 |
| Cs-134 | < | 4.80E+01 | < | 5.80E+01 | < | 3.70E+01 |
| Cs-137 | < | 3.50E+01 | < | 6.40E+01 | < | 3.30E+01 |
| Ba-140 | < | 3.50E+02 | < | 4.20E+02 | < | 2.80E+02 |
| La-140 | < | 4.00E+02 | < | 4.80E+02 | < | 3.30E+02 |
| Ce-141 | < | 8.90E+01 | < | 1.30E+02 | < | 7.20E+01 |
| Ce-144 | < | 1.80E+02 | < | 2.70E+02 | < | 1.50E+02 |

| Nuclide | 1-JUN White Bass | | 1-JUN White Perch | | 7-OCT Catfish | |
|---------|------------------|-----------------------|-------------------|-----------------------|---------------|-----------------------|
| Sr-89 | < | 1.30E+02 | < | 2.80E+02 | < | 2.70E+02 |
| Sr-90 | < | 1.30E+02 | < | 1.70E+02 | < | 2.60E+02 |
| Be-7 | < | 6.70E+02 | < | 6.40E+02 | < | 7.30E+02 |
| K-40 | | 2.68E+03 +/- 4.40E+02 | | 2.59E+03 +/- 3.80E+02 | | 2.85E+03 +/- 3.60E+02 |
| Mn-54 | < | 4.40E+01 | < | 5.00E+01 | < | 6.40E+01 |
| Co-58 | < | 6.50E+01 | < | 6.60E+01 | < | 9.50E+01 |
| Fe-59 | < | 2.30E+02 | < | 1.90E+02 | < | 2.10E+02 |
| Co-60 | < | 5.10E+01 | < | 5.10E+01 | < | 6.00E+01 |
| Zn-65 | < | 1.60E+02 | < | 1.30E+02 | < | 1.80E+02 |
| Zr-95 | < | 1.20E+02 | < | 1.20E+02 | < | 1.20E+02 |
| Ru-103 | < | 8.10E+01 | < | 5.70E+01 | < | 1.80E+02 |
| Ru-106 | < | 5.00E+02 | < | 4.00E+02 | < | 5.40E+02 |
| Cs-134 | < | 5.10E+01 | < | 5.10E+01 | < | 5.50E+01 |
| Cs-137 | < | 2.60E+01 | < | 5.60E+01 | < | 4.60E+01 |
| Ba-140 | < | 2.70E+02 | < | 8.30E+01 | < | 2.40E+03 |
| La-140 | < | 3.10E+02 | < | 9.60E+01 | < | 2.70E+03 |
| Ce-141 | < | 1.10E+02 | < | 8.40E+01 | < | 2.60E+02 |
| Ce-144 | < | 2.20E+02 | < | 2.00E+02 | < | 2.50E+02 |

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**FERMI 2
FISH ANALYSIS**

**F-3 (Control)
(pCi/kg wet)**

| Nuclide | 7-OCT Drum | | | 7-OCT Walleye | | | 7-OCT White Bass | | |
|---------|------------|----------|--------------|---------------|----------|--------------|------------------|----------|--------------|
| Sr-89 | < | 2.60E+02 | | < | 2.30E+02 | | < | 2.80E+02 | |
| Sr-90 | < | 2.40E+02 | | < | 2.10E+02 | | < | 2.50E+02 | |
| Be-7 | < | 7.50E+02 | | < | 6.00E+02 | | < | 6.00E+02 | |
| K-40 | | 2.81E+03 | +/- 3.10E+02 | | 2.88E+03 | +/- 2.20E+02 | | 2.85E+03 | +/- 2.10E+02 |
| Mn-54 | < | 4.50E+01 | | < | 2.90E+01 | | < | 3.80E+01 | |
| Co-58 | < | 7.70E+01 | | < | 5.50E+01 | | < | 6.10E+01 | |
| Fe-59 | < | 2.60E+02 | | < | 1.70E+02 | | < | 2.20E+02 | |
| Co-60 | < | 4.80E+01 | | < | 3.00E+01 | | < | 3.50E+01 | |
| Zn-65 | < | 1.20E+02 | | < | 8.10E+01 | | < | 1.50E+02 | |
| Zr-95 | < | 1.40E+02 | | < | 1.10E+02 | | < | 1.20E+02 | |
| Ru-103 | < | 1.10E+02 | | < | 1.20E+02 | | < | 1.00E+02 | |
| Ru-106 | < | 3.90E+02 | | < | 3.00E+02 | | < | 3.50E+02 | |
| Cs-134 | < | 3.90E+01 | | < | 2.70E+01 | | < | 3.70E+01 | |
| Cs-137 | < | 3.50E+01 | | < | 2.50E+01 | | < | 3.60E+01 | |
| Ba-140 | < | 1.90E+03 | | < | 2.40E+03 | | < | 2.00E+03 | |
| La-140 | < | 2.20E+03 | | < | 2.80E+03 | | < | 2.30E+03 | |
| Ce-141 | < | 2.00E+02 | | < | 1.80E+02 | | < | 1.70E+02 | |
| Ce-144 | < | 2.20E+02 | | < | 1.60E+02 | | < | 1.70E+02 | |

Appendix D

Environmental Program Execution

Environmental Program Execution

On occasions, samples cannot be collected. This can be due to a variety of events, such as equipment malfunction, loss of electrical power, severe weather conditions, or vandalism. In 2005, missed samples were a result of missing two field TLDs and loss of electrical power or malfunction of air sampling equipment. The following sections list all missed samples, changes and corrective actions taken during 2005. These missed samples did not have a significant impact on the execution of the REMP.

Direct Radiation Monitoring

All TLDs are placed in the field in inconspicuous locations to minimize the loss of TLDs due to vandalism. During 2005, two hundred sixty-eight (268) TLDs were placed in the field for the REMP program and all but two TLDs were collected and processed. There were no changes to the Direct Radiation Monitoring program during 2005.

- T-56 was found missing during the third quarter collection and was replaced with the next quarter's TLD.
- T-30 was found missing during the second quarter collection and was replaced with the next quarter's TLD.

Atmospheric Monitoring

During 2005, two hundred sixty (260) air samples were placed in the field, all but three particulate filters and charcoal filters were collected and processed. There were no changes to the Atmospheric Monitoring program during 2005.

- API-1 filters collected on 8/2/2005 were not counted due to low volume as a result of a GFI circuit trip. For this reason, the third quarter composite sample for this location is considered to be less than representative.
- API-2 filters collected on 11/8/2005 were not counted due to low volume caused by loose fuse. The fuse was replaced and sampling equipment was restored to operation. For this reason, the fourth quarter composite sample for this location is considered to be less than representative.
- API-5 filters collected on 8/16/2005 were not counted due to low volume caused by a blown fuse. The fuse was replaced and sampling equipment was restored to operation. For this reason, the third quarter composite sample for this location is considered to be less than representative.

Terrestrial Monitoring

During 2005, all scheduled terrestrial monitoring samples were collected. There were no changes to the Terrestrial Monitoring program during 2005.

Milk Sampling

All scheduled milk samples were collected in 2005.

Garden Sampling

All scheduled garden samples were collected in 2005.

Groundwater Sampling

All scheduled groundwater samples were collected in 2005.

Aquatic Monitoring

During 2005, all scheduled aquatic monitoring samples were collected. There were no changes to the Aquatic Monitoring program during 2005.

Drinking Water Sampling

All scheduled drinking water samples were collected in 2005.

Surface Water Sampling

All scheduled surface water samples were collected in 2005.

Sediment Sampling

All scheduled sediment samples were collected in 2005.

Fish Sampling

All scheduled fish samples were collected in 2005.

Appendix E

Effluent and Radwaste Data

Regulatory Limits for Radioactive Effluents

The Nuclear Regulatory Commission (NRC) limits on liquid and gaseous effluents are incorporated into the Fermi 2 Offsite Dose Calculation Manual. These limits prescribe the maximum doses and dose rates due to radioactive effluents resulting from normal operation of Fermi 2. These limits are described in the following sections.

A. Gaseous Effluents

- I. Dose rate due to radioactivity released in gaseous effluents to areas at and beyond the site boundary shall be limited to the following:
 - a) Noble gases

Less than or equal to 500 mrem/year to the total body.
Less than or equal to 3000 mrem/year to the skin.
 - b) Iodine-131, iodine-133, tritium, and for all radionuclides in particulate form with half lives greater than 8 days

Less than or equal to 1500 mrem/year to any organ.
- II. Air dose due to noble gases to areas at and beyond the site boundary shall be limited to the following:
 - a) Less than or equal to 5 mrad for gamma radiation
Less than or equal to 10 mrad for beta radiation
- During any calendar quarter
 - b) Less than or equal to 10 mrad for gamma radiation
Less than or equal to 20 mrad for beta radiation
- During any calendar year
- III. Dose to a member of the public from iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half lives greater than 8 days in gaseous effluents released to areas at and beyond the site boundary shall be limited to the following:

- a) Less than or equal to 7.5 mrem to any organ
- During any calendar quarter

- b) Less than or equal to 15 mrem to any organ
- During any calendar year

Note: The calculated site boundary dose rates for Fermi 2 are based on identification of individual isotopes and on use of dose factors specific to each identified isotope or a highly conservative dose factor. Average energy values are not used in these calculations, and therefore need not be reported.

B. Liquid Effluents

- I. The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to ten times the concentrations specified in Title 10 of the Code of Federal Regulations (10 CFR) Part 20 (Standards for Protection Against Radiation), Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases, as required by the Fermi 2 Offsite Dose Calculation Manual. For dissolved or entrained noble gases, the concentration shall be limited to $2E-4$ (.0002) microcuries/ml total activity. This limit is based on the Xe-135 air submersion dose limit converted to an equivalent concentration in water as discussed in the International Commission on Radiological Protection (ICRP) Publication 2.

- II. The dose or dose commitment to a member of the public from radioactive materials in liquid effluents released to unrestricted areas shall be limited to the following:
 - a) Less than or equal to 1.5 mrem to the total body
Less than or equal to 5 mrem to any organ
- During any calendar quarter

 - b) Less than or equal to 3 mrem to the total body
Less than or equal to 10 mrem to any organ
- During any calendar year

Measurements and Approximations of Total Activity in Radioactive Effluents

As required by NRC Regulatory Guide 1.21, this section describes the methods used to measure the total radioactivity in effluent releases and to estimate the overall errors associated with these measurements. The effluent monitoring systems are described in Chapter 11.4 of the Fermi 2 Updated Final Safety Analysis Report (UFSAR).

A. Gaseous Effluents

I. Fission and Activation Gases

Samples are obtained from each of the six plant radiation monitors which continuously monitor the five ventilation exhaust points. The fission and activation gases are quantified by gamma spectroscopy analysis of periodic samples.

The summary values reported are the sums of all fission and activation gases quantified at all monitored release points.

II. Radioiodines

Samples are obtained from each of the six plant radiation monitors which continuously monitor the five ventilation exhaust points. The radioiodines are entrained on charcoal and then quantified by gamma spectroscopy analysis. For each sample, the duration of sampling and continuous flow rate through the charcoal are used in determining the concentration of radioiodines. From the flow rate of the ventilation system, a rate of release can be determined.

The summary values reported are the sums of all radioiodines quantified at all continuously monitored release points.

III. Particulates

Samples are obtained from each of the six plant effluent radiation monitors which continuously monitor the five ventilation exhaust points. The particulates are collected on a filter and then quantified by gamma spectroscopy analysis.

For each sample, the duration of sampling and continuous flow rate through the filter are used in determining the concentration of particulates. From the flow rate of the ventilation system, a rate of release can be determined.

Quarterly, the filters from each ventilation release point are composited and then radiochemically separated and analyzed for strontium (Sr)-89/90 using various analytical methods.

The summary values reported are the sums of all particulates quantified at all monitored release points.

IV. Tritium

Samples are obtained from each of the six plant effluent radiation monitors which continuously monitor the five ventilation exhaust points. The sample is passed through a bottle containing water and the tritium is "washed" out to the collecting water. Portions of the collecting water are analyzed for tritium using liquid scintillation counting techniques. For each sample, the duration of sample and sample flow rate is used to determine the concentration. From the flow rate of the ventilation system, a release rate can be determined.

The summary values reported are the sums of all tritium quantified at all monitored release points.

V. Gross Alpha

The gaseous particulate filters from the six plant effluent radiation monitors are stored for one week to allow for decay of naturally occurring alpha emitters. These filters are then analyzed for gross alpha radioactivity by gas proportional counting, and any such radioactivity found is assumed to be plant related. The quantity of alpha emitters released can then be determined from sample flow rate, sample duration, and stack flow rate.

The summary values reported are the sums of all alpha emitters quantified at all monitored release points.

B. Liquid Effluents

The liquid radwaste processing system and the liquid effluent monitoring system are described in the Fermi 2 UFSAR. Fermi 2 released no radioactive liquid effluents in 2005.

C. Statistical Measurement Uncertainties

The statistical uncertainty of the measurements in this section has been calculated and summarized in the following table:

| Measurement Type | Sample Type | One Sigma Uncertainty |
|------------------------------|-------------|-----------------------|
| Fission and Activation Gases | Gaseous | 30% |
| Radioiodines | Gaseous | 17% |
| Particulates | Gaseous | 16% |
| Tritium | Gaseous | 25% |
| Gross Alpha | Gaseous | 16% |

Gaseous Releases by Individual Nuclide

Values in the following tables which are preceded by the “less than” symbol represent the lower limit of detection (LLD) in units of microcuries per cubic centimeter ($\mu\text{Ci}/\text{cc}$) for individual samples, and indicate that the nuclide in question was not detected in gaseous effluent samples in the indicated quarter of 2005. For quantities of gross alpha radioactivity and tritium in gaseous effluents, see Tables 3 and 4 on page 13 of this report.

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A. Particulate Radionuclides (Curies)

| Nuclide | Quarter 1 | Quarter 2 | Quarter 3 | Quarter 4 |
|----------------|------------------|------------------|------------------|------------------|
| Cr-51 | 1.24E-05 | <4.0E-13 | <4.0E-13 | <4.0E-13 |
| Mn-54 | <5.4E-14 | 4.70E-05 | 2.57E-06 | 2.31E-06 |
| Co-58 | 2.03E-06 | 3.57E-05 | 3.76E-06 | <3.0E-14 |
| Co-60 | 1.77E-06 | 3.31E-05 | 5.76E-06 | 8.42E-06 |
| Zn-65 | <9.7E-14 | 4.77E-06 | <9.7E-14 | <9.7E-14 |
| Zn-69m | <4.4E-13 | 2.08E-05 | <4.4E-13 | <4.4E-13 |
| Tc-99m | <1.1E-12 | 1.09E-04 | <1.1E-12 | <1.1E-12 |
| Ba-139 | 1.20E-01 | 1.06E-01 | 1.04E-01 | 1.07E-01 |
| La-140 | 1.20E-04 | 2.31E-04 | 1.28E-04 | 1.96E-04 |
| Ba-140 | 4.14E-05 | 7.90E-05 | 6.57E-05 | 5.35E-05 |
| Y-91m | 9.66E-03 | 1.11E-02 | 1.35E-02 | 9.92E-03 |
| Sr-91 | 6.86E-04 | 7.79E-05 | 2.65E-04 | 6.04E-05 |
| Rb-89 | 1.19E-01 | 9.69E-02 | 7.89E-02 | 4.79E-02 |
| Cs-138 | 5.93E-02 | 5.98E-02 | 5.66E-02 | 6.76E-02 |
| As-76 | 3.01E-03 | 7.31E-03 | 2.69E-03 | 6.06E-03 |
| Br-82 | <4.7E-13 | 1.96E-05 | <4.7E-13 | 1.29E-05 |
| Sr-89 | 6.32E-05 | 6.03E-05 | 4.82E-05 | 5.21E-05 |
| Sr-90 | <1.5E-14 | <1.5E-14 | 1.21E-06 | <1.5E-14 |
| Cs-134 | <5.2E-14 | <5.2E-14 | <5.2E-14 | <5.2E-14 |
| Cs-137 | <8.4E-14 | <8.4E-14 | <8.4E-14 | <8.4E-14 |
| Ce-141 | <1.1E-13 | <1.1E-13 | <1.1E-13 | <1.1E-13 |
| Ce-143 | <4.6E-13 | <4.6E-13 | <4.6E-13 | <4.6E-13 |
| Ce-144 | <3.7E-13 | <3.7E-13 | <3.7E-13 | <3.7E-13 |
| Total | 3.12E-01 | 2.82E-01 | 2.56E-01 | 2.39E-01 |

B. Noble Gases

| Nuclide | Quarter 1 | Quarter 2 | Quarter 3 | Quarter 4 |
|----------------|--------------------|--------------------|--------------------|--------------------|
| Xe-133 | <8.9E-08 | <8.9E-08 | <8.9E-08 | <8.9E-08 |
| Xe-135 | <2.3E-08 | <2.3E-08 | <2.3E-08 | <2.3E-08 |
| Xe-135m | <2.2E-08 | <2.2E-08 | <2.2E-08 | <2.2E-08 |
| Xe-138 | <1.2E-07 | <1.2E-07 | <1.2E-07 | <1.2E-07 |
| Total | <2.5E-07 | <2.5E-07 | <2.5E-07 | <2.5E-07 |

C. Radioiodines (Curies)

| Nuclide | Quarter 1 | Quarter 2 | Quarter 3 | Quarter 4 |
|--------------|-----------------|-----------------|-----------------|-----------------|
| I-131 | 3.64E-04 | 4.83E-04 | 3.95E-04 | 4.42E-04 |
| I-132 | 2.69E-03 | 3.00E-03 | 2.68E-03 | 2.05E-03 |
| I-133 | 2.45E-03 | 3.40E-03 | 3.11E-03 | 3.24E-03 |
| I-134 | 8.06E-04 | 4.36E-03 | 3.47E-03 | 6.18E-04 |
| I-135 | 3.30E-03 | 4.31E-03 | 3.29E-03 | 1.66E-03 |
| Total | 9.61E-03 | 1.56E-02 | 1.29E-02 | 8.01E-03 |

Shipments of Radwaste

Fermi 2 complies with the extensive federal regulations which govern radioactive waste shipments. Radioactive solid waste shipments from the Fermi 2 site consist of waste generated during water treatment, radioactive trash, irradiated components, etc. Shipment destinations are either licensed burial sites or intermediate processing facilities. Waste shipped to intermediate processing facilities is shipped directly from these facilities to licensed burial sites after processing. The following tables contain estimates of major nuclide composition, by class of waste, of Fermi 2 solid radwaste received at the Barnwell, SC, burial facility or at the Envirocare, UT, facility in 2005.

- a. **Spent resins, sludges, etc.** Waste in this category in 2005 was Class A waste and consisted of spent resins and sludges. It was initially shipped in either High Integrity Containers or Polyethylene Liners, within shielded transportation casks, either directly to the Barnwell, SC, burial facility or to an intermediate processor. Waste sent directly to the Barnwell disposal facility was dewatered prior to shipment. Waste sent to the intermediate processor was processed by incineration, after which it was forwarded for disposal to the Envirocare, UT, facility or to the Barnwell Waste Management Facility. All quantities were determined by measurement.

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Class A Resin:

| Radionuclide | Activity (mCi) | Percent of Total Activity |
|--------------|----------------|---------------------------|
| Ag-110m | 1.81E+02 | 0.04 |
| Am-241 | 1.58E-02 | <0.01 |
| Ba-140 | 1.89E-01 | <0.01 |
| C-14 | 2.43E+03 | 0.53 |
| Ce-144 | 2.42E+01 | 0.01 |
| Cm-242 | 4.22E-03 | <0.01 |
| Cm-243 | 6.94E-02 | <0.01 |
| Cm-244 | 6.78E-02 | <0.01 |
| Co-58 | 5.85E+02 | 0.13 |
| Co-60 | 2.05E+05 | 44.4 |
| Cr-51 | 1.01E+02 | 0.02 |
| Cs-134 | 5.74E+00 | <0.01 |
| Cs-137 | 1.84E+03 | 0.4 |
| Fe-55 | 1.94E+05 | 41.93 |
| Fe-59 | 2.84E+01 | 0.01 |
| H-3 | 3.53E+02 | 0.08 |
| I-129 (LLD) | 6.05E-01 | NA |
| I-131 | 3.63E-02 | <0.01 |
| La-140 | 1.46E-01 | <0.01 |
| Mn-54 | 2.92E+04 | 6.33 |
| Nb-95 | 2.00E-01 | <0.01 |
| Ni-63 | 8.21E+03 | 1.78 |
| Pu-238 | 1.08E-01 | <0.01 |
| Pu-239 | 1.95E-02 | <0.01 |
| Pu-240 | 1.95E-02 | <0.01 |
| Pu-241 | 2.80E+00 | <0.01 |
| Sb-124 | 1.88E+00 | <0.01 |
| Sr-89 | 4.27E+01 | 0.01 |
| Sr-90 | 5.52E+01 | 0.01 |
| Tc-99 (LLD) | 3.00E-01 | NA |
| Zn-65 | 2.00E+04 | 4.34 |
| Zr-95 | 6.88E-02 | <0.01 |
| Total | 4.62E+05 | 100.0 |

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2. Class B Resin: None shipped

3. Class C Resin: None shipped

b. **Dry compressible waste, contaminated equipment, etc.** Waste in this category in 2005 was shipped in strong tight containers, and was classified as dry active waste (DAW). All waste in this category was Class A waste. The DAW was compacted or incinerated by an intermediate processor. After incineration, some of the residue from this waste was solidified in concrete. All quantities were determined by measurement.

| Radionuclide | Activity (mCi) | Percent of Total Activity |
|--------------|----------------|---------------------------|
| C-14 | 1.23E+02 | 16.88 |
| Co-58 | 2.50E+00 | 0.34 |
| Co-60 | 1.07E+02 | 14.78 |
| Cr-51 | 9.08E+00 | 1.25 |
| Cs-137 | 6.60E-02 | 0.01 |
| Fe-55 | 3.37E+02 | 46.29 |
| Fe-59 | 7.54E-01 | 0.10 |
| H-3 | 4.78E+01 | 6.57 |
| I-129 | 9.96E+00 | 1.37 |
| Mn-54 | 3.16E+01 | 4.35 |
| Ni-63 | 2.69E+00 | 0.37 |
| Sb-124 | 3.99E-02 | 0.01 |
| Tc-99 | 4.63E+01 | 6.37 |
| Zn-65 | 9.54E+00 | 1.31 |
| Total | 7.27E+02 | 100.0 |

c. **Irradiated components, control rods, etc.** No waste in this category was shipped.

d. **Other** No waste in this category was shipped to a disposal site.

Appendix F

Interlaboratory Comparison Data Framatome ANP Environmental Laboratory's Quality Assurance Programs

Interlaboratory Comparison Program for 2005

In an interlaboratory comparison program, participant laboratories receive from a commerce source, environmental samples of known activity concentration for analysis. After the samples have been analyzed by the laboratory, the manufacturer of the sample reports the known activity concentration of the samples to the laboratory. The laboratory compares its results to the reported concentrations to determine any significant deviations, investigates such deviations if found, and initiates corrective action if necessary. Participation in this program provides assurance that the contract laboratory is capable of meeting accepted criteria for radioactivity analysis.

Included in this Appendix are the Semi-Annual Status Reports covering the Framatome ANP Environmental Laboratory's Quality Assurance Programs for the first and second halves of 2005.



August 31, 2005
EL 097/05

TO: Distribution

FROM: J. M. Raimondi

SUBJECT: Framatome ANP Environmental Laboratory
Analytical Service Semi-Annual Quality Assurance Status Report
(January – June 2005)

Attached is the Semi-Annual Status Report covering the Framatome ANP Environmental Laboratory's (E-LAB) Quality Assurance Programs comprising radiological environmental, Part 50/61, and bioassay analytical services for the first half of 2005.

For the Radiological Environmental Monitoring Program (REMP):

- 99.5% of 552 individual QC analyses evaluated during this semi-annual period met E-LAB acceptance criteria for bias, while
- 100% of 317 QC analyses met the Laboratory QC acceptance criteria for precision.

To provide a perspective of the overall environmental quality program since its inception in 1977:

- 96.7% of the 17,751 environmental QC analyses processed in the past 28 years met acceptance criteria for bias, whereas,
- 99.4% of 15,580 QC samples evaluated for precision met Laboratory criteria for this performance category.

DOE program participation (MAPEP) resulted in 31 of 33 mean results evaluated as in "Agreement" with the acceptance criteria. DOE data is not included in the above values.

The Framatome ANP Environmental Laboratory (ID# 11823) maintained accreditation for six radiological analytes in the Potable water and Non-Potable water categories from the State of New York Department of Health under the National Environmental Laboratory Accreditation Program (NELAP). A total of 9 Proficiency Test results were all rated "Acceptable," this period.

For Part 50/Part 61 processing during the first half of 2005:

- 98.3% of the 119 Part 50/61 individual analyses evaluated for bias
- 100% of the 111 analyses evaluated for precision met E-LAB acceptance criteria.

To provide a perspective of the overall Part 50/61 sample quality program since 1988:

- 94.1% of the 4139 Part 50/61 QC analyses met the acceptance criteria for bias and
- 99.2% of the 3981 Part 50/61 QC samples met the Laboratory criteria for precision.

A handwritten signature in black ink, appearing to read 'J. M. Raimondi', is written over a horizontal line.

J. M. Raimondi
Manager, Environmental Laboratory

CAS/cas
ATTACHMENTS

Distribution

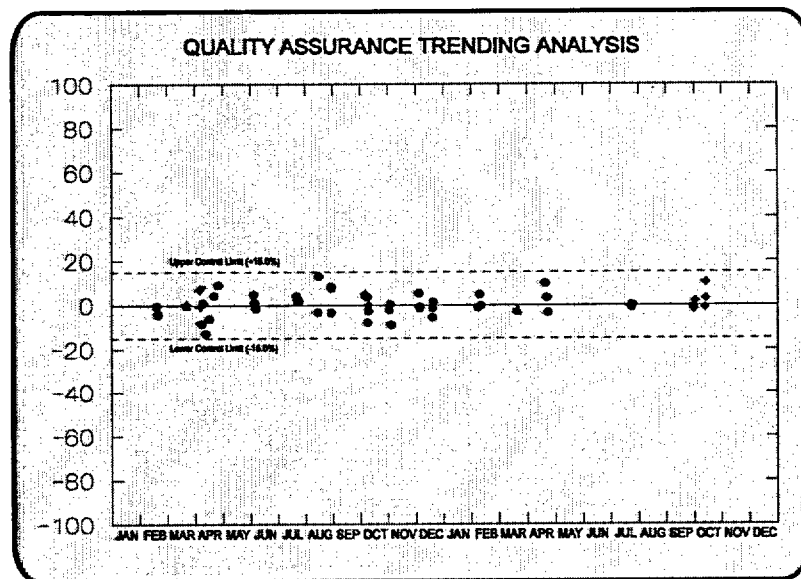
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SEMI-ANNUAL QUALITY ASSURANCE STATUS REPORT

January – June 2005



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**FRAMATOME ANP
ENVIRONMENTAL LABORATORY**

**ANALYTICAL SERVICES
SEMI-ANNUAL QUALITY ASSURANCE STATUS REPORT**

JANUARY-JUNE 2005

EL 097/05

Prepared By: *C. Plettin* Date: *8/5/2005*

Reviewed By: *A. Banawal* Date: *8/31/05*

Approved By: *J. M. Rainli* Date: *9/10/05*

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ATTACHMENT 1

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I. INTRODUCTION

This report covers the Quality Assurance (QA) Program for the Analytical Services function of the Framatome ANP Environmental Laboratory (E-LAB) for the first half (January-June) of 2005. Due to the broad scope of QC inter-comparison programs in which the E-LAB participates, the report consolidates wherever possible, text and results into three service categories: Radiological Environmental Monitoring, Part 50/61, and Bioassay.

This report includes:

- intralaboratory QC results analyzed during the reporting period,
- interlaboratory QC results, analyzed prior to the reporting period, for which "known values" were not previously available, and
- interlaboratory QC results, analyzed during the reporting period, for which "known values" were available.

Any other inter-laboratory QC results will be included in the next semi-annual report.

Manual 100, Revision 8 (Reference 1) became effective on September 10, 2004. The text of this report reflects the latest revision of this manual, as do the trending graphs and any data evaluations performed after the September 10, 2004 date. Any data evaluations performed prior to September 10th, however, were conducted in accordance with Manual 100, Revision 7.

A. Quality Control Program Scope

1. Inter-laboratory and Third Party

The Framatome ANP Environmental Laboratory QC Program is designed to monitor the quality of analytical processing associated with environmental, bioassay, effluent (10CFR Part 50), and waste (10CFR Part 61) sample analysis.

Inter-laboratory and third party quality control programs for environmental radioanalyses include: the Environmental Crosscheck Program, administered by Analytix, Inc., the National Institute of Standards and Technology (NIST) Measurement Assurance Program (MAP), the Environmental Resource Associates (ERA) Proficiency Test (PT) Program, the Department of Energy (DOE) Quality Assessment Program (QAP), and the Mixed Analyte performance Evaluation Program (MAPEP).

The QAP program administered by the (DOE) Environmental Measurements Laboratory (EML) was suspended by the Department of Homeland Security early in 2004. The MAPEP program is administered by the Radiological and Environmental Sciences Laboratory (RESL) and consists of four media (water, vegetation, soil, and air filters) submitted twice each year. The MAPEP samples are designed to evaluate the ability and quality of analytical facilities performing sample measurements

that contain hazardous and radioactive (mixed) analytes. The ERA PT program consists of radionuclides in water submitted twice per year. This program is used to maintain certification with the National Environmental Laboratory Accreditation Program (NELAP). The certification is necessary to perform analysis for projects that must meet EPA regulations for the Clean Water Act (CWA), Resource Conservation & Recovery Act (RCRA), or the Safe Drinking Water Act (SDWA).

Inter-laboratory and third party quality control for Part 50/61 radioanalyses, is provided by the Radiochemistry Crosscheck Program, administered by Analytics, Inc. and the NIST MAP.

2. Intra-laboratory

The internal Quality Control program is designed to include QC functions such as instrumentation checks (to insure proper instrument response), blank samples (to which no analyte radioactivity has been added), instrumentation backgrounds, duplicates, as well as overall staff qualification analyses and process controls. Both process control and qualification analyses samples seek to mimic the media type of those samples submitted for analysis by the various laboratory clients. These process controls (or process checks) are either actual samples submitted in duplicate in order to evaluate the precision of laboratory measurements, or blank samples which have been "spiked" with a known quantity of a radioisotope that is of interest to Laboratory clients. These QC samples, which represent either "single" or "double blind" unknowns, are intended to evaluate the entire radiochemical and radiometric process.

To provide a sense of direction and consistency in administering the quality control program, E-LAB has developed and follows an annual quality control and audit assessment schedule (Reference 2). The plan, which is approved on or before January 15th of each year and reviewed for adequacy at monthly LQARC meetings, describes the scheduled frequency and scope of Quality Assurance and Control actions considered necessary for an adequate program. The magnitude of the process control program combines both internal and external sources targeted at 5% of the routine sample analysis load.

B. Quality Assurance Program (Internal and External Audits)

During each semi-annual reporting period at least one internal assessment is conducted in accordance with the pre-established E-LAB Quality Control and Audit Assessment Schedule. In addition, the Laboratory may be audited by prospective customers during a pre-contract audit, and/or by existing clients who wish to conduct periodic audits in accordance with their contractual arrangements. A National Environmental Laboratory Accreditation Program (NELAP) audit is performed every two years as part of maintaining certification to perform EPA-related analyses.

II. PERFORMANCE EVALUATION CRITERIA

A. Acceptance Criteria

E-LAB has adopted a QC acceptance protocol based upon two performance models:

- For those inter-laboratory programs that already have established performance criteria (i.e., DOE MAPEP, ERA, and TRIP), the Laboratory will utilize the criteria for the specific program.
- For inter-laboratory or third party QC programs that have no preset acceptance criteria (e.g. the Analytics Crosscheck Programs, NIST MAP), results will be evaluated in accordance with E-LAB internal acceptance criteria.

1. Internal Process Control Samples

Internal Process Control (PC) results are evaluated in accordance with two separate E-LAB acceptance criteria. A full discussion of the analytical services acceptance criteria can be found in Reference 1. The first criterion concerns bias, which is defined as the deviation of any one result from the known value. The second criterion concerns precision, which deals with the ability of the measurement to be faithfully replicated by comparison of an individual result with the mean of all results for a given sample set. Quality control deviations falling outside the Laboratory acceptance criteria are discussed in the appendices.

(a) Bias

For each analytical measurement tested, the bias is the percent deviation of the reported result relative to the expected value (value of the spike known by comparison with or derivation from a standard reference material). The percent deviation relative to the known is calculated as follows:

$$\frac{(H'_i - H_i)}{H_i} 100$$

where:

H'_i = the value of the i^{th} measurement in a category being tested

H_i = the actual quantity in the test sample as defined by the spike

The Laboratory internal criterion for bias is that an analysis is considered in agreement if the value is within $\pm 15\%$ of the known value. If this condition is not met, the two-sigma range about the analyzed value is established. If the known value falls within the specified range, the analysis is considered in agreement.

Deviations from this general criterion, for specific radionuclides, are given in Tables 1 and 13 and Reference 1.

E-LAB acceptance criteria are applied when the sample concentration is 10 or more times the method MDC. Otherwise, the "known value" and associated uncertainty are compared to the measured result and uncertainty using a two-tailed standard statistical test at the 95% confidence level.

(b) Precision

For a group of test measurements containing a given spiked level, the precision is the percent deviation of individual results relative to the mean reported measurement. At least two values are required for the determination of precision. The percent deviation relative to the mean reported measurement is calculated as follows:

$$\left(\frac{H_i' - \bar{H}}{\bar{H}} \right) 100$$

where:

H_i' = the reported measurement for the *i*th analytical measurement

\bar{H} = the mean analytical measurement

$$\bar{H} = \sum H_i' \left(\frac{1}{n} \right)$$

n = the number of samples in the test group

The Laboratory criterion for precision is that an analysis is considered in agreement if the individual value is within $\pm 15\%$ of the mean value. If this condition is not met, the two-sigma range about the analyzed value is established. If the mean value falls within the specified range, the analysis is considered in agreement. In the case of duplicate or replicate analyses where there is no "known" value, the two-sigma range is established for each duplicate analysis (three-sigma range for replicates) for each analysis. If the ranges overlap, the analyses are considered in agreement for precision.

Deviations from this general criterion, for specific radionuclides, are given in Tables 1 and 13 and Reference 1.

(c) Mean Bias

For each group of analytical measurements tested, the mean bias is the percent deviation of the mean reported result relative to the expected value. The mean percent deviation relative to the expected value is calculated as follows:

$$\left(\left(\frac{(\bar{H} - H_i)}{H_i} \right) 100 \right)$$

where:

\bar{H} = the mean analytical measurement

H_i = the actual quantity in the test sample as defined by the spike

2. Backgrounds

As discussed in Reference 1, backgrounds represent the ambient signal response, recorded by measuring instruments, which is independent of radioactivity contributed by the radionuclides being measured in the sample. Backgrounds will not normally contain any three-sigma statistically positive activity of the target parameters. The background signal is subtracted from the sample's signal.

3. Blanks

Wherever possible equivalent media for preparing laboratory processing blanks will be used. Synthetic matrices may be used for bioassay if equivalency is proven.

4. NRC Resolution Criteria

Some Laboratory clients use the NRC Resolution Criteria to evaluate double blind Part 50 performance. NRC Resolution Criteria are based on an empirical relationship that combines prior experience and the accuracy needs of the program. As "Resolution" increases, the acceptability of one's measurement becomes more selective. Conversely, as "Resolution" decreases, agreement levels are widened to account for the increase in uncertainty.

5. DOE Evaluation Criteria

The Radiological & Environmental Sciences Laboratory (RESL) inter-comparison program, MAPEP defines three levels of performance: Acceptable (flag = "A"), Acceptable with Warning (flag = "W"), and Not Acceptable (flag = "N"). Performance is considered acceptable for a mean with a bias $\leq 20\%$ of the reference value for the analyte. Performance is acceptable with warning for a mean result bias of $>20\%$ but $\leq 30\%$ of the reference value. If the bias is greater than 30% the

results are deemed not acceptable.

6. ANSI 13.30 Relative Bias Criteria for Bioassay

The relative bias statistic is defined for the i th measurement in a category with respect to the expected value (value of the spike known by comparison with or derivation from a standard reference material) is defined as:

$$B_{ri} = \frac{(A_i - A_{ai})}{A_{ai}}$$

Where:

A_i = the value of the i th measurement in a category being tested

A_{ai} = the actual quantity in the test sample, as defined by the spike

In order to avoid the expense of a large number of replicates at each radioactivity level in each category, the relative bias B_r is calculated from the individual relative biases B_{ri} and defined as

$$B_r = \sum_{i=1}^N \left(\frac{B_{ri}}{N} \right)$$

Where: N is the number of test samples measured by an individual service laboratory in a given test category.

For testing purposes B_r shall be within -0.25 to +0.50

B. QC Investigation Criteria and Result Reporting

1. QC Investigation Criteria

Summarized below are the investigation criteria applied to QC analyses that failed E-LAB bias criteria. The Condition Report process tracks investigation results.

- (a) No investigation is necessary when an individual QC result falls outside the QC performance criteria for bias.
- (b) Investigations shall be initiated when the mean of a QC process batch or the mean of three consecutive individual QC processes is outside the performance criterion for bias.
- (c) An investigation shall be initiated when the trending of at least 12 consecutive results for a given process indicates that the mean bias from the known is greater than 60% of the bias performance criterion.

2. Reporting of Analytical Results to Laboratory Customers

A similar set of guidelines was developed, applicable to reporting of results. The guidelines are as follows:

If an investigation is required for a process (normally after consecutive QC process check failures), and if the QC results requiring the investigation have a mean bias from the known of greater than \pm (applicable E-LAB bias criterion +5%) for environmental and bioassay processing and \pm (applicable E-LAB bias criterion +10%) for Part 50/61 processing, then the LQARC shall meet to determine the disposition of client results.

3. Self-Assessment Program

In accordance with Reference 1, E-LAB has established a Self-Assessment policy where all Laboratory staff members are strongly encouraged to continually evaluate laboratory activities for quality enhancements, cost savings, and time savings.

III. ANALYTICAL SERVICES QUALITY CONTROL SYNOPSIS

A. Result Summary

Two-year (2004-2005) trending graphs are provided in Appendices A-C of this report to give temporal perspective regarding possible trends or bias. In the event an analysis does not meet E-LAB performance criteria, the individual analysis sheet(s), in addition to a brief explanation, are included to augment the graph. It should be noted that DOE and ERA samples are evaluated against criteria specific to the DOE samples. Therefore, only sample results which fell in the "Warning" or Non-Agreement" categories will be addressed in the Appendices. If any questions arise regarding previous analyses, please refer to the semi-annual status report corresponding to the sample analysis date. In all cases an analysis sheet is available for each individual analysis to back-up the data presented on the graph.

1. Radiological Environmental Services Quality Control

During this semi-annual reporting period, thirty-two nuclides associated with media types were analyzed by means of the Laboratory's internal process control, DOE, NIST, ERA and Analytics quality control programs. Media types representative of client company analyses performed during this reporting period were selected. Presented below is a synopsis of the media types evaluated.

Air Filter
Charcoal (Air Iodine)
Milk

Sediment/soil
Vegetation
Water

(a) Analytics Environmental Cross Check Program

During this semi-annual period the Analytics Cross Check Program provided 169 individual environmental analyses for bias and 169 for precision evaluation (Table 1). Of the 169 analyses evaluated for bias, 98.2% (166/169) of all results fell within E-LAB acceptance criteria. Of the 169 analyses evaluated for precision, 100% (169/169) came within E-LAB tolerance limits. Appendix A graphically summarizes the results by two-year trending graphs.

Table 2 provides a report of the Laboratory's participation in the Analytics' cross check program for the fourth quarter of 2004 and first quarter of 2005. Using the Laboratory's internal acceptance criteria as the basis of evaluation, 55 of 57 of mean results came within agreement criteria. The two failures, gross alpha on an air filter and Fe-59 on an air filter, are discussed in Table 22 as CR 05-10 and CR 05-11, respectively.

(b) National Institute of Standards and Technology (NIST) Measurement Assurance Program (MAP)

The E-LAB has been a participant in the Nuclear Energy Institute (NEI)/National Institute of Standards and Technology (NIST) Measurements Assurance Program since June of 1987. Continued participation is documented by dated Reports of Traceability issued for particular radionuclides, which indicate the deviation of the participant's reported value for a given measurement technique from that measured and certified by the NIST.

During this reporting period there were five NIST MAP samples consisting of a total of 9 radionuclides and 53 measurements performed. Detailed information on Environmental NIST MAP data is provided in Tables 3 and 4. All of the 53 measurements met the E-LAB acceptance criteria and 6 of 18 mean results met the administrative limit of $\pm 5\%$ for traceability.

(c) Summary of Participation in the Department of Energy (DOE) Monitoring Programs

The EML has suspended the DOEQAP program (Table 5) as of early 2004.

During this semi-annual reporting period, a combination of four different media types and fifteen different nuclides were analyzed by means of the DOE Mixed Analyte Performance Evaluation Program (MAPEP, Table 6). Of the thirty-three mean analyses evaluated, all but two were in "Agreement." Two results, Am-241 in vegetation and Ni-63 in water, were rated as "Warning." See Table 22 for more detail on the results.

(d) Environmental Resource Associates (ERA) Proficiency Test (PT)

Program

During this semi-annual period, a total of 9 mean results (n=3) were evaluated by ERA. Using the evaluation criteria set by NELAP, 100% (9/9) of the radionuclides were in "Agreement." Appendix A graphically summarized the results by two-year trending graphs. Table 7 provides a report of the Laboratory's participation in the PT program.

The Framatome ANP Environmental Laboratory (Lab ID# 11823) maintained NELAP accreditation from the New York State Department of Health through the Environmental Laboratory Approval Program for the following methods for both potable and non-potable waters:

Gross Alpha, Method EPA 900.0
Gross Beta, Method EPA 900.0
Iodine-131, Method ASTM D4785-88
Photon Emitters, Method EPA 901.1
Radioactive Cesium, Method EPA 901.1
Tritium, Method EPA 906.0

(e) Intra-Laboratory Process Control Program

The Environmental Laboratory internal process control program evaluated 337 individual analyses for bias and 103 analyses for precision. Trending graphs associated with the performance results for this program are given in Appendix A, and the results are summarized in Table 8.

Of the 337 internal process control analyses evaluated for bias, 100% met Laboratory acceptance criteria. Also, 100% of the 103 results for precision were found to be acceptable.

Table 9 lists QC samples used to qualitatively screen calibrated geometry air charcoals for activity above the Minimum Detectable Concentration (MDC). All 69 QC charcoals evaluated during this semi-annual period reported positive activity as expected. The bias data for each individual measurement is presented in Table 9.

(f) Analytical Blanks

During this semi-annual reporting period, none of the 127 environmental analytical blanks analyzed reported positive activity, greater than three (3) times the standard deviation.

(g) Blind Duplicate Results

Blind duplicate results for 2005 are presented in Attachment 1. Based upon the summary evaluation, 99.5% of all paired

measurements met the acceptance criteria. This data is not included in the summary tables (Tables 10-12).

(h) Overall Data Summary for the Reporting Period January-June 2005

The compilation of intra- and inter-laboratory comparison data by analyzed matrix for this reporting period is summarized in Table 10. Table 11 presents the same data grouped according to analysis type. In either case, the cumulative bias for the three programs evaluated to internal E-LAB performance criteria shows 99.5% of the 552 individual results were observed to fall within the E-LAB bias acceptance criteria, while 100% of the 317 analyses passed the acceptance criteria for precision.

(i) Summary of Environmental Quality Control Results by Year

The historical summary of the E-LAB process control program performance for the environmental monitoring function is provided in Table 12. For the first half of 2005, 99.5% of the analyses fell within the E-LAB acceptance criteria for bias as compared to a historical percentage of 96.7. Similarly, 100% of the analyses evaluated for precision met the E-LAB acceptance criteria as compared to 99.4% of analyses for the 28-year operating history.

2. Part 50/61 Quality Control

During this semi-annual reporting period, eighteen nuclides were analyzed by means of the Laboratory's internal process control, National Institute for Standards and Technology Measurement Assurance Program (NIST MAP) measurements of Part 50/61 radionuclides, and the Analytics Radiochemistry Crosscheck Program.

(a) Analytics Radiochemistry Cross Check Program

During this semi-annual period the Analytics Cross Check Program provided 9 individual analyses to be evaluated for bias and precision (Table 13). Of the 9 analyses, 100% fell within the E-LAB acceptance criteria for bias and 100% for precision. Appendix B graphically summarizes the results by two-year trending graphs.

Table 14 provides a report of the Laboratory's participation in the Analytics' cross check program for the first half of 2005. Using the Laboratory's internal acceptance criteria as the basis of evaluation, all 3 results passed the agreement criteria. The second quarter data was submitted for evaluation but results have not yet been received.

(b) NIST Measurement Assurance Program (MAP)

There were 48 NIST MAP process control analyses evaluated for both bias and precision during the first half of 2005 in the Part 50/61 area. Of these, 100% (48/48) met the E-LAB acceptance criteria for bias and for precision (Table 15).

Table 16 summarizes the percent deviation of the E-LAB's mean measurements from the NIST reported known values for each source standard. Of the 18 mean results evaluated, all 18 were within E-LAB performance criteria for bias and precision. Six of the eighteen mean measurements met the target traceability criteria of $\pm 5\%$.

(c) Intra-Laboratory Process Check Program

There were 62 internal Laboratory QC process control analyses evaluated for bias and 54 for precision during the first half of 2005 in the Part 50/61 area. Of these, 96.8% (60/62) met the E-LAB acceptance criteria for bias. A total of 100% (54/54) Part 50/61 process control samples met E-LAB acceptance criteria for precision (Table 17).

(d) Analytical Blanks

During this semi-annual reporting period, one of the 257 Part 50/61 analytical blanks analyzed reported positive activity greater than three (3) times the standard deviation. The single failure was for a Ni-63 blank. All of the client samples analyzed in this batch were reprocessed with a new blank.

(e) Overall Data Summary for the Reporting Period January-June 2005

The compilation of intra- and inter-laboratory comparison data by analyzed matrix for this reporting period is summarized in Table 18. The cumulative bias shows 98.3% (117/119) of the individual results fell within E-LAB acceptance criteria for bias. A total of 100% (111/111) of the results met Laboratory precision criteria.

(f) Summary of Part 50/61 Quality Control Results by Year

The historical E-LAB summary of process control performance for the Part 50/61 monitoring program is provided in Table 19. For the first half of 2005, 98.3% of the QC analyses fell within E-LAB acceptance criteria for bias as compared to the seventeen year historical percentage of 94.1. For precision, 100% of the results met the precision acceptance criteria as compared to 99.2% historically.

3. Bioassay Quality Control

There were no bioassay QC analyses performed during this semi-annual period as indicated in Table 20.

For the past several years, the E-LAB has participated in the Lawrence Livermore National Laboratory (LLNL) Thyroid Radioiodine Intercomparison Project (TRIP). This program allows laboratories and facilities to self-assess their performance for *in-vivo* measurements of radioiodine isotopes in the thyroid. The LLNL established the intercomparison project to provide participating facilities with an independent means of evaluating their thyroid radio-iodine measurement using the IAEA/ANSI thyroid calibration neck phantom and well characterized NIST-traceable isotopes for I-125 and I-131. As shown in Table 21, the TRIP 1204 test was successfully completed in the first half of 2005.

B. Status of Condition Reports (CR)

Table 22 provides a synopsis of CR activity for sample processing during the first half of 2005. Thirteen items were closed while fourteen were opened during this reporting period. A total of four CRs remain open, one of which is older than 6 months due to supplier problems.

C. Status of Audits/Assessments

1. Internal

QA Assessment 05-01, "E-LAB Annual Management Review"

The NELAP-required annual review of 2004 activities was conducted. The review included policies/procedures, audits, corrective actions, customer feedback, interlaboratory comparisons, and training. No findings were issued as a result of the annual review.

QA Assessment 05-02, "REMP Processing"

The assessment was conducted to verify that processing controls for REMP samples are being effectively implemented by the personnel responsible. Personnel observed processing samples are qualified to perform their activities. They were found to be knowledgeable of the processing rules and client-specific considerations. Equipment used in the processing/analyses was calibrated and QC checked as required by the QA program. Improvement in laboratory cleanliness and I-131(LL) processing was observed.

2. External

There were no external audits conducted during this semi-annual period.

IV. UPDATED PROCEDURES ISSUED DURING JANUARY-JUNE 2005

A list of Analytical Services Section procedures, which were updated during this semi-annual period, is included in Table 23.

V. REFERENCES

1. Framatome ANP Environmental Laboratory Manual 100 "Laboratory Quality Assurance Plan", Revision 8, September 10, 2004.
2. Framatome ANP Environmental Laboratory 2005 Quality Control and Audit Assessment Schedule.

TABLE 1

**ANALYTICS ENVIRONMENTAL CROSSCHECK PROGRAM RESULTS BY
FRAMATOME ANP ENVIRONMENTAL LABORATORY
ACCEPTANCE CRITERIA, MEDIA, AND MEASUREMENT CATEGORIES
JANUARY-JUNE 2005**

| | Bias Criteria (1) | | | | Precision Criteria (2) | | | |
|---------------------------------------|-------------------|-------------|-------------|------------|------------------------|------------|------------|------------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Air Particulate | | | | | | | | |
| Alpha | 1 | 2 | 1 | 2 | 6 | 0 | 0 | 0 |
| Beta | 3 | 3 | 0 | 0 | 6 | 0 | 0 | 0 |
| Gamma | 10 | 8 | 8 | 1 | 27 | 0 | 0 | 0 |
| Sr-89 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 |
| Sr-90 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 |
| II. Milk | | | | | | | | |
| Gamma | 47 | 12 | 1 | 0 | 55 | 3 | 2 | 0 |
| Iodine (LL) | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Sr-89 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 |
| Sr-90 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 |
| III. Water | | | | | | | | |
| Alpha | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 |
| Beta | 2 | 1 | 0 | 0 | 2 | 1 | 0 | 0 |
| Gamma | 18 | 11 | 1 | 0 | 28 | 2 | 0 | 0 |
| H-3 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Iodine (LL) | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Sr-89 | 2 | 2 | 2 | 0 | 6 | 0 | 0 | 0 |
| Sr-90 | 1 | 2 | 3 | 0 | 2 | 2 | 2 | 0 |
| Total Number in Range: | 99 | 45 | 22 | 3 | 157 | 8 | 4 | 0 |
| Percentage of Total Processed: | 58.6 | 26.6 | 13.0 | 1.8 | 92.9 | 4.7 | 2.4 | 0.0 |
| Sum of Analyses: | 169 | | | | 169 | | | |

(1) Percent Bias by Deviation Category as noted in Table 1, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 1, Footnote (2)

* Total may not equal 100 due to rounding

TABLE 1

ENVIRONMENTAL PROCESS CONTROL ANALYSIS RESULTS BY
FRAMATOME ANP ENVIRONMENTAL LABORATORY
ACCEPTANCE CRITERIA, MEDIA AND MEASUREMENT CATEGORIES
JANUARY-JUNE 2005
(Continued)

(1) Percent Bias by Deviation Category

1 = >0 and ≤ 5

2 = >5 and ≤ 10

3 = >10 and ≤ 15 (or within 2 sigma of known, see Reference 1)

For Gross Alpha and Beta
In water

3 = >10 and ≤ 25 (or within 2 sigma of known)

For Sr-89/90 mixtures

3 = >10 and ≤ 25 (or within 2 sigma of known)

For Alpha Spectrometry*,

3 = >10 and ≤ 20 (or within 2 sigma of known)

For Uranium-Total, Pu-241,
Zn-65 on an air filter

3 = >10 and ≤ 20 (or within 2 sigma of known)

4 = Outside criteria

(2) Percent Precision by Deviation Category

1 = >0 and ≤ 5

2 = >5 and ≤ 10

3 = >10 and ≤ 15 (or within 2 sigma of mean, see Reference 1). Exceptions as above.

4 = Outside criteria

* Isotopic Uranium (U-234, 235, 238)
Isotopic Thorium (Th-230, 232)
Np-237
Am-241/Cm-242, 243/244
Pu-alpha (Pu-238, 239, 240)
Ra-226

** Total may not equal 100 due to rounding.

TABLE 2

FRAMATOME ANP ENVIRONMENTAL LABORATORY
ANALYTICS ENVIRONMENTAL CROSS CHECK PROGRAM
PERFORMANCE EVALUATION

| Sample Number | Quarter/ Year | Sample Media | Nuclide | Units | Reported Value | Known Value | Ratio E-LAB/ Analytics | Evaluation |
|---------------|---------------|--------------|-------------|-------|----------------|-------------|------------------------|---------------|
| E4380-162 | 4th/2004 | Water | H-3 | pCi/L | 8327 | 8060 | 1.03 | Agreement |
| E4381-162 | 4th/2004 | Filter | Sr-89 | pCi | 87.7 | 92.3 | 0.95 | Agreement |
| E4381-162 | 4th/2004 | Filter | Sr-90 | pCi | 8.78 | 10.6 | 0.83 | Agreement |
| E4382-162 | 4th/2004 | Filter | Gross Alpha | pCi | 24.9 | 29.5 | 0.84 | Non-Agreement |
| E4382-162 | 4th/2004 | Filter | Gross Beta | pCi | 223 | 204 | 1.09 | Agreement |
| E4383-162 | 4th/2004 | Filter | Ce-141 | pCi | 75.6 | 80.3 | 0.94 | Agreement |
| E4383-162 | 4th/2004 | Filter | Cr-51 | pCi | 201 | 189 | 1.06 | Agreement |
| E4383-162 | 4th/2004 | Filter | Cs-134 | pCi | 82.4 | 84.7 | 0.97 | Agreement |
| E4383-162 | 4th/2004 | Filter | Cs-137 | pCi | 68.8 | 62.9 | 1.09 | Agreement |
| E4383-162 | 4th/2004 | Filter | Co-58 | pCi | 75.3 | 72.9 | 1.03 | Agreement |
| E4383-162 | 4th/2004 | Filter | Mn-54 | pCi | 76.3 | 67.7 | 1.13 | Agreement |
| E4383-162 | 4th/2004 | Filter | Fe-59 | pCi | 69.8 | 60.5 | 1.15 | Non-Agreement |
| E4383-162 | 4th/2004 | Filter | Zn-65 | pCi | 109 | 97.7 | 1.12 | Agreement |
| E4383-162 | 4th/2004 | Filter | Co-60 | pCi | 85.1 | 87.1 | 0.98 | Agreement |
| E4384-162 | 4th/2004 | Milk | I-131LL | pCi/L | 64.2 | 66.7 | 0.96 | Agreement |
| E4384-162 | 4th/2004 | Milk | I-131 | pCi/L | 69.0 | 66.7 | 1.03 | Agreement |
| E4384-162 | 4th/2004 | Milk | Ce-141 | pCi/L | 154 | 155 | 0.99 | Agreement |
| E4384-162 | 4th/2004 | Milk | Cr-51 | pCi/L | 385 | 379 | 1.02 | Agreement |
| E4384-162 | 4th/2004 | Milk | Cs-134 | pCi/L | 167 | 170 | 0.98 | Agreement |
| E4384-162 | 4th/2004 | Milk | Cs-137 | pCi/L | 132 | 126 | 1.05 | Agreement |
| E4384-162 | 4th/2004 | Milk | Co-58 | pCi/L | 147 | 146 | 1.01 | Agreement |
| E4384-162 | 4th/2004 | Milk | Mn-54 | pCi/L | 144 | 136 | 1.06 | Agreement |
| E4384-162 | 4th/2004 | Milk | Fe-59 | pCi/L | 129 | 121 | 1.07 | Agreement |
| E4384-162 | 4th/2004 | Milk | Zn-65 | pCi/L | 197 | 196 | 1.01 | Agreement |
| E4383-162 | 4th/2004 | Milk | Co-60 | pCi/L | 177 | 175 | 1.01 | Agreement |
| E4412-162 | 4th/2004 | Water | Sr-89 | pCi/L | 90.9 | 98.1 | 0.93 | Agreement |
| E4412-162 | 4th/2004 | Water | Sr-90 | pCi/L | 9.33 | 11.3 | 0.83 | Agreement |

TABLE 2
(Continued)
FRAMATOME ANP ENVIRONMENTAL LABORATORY
ANALYTICS RADIOLOGICAL ENVIRONMENTAL CROSS-CHECK
PERFORMANCE EVALUATION

| Sample Number | Quarter/ Year | Sample Media | Nuclide | Units | Reported Value | Known Value | Ratio E-LAB/ Analytics | Evaluation |
|---------------|---------------|--------------|-------------|-------|----------------|-------------|------------------------|------------|
| E4459-162 | 1st/2005 | Water | Gross Alpha | pCi/L | 39.9 | 40.8 | 0.98 | Agreement |
| E4459-162 | 1st/2005 | Water | Gross Beta | pCi/L | 279 | 292 | 0.96 | Agreement |
| E4460-162 | 1st/2005 | Water | I-131LL | pCi/L | 66.2 | 65.9 | 1.00 | Agreement |
| E4460-162 | 1st/2005 | Water | I-131 | pCi/L | 69.3 | 65.9 | 1.05 | Agreement |
| E4460-162 | 1st/2005 | Water | Ce-141 | pCi/L | 219 | 221 | 0.99 | Agreement |
| E4460-162 | 1st/2005 | Water | Cr-51 | pCi/L | 346 | 322 | 1.07 | Agreement |
| E4460-162 | 1st/2005 | Water | Cs-134 | pCi/L | 130 | 134 | 0.97 | Agreement |
| E4460-162 | 1st/2005 | Water | Cs-137 | pCi/L | 127 | 125 | 1.01 | Agreement |
| E4460-162 | 1st/2005 | Water | Co-58 | pCi/L | 108 | 111 | 0.97 | Agreement |
| E4460-162 | 1st/2005 | Water | Mn-54 | pCi/L | 160 | 154 | 1.04 | Agreement |
| E4460-162 | 1st/2005 | Water | Fe-59 | pCi/L | 114 | 107 | 1.07 | Agreement |
| E4460-162 | 1st/2005 | Water | Zn-65 | pCi/L | 192 | 1991 | 1.01 | Agreement |
| E4460-162 | 1st/2005 | Water | Co-60 | pCi/L | 138 | 139 | 1.00 | Agreement |
| E4461-162 | 1st/2005 | Water | Sr-89 | pCi/L | 94.6 | 103 | 0.92 | Agreement |
| E4461-162 | 1st/2005 | Water | Sr-90 | pCi/L | 15.6 | 17.2 | 0.90 | Agreement |
| E4462-162 | 1st/2005 | Filter | Gross Alpha | pCi | 20.8 | 21.9 | 0.95 | Agreement |
| E4462-162 | 1st/2005 | Filter | Gross Beta | pCi | 162 | 157 | 1.04 | Agreement |
| E4463-162 | 1st/2005 | Milk | I-131LL | pCi/L | 91.2 | 92.3 | 0.99 | Agreement |
| E4463-162 | 1st/2005 | Milk | I-131 | pCi/L | 95.9 | 92.3 | 1.04 | Agreement |
| E4463-162 | 1st/2005 | Milk | Ce-141 | pCi/L | 229 | 229 | 1.00 | Agreement |
| E4463-162 | 1st/2005 | Milk | Cr-51 | pCi/L | 334 | 334 | 1.00 | Agreement |
| E4463-162 | 1st/2005 | Milk | Cs-134 | pCi/L | 137 | 139 | 0.99 | Agreement |
| E4463-162 | 1st/2005 | Milk | Cs-137 | pCi/L | 133 | 130 | 1.03 | Agreement |
| E4463-162 | 1st/2005 | Milk | Co-58 | pCi/L | 118 | 115 | 1.02 | Agreement |
| E4463-162 | 1st/2005 | Milk | Mn-54 | pCi/L | 166 | 160 | 1.04 | Agreement |
| E4463-162 | 1st/2005 | Milk | Fe-59 | pCi/L | 117 | 111 | 1.05 | Agreement |
| E4463-162 | 1st/2005 | Milk | Zn-65 | pCi/L | 203 | 198 | 1.03 | Agreement |
| E4463-162 | 1st/2005 | Milk | Co-60 | pCi/L | 145 | 144 | 1.01 | Agreement |
| E4464-162 | 1st/2005 | Milk | Sr-89 | pCi/L | 93.8 | 107 | 0.88 | Agreement |
| E4464-162 | 1st/2005 | Milk | Sr-90 | pCi/L | 16.1 | 17.9 | 0.90 | Agreement |

TABLE 3

**NIST MAP ANALYSIS RESULTS BY
FRAMATOME ANP ENVIRONMENTAL LABORATORY
ACCEPTANCE CRITERIA, MEDIA, AND MEASUREMENT CATEGORIES
JANUARY-JUNE 2005**

| | Bias Criteria (1) | | | | Precision Criteria (2) | | | |
|---------------------------------------|-------------------|-------------|-------------|------------|------------------------|------------|------------|------------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Water | | | | | | | | |
| Am-241 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 |
| Cm-244 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 |
| Fe-55 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 |
| Gamma | 4 | 14 | 0 | 0 | 18 | 0 | 0 | 0 |
| H-3 | 9 | 0 | 0 | 0 | 9 | 0 | 0 | 0 |
| I-131(LL) | 2 | 2 | 1 | 0 | 3 | 2 | 0 | 0 |
| Ni-63 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 |
| Pu-239 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 0 |
| Pu-241 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Tc-99 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Total Number in Range: | 21 | 22 | 10 | 0 | 50 | 3 | 0 | 0 |
| Percentage of Total Processed: | 39.6 | 41.5 | 18.9 | 0.0 | 94.3 | 5.7 | 0.0 | 0.0 |
| Sum of Analyses: | 53 | | | | 53 | | | |

(1) Percent Bias by Deviation Category as noted in Table 1, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 1, Footnote (2)

* Total may not equal 100 due to rounding

TABLE 4

**SUMMARY OF FRAMATOME ANP ENVIRONMENTAL LABORATORY
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)
TRACEABILITY RESULTS
JANUARY-JUNE, 2005**

| NIST Standard Number | Reference Date of Standard | Radionuclide | Matrix | E-LAB Measurement Technique | Mean Percent Deviation From NIST |
|-----------------------------|-----------------------------------|---------------------|---------------|--------------------------------------|---|
| 1707-12 | 30-Aug-04 | Tc-99 | Liquid | Liquid Scintillation Counter #2 | -1.91 |
| 1720-04 | 10-Nov-04 | Am-241 | Liquid | Alpha Spectroscopy Units #33, 34, 35 | -10.85 |
| 1720-04 | 10-Nov-04 | Cm-244 | Liquid | Alpha Spectroscopy Units #33, 34, 35 | -9.46 |
| 1720-04 | 10-Nov-04 | Pu-239 | Liquid | Alpha Spectroscopy Units #33, 34, 35 | -15.99 |
| 1720-04 | 10-Nov-04 | Pu-241 | Liquid | Liquid Scintillation Counter #2 | -1.97 |
| 1743-05 | 10-Jan-05 | H-3 | Liquid | Liquid Scintillation Counter #2 | 1.87 |
| 1743-05 | 10-Jan-05 | Fe-55 | Liquid | Liquid Scintillation Counter #2 | 10.74 |
| 1743-05 | 10-Jan-05 | Ni-63 | Liquid | Liquid Scintillation Counter #2 | -9.72 |
| 1751-02 | 2-Mar-05 | H-3 | Liquid | Liquid Scintillation Counter #4 | 2.56 |
| 1751-02 | 2-Mar-05 | I-131(LL) | Liquid | Beta-Gamma Coincidence Unit #1 | -5.59 |
| 1751-02 | 2-Mar-05 | I-131 | Liquid | Gamma Spectroscopy #2 | -6.41 |
| 1751-02 | 2-Mar-05 | I-131 | Liquid | Gamma Spectroscopy #4 | -5.31 |
| 1751-02 | 2-Mar-05 | I-131 | Liquid | Gamma Spectroscopy #5 | -5.31 |
| 1751-05 | 2-Mar-05 | H-3 | Liquid | Liquid Scintillation Counter #4 | 3.06 |
| 1751-05 | 2-Mar-05 | I-131(LL) | Liquid | Beta-Gamma Coincidence Unit #2 | -8.61 |
| 1751-05 | 2-Mar-05 | I-131 | Liquid | Gamma Spectroscopy #2 | -8.42 |
| 1751-05 | 2-Mar-05 | I-131 | Liquid | Gamma Spectroscopy #4 | -5.59 |
| 1751-05 | 2-Mar-05 | I-131 | Liquid | Gamma Spectroscopy #5 | -4.67 |

Data on NIST MAP program is repeated in Table 16 for Part 50/61 QC data.

TABLE 5

**ENVIRONMENTAL MEASUREMENTS LABORATORY
QUALITY ASSESSMENT PROGRAM**

| MATRIX/ UNITS | RADIO- NUCLIDE | REPORTED MEAN VALUE Bq/Units | REPORTED ERROR | EML VALUE Bq/Units | EML ERROR | REPORTED TO KNOWN RATIO | EVALUATION |
|--------------------------|---------------------------|---|---------------------------|-----------------------------------|----------------------|--|-------------------|
|--------------------------|---------------------------|---|---------------------------|-----------------------------------|----------------------|--|-------------------|

EML has notified the industry that QAP 60 (March 2004) was the final set of samples to be issued. Further information may be found on the EML website, URL <http://www.eml.doe.gov/qap/>

TABLE 6

**DEPARTMENT OF ENERGY MIXED ANALYTE
PERFORMANCE EVALUATION PROGRAM**

| MATRIX/ UNITS | REFERENCE DATE | RADIO- NUCLIDE | REPORTED MEAN VALUE Bq/Units | MAPEP VALUE Bq/Units | % Bias | EVALUATION |
|------------------------|-------------------|-------------------|------------------------------------|----------------------------|---------|-------------|
| Filter (Bq/filter) | 1-Jan-05 | Cs-134 | 3.525 | 3.51 | 0.4 | Agreement |
| Filter (Bq/filter) | 1-Jan-05 | Cs-137 | 2.367 | 2.26 | 4.7 | Agreement |
| Filter (Bq/filter) | 1-Jan-05 | Co-57 | 5.11 | 4.92 | 3.9 | Agreement |
| Filter (Bq/filter) | 1-Jan-05 | Co-60 | 3.084 | 3.03 | 1.8 | Agreement |
| Filter (Bq/filter) | 1-Jan-05 | Mn-54 | 3.468 | 3.33 | 4.1 | Agreement |
| Filter (Bq/filter) | 1-Jan-05 | Sr-90 | 1.1915 | 1.35 | -11.7 | Agreement |
| Filter (Bq/filter) | 1-Jan-05 | Zn-65 | 3.45 | 3.14 | 9.9 | Agreement |
| Soil (Bq/kg) | 1-Jan-05 | Am-241 | 97.1 | 109 | -10.9 | Agreement |
| Soil (Bq/kg) | 1-Jan-05 | Cs-134 | 764 | 759 | 0.7 | Agreement |
| Soil (Bq/kg) | 1-Jan-05 | Cs-137 | 316 | 315 | 0.3 | Agreement |
| Soil (Bq/kg) | 1-Jan-05 | Co-57 | 245 | 242 | 1.2 | Agreement |
| Soil (Bq/kg) | 1-Jan-05 | Co-60 | 215 | 212 | 1.4 | Agreement |
| Soil (Bq/kg) | 1-Jan-05 | Mn-54 | 511 | 485 | 5.4 | Agreement |
| Soil (Bq/kg) | 1-Jan-05 | Pu-238 | 0.755+/-0.30 | 0.48 | N/A (1) | Agreement |
| Soil (Bq/kg) | 1-Jan-05 | Pu-239/240 | 89 | 89.5 | -0.6 | Agreement |
| Soil (Bq/kg) | 1-Jan-05 | K-40 | 631 | 604 | 4.5 | Agreement |
| Soil (Bq/kg) | 1-Jan-05 | U-233/234 | 55.5 | 62.5 | -11.2 | Agreement |
| Soil (Bq/kg) | 1-Jan-05 | U-238 | 229.1 | 249 | -8.0 | Agreement |
| Soil (Bq/kg) | 1-Jan-05 | Zn-65 | 857 | 810 | 5.8 | Agreement |
| Vegetation (Bq/sample) | 1-Jan-05 | Am-241 | 0.1097 | 0.145 | -24.3 | Warning (2) |
| Vegetation (Bq/sample) | 1-Jan-05 | Pu-238 | 0.18815 | 0.224 | -16.0 | Agreement |
| Vegetation (Bq/sample) | 1-Jan-05 | Pu-239/240 | 0.00235+/-0.0008 | 0.0006 | N/A(3) | Agreement |
| Vegetation (Bq/sample) | 1-Jan-05 | Sr-90 | 1.495 | 1.65 | -9.4 | Agreement |
| Water (Bq/L) | 1-Jan-05 | Cs-134 | 118.4 | 127 | -6.8 | Agreement |
| Water (Bq/L) | 1-Jan-05 | Cs-137 | 399.7 | 332 | -9.7 | Agreement |
| Water (Bq/L) | 1-Jan-05 | Co-57 | 211.7 | 227 | -6.7 | Agreement |
| Water (Bq/L) | 1-Jan-05 | Co-60 | 235.6 | 251 | -6.1 | Agreement |
| Water (Bq/L) | 1-Jan-05 | H-3 | 303.3 | 280 | 8.3 | Agreement |
| Water (Bq/L) | 1-Jan-05 | Fe-55 | 82.2 | 75.9 | 8.3 | Agreement |
| Water (Bq/L) | 1-Jan-05 | Mn-54 | 305.9 | 331 | -7.6 | Agreement |
| Water (Bq/L) | 1-Jan-05 | Ni-63 | 1.45+/-1.4 | 9 | N/A | Warning (4) |
| Water (Bq/L) | 1-Jan-05 | Sr-90 | 0.216+/-0.093 | False Positive Test | N/A | Agreement |
| Water (Bq/L) | 1-Jan-05 | Zn-65 | 488.7 | 496 | -1.5 | Agreement |

(1) - Pu-238 reported as non-positive, acceptable sensitivity test result.

(2) - CR 05-13 Issued to evaluate the negative bias for Am-241.

(3) - Pu-239/240 reported as non-positive, acceptable sensitivity test result.

(4) - CR 05-14 Issued to evaluate the false negative result on the sensitivity test.

TABLE 7

**ENVIRONMENTAL RESOURCE ASSOCIATES PROFICIENCY TEST RESULTS
FRAMATOME ANP ENVIRONMENTAL LABORATORY**

| ERA LOT #/ REF. DATE | MATRIX/ UNITS | RADIO- NUCLIDE | REPORTED MEAN VALUE pCi/L | ERA VALUE pCi/L | ERA CONTROL LIMITS | ERA WARNING LIMITS | EVALUATION |
|-------------------------------------|--------------------------|---------------------------|--|--------------------------------|-----------------------------------|-----------------------------------|-------------------|
| RAD-61 May 2005 | Water pCi/L | Gross Alpha | 38.9 | 37.0 | 21.0-53.0 | 26.3-47.7 | Agreement |
| RAD-61 May 2005 | Water pCi/L | Gross Beta | 37.8 | 34.2 | 25.5-42.9 | 28.4-40.0 | Agreement |
| RAD-61 May 2005 | Water pCi/L | Tritium | 24100 | 24400 | 20200-28600 | 21600-27200 | Agreement |
| RAD-61 May 2005 | Water pCi/L | Ba-133 | 88.9 | 88.4 | 73.1-104 | 78.2-98.6 | Agreement |
| RAD-61 May 2005 | Water pCi/L | Cs-134 | 76.9 | 78.6 | 69.9-87.3 | 72.8-84.4 | Agreement |
| RAD-61 May 2005 | Water pCi/L | Cs-137 | 204 | 201 | 184-218 | 189-213 | Agreement |
| RAD-61 May 2005 | Water pCi/L | Co-60 | 38.4 | 37.0 | 28.3-45.7 | 31.2-42.8 | Agreement |
| RAD-61 May 2005 | Water pCi/L | Zn-65 | 121 | 118 | 97.6-138 | 104-132 | Agreement |
| RAD-61 May 2005 | Water pCi/L | I-131 | 15.1 | 15.5 | 10.3-20.7 | 12.0-19.0 | Agreement |

TABLE 8

**INTRA-LABORATORY ENVIRONMENTAL PROCESS CONTROL RESULTS BY
FRAMATOME ANP ENVIRONMENTAL LABORATORY
ACCEPTANCE CRITERIA, MEDIA, AND MEASUREMENT CATEGORIES
JANUARY-JUNE 2005**

| | Bias Criteria (1) | | | | Precision Criteria (2), (3) | | | |
|---|-------------------|-------------|-------------|------------|-----------------------------|------------|-------------|------------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Air Particulate | | | | | | | | |
| Beta | 124 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamma | - | - | - | - | - | - | - | - |
| II. Air Charcoal | | | | | | | | |
| Gamma-Quantitative | 2 | 2 | 0 | 0 | - | - | - | - |
| Gamma - Screening | 55 | 11 | 3 | 0 | - | - | - | - |
| III. Milk | | | | | | | | |
| Gamma | - | - | - | - | - | - | - | - |
| Iodine (LL) | - | - | - | - | - | - | - | - |
| Sr-89 | 4 | 1 | 0 | 0 | 5 | 0 | 0 | 0 |
| Sr-90 | 5 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| IV. Soil/Sed. | | | | | | | | |
| Am-241 | - | - | - | - | - | - | - | - |
| Gamma | - | - | - | - | - | - | - | - |
| Pu-239 | - | - | - | - | - | - | - | - |
| V. Water | | | | | | | | |
| Am-241 | 2 | 0 | 8 | 0 | 2 | 0 | 8 | 0 |
| C-14 | 2 | 3 | 3 | 0 | 0 | 0 | 8 | 0 |
| Fe-55 | 1 | 3 | 3 | 0 | 0 | 0 | 4 | 0 |
| Gross Alpha | 8 | 3 | 7 | 0 | 0 | 0 | 6 | 0 |
| Gross Beta | 6 | 15 | 1 | 0 | 6 | 0 | 0 | 0 |
| Gamma | 3 | 5 | 0 | 0 | 0 | 0 | 8 | 0 |
| Iodine (LL) | - | - | - | - | - | - | - | - |
| Ni-63 | 3 | 1 | 2 | 0 | 0 | 0 | 4 | 0 |
| Pu-238 | 1 | 5 | 0 | 0 | 0 | 0 | 6 | 0 |
| Pu-241 | 0 | 5 | 3 | 0 | 0 | 0 | 8 | 0 |
| Sr-90 | 2 | 0 | 4 | 0 | 0 | 0 | 6 | 0 |
| Tritium | 11 | 8 | 0 | 0 | 15 | 2 | 2 | 0 |
| Tc-99 | 4 | 1 | 2 | 0 | 0 | 0 | 8 | 0 |
| Total Number in Range: | 233 | 68 | 36 | 0 | 33 | 2 | 68 | 0 |
| Percentage of Total Processed: | 69.1 | 20.2 | 10.7 | 0.0 | 32.0 | 1.9 | 66.0 | 0.0 |
| Sum of Analyses: | 337 | | | | 103 | | | |

(1) Percent Bias by Deviation Category as noted in Table 1, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 1, Footnote (2)

(3) Most Precision data generated from non-positive client samples for specific contractual evaluation

* Total may not equal 100 due to rounding

TABLE 9

QC CHARCOAL ACTIVITY SCREENING RESULTS

| SPIKE NUMBER | LSN | FILTER TYPE | ANALYSIS DATE | ACT. REPORTED | % BIAS |
|--------------|------------|-------------|---------------|---------------|--------|
| 69484162-D | 8644-01 | SAIC-1 | 5-Jan-05 | YES | -2.91 |
| | 8656-01 | SAIC-1 | 7-Jan-05 | YES | 4.76 |
| | 8673-01 | SAIC-1 | 14-Jan-05 | YES | 3.17 |
| | 8694-01 | SAIC-1 | 17-Jan-05 | YES | 3.75 |
| | 8705-01 | SAIC-1 | 20-Jan-05 | YES | 5.64 |
| | 8777-01 | SAIC-1 | 28-Jan-05 | YES | 1.49 |
| | 69484162-F | 8644-02 | SAIC-2 | 5-Jan-05 | YES |
| 8656-02 | | SAIC-2 | 7-Jan-05 | YES | 2.28 |
| 8673-02 | | SAIC-2 | 14-Jan-05 | YES | 3.82 |
| 8694-02 | | SAIC-2 | 17-Jan-05 | YES | 3.11 |
| 8705-02 | | SAIC-2 | 20-Jan-05 | YES | 11.45 |
| 8771-02 | | SAIC-2 | 28-Jan-05 | YES | 3.13 |
| 69484162-E | | 8644-03 | SA2C | 5-Jan-05 | YES |
| | 8656-03 | SA2C | 7-Jan-05 | YES | -4.11 |
| | 8673-03 | SA2C | 14-Jan-05 | YES | -2.48 |
| | 8694-03 | SA2C | 17-Jan-05 | YES | -6.34 |
| | 8705-03 | SA2C | 20-Jan-05 | YES | -4.71 |
| | 8771-03 | SA2C | 28-Jan-05 | YES | -5.88 |
| | 69837162-B | 8801-01 | SAIC-1 | 4-Feb-05 | YES |
| 8811-01 | | SAIC-1 | 8-Feb-05 | YES | 1.29 |
| 8857-01 | | SAIC-1 | 24-Feb-05 | YES | -3.36 |
| 8894-01 | | SAIC-1 | 1-Mar-05 | YES | 0.40 |
| 8919-01 | | SAIC-1 | 8-Mar-05 | YES | 3.29 |
| 8945-01 | | SAIC-1 | 16-Mar-05 | YES | -0.58 |
| 8991-01 | | SAIC-1 | 28-Mar-05 | YES | -12.64 |
| 9014-01 | | SAIC-1 | 31-Mar-05 | YES | -7.31 |
| 69837162-D | | 8801-02 | SAIC-2 | 4-Feb-05 | YES |
| | 8811-02 | SAIC-2 | 8-Feb-05 | YES | -0.99 |
| | 8857-02 | SAIC-2 | 24-Feb-05 | YES | -1.95 |
| | 8894-02 | SAIC-2 | 1-Mar-05 | YES | 0.59 |
| | 8919-02 | SAIC-2 | 8-Mar-05 | YES | 0.11 |
| | 8945-02 | SAIC-2 | 16-Mar-05 | YES | -0.64 |
| | 8991-02 | SAIC-2 | 24-Mar-05 | YES | -0.11 |
| | 9014-02 | SAIC-2 | 1-Apr-05 | YES | -6.80 |
| | 69837162-C | 8801-03 | SA2C | 4-Feb-05 | YES |
| 8811-03 | | SA2C | 8-Feb-05 | YES | -0.59 |
| 8857-03 | | SA2C | 24-Feb-05 | YES | -4.44 |
| 8894-03 | | SA2C | 1-Mar-05 | YES | 0.71 |
| 8919-03 | | SA2C | 8-Mar-05 | YES | 6.03 |
| 8945-03 | | SA2C | 16-Mar-05 | YES | -1.76 |
| 8991-03 | | SA2C | 25-Mar-05 | YES | 2.34 |
| 9014-03 | | SA2C | 29-Mar-05 | YES | -1.55 |

TABLE 9
(continued)
QC CHARCOAL ACTIVITY SCREENING RESULTS

| SPIKE NUMBER | LSN | FILTER TYPE | ANALYSIS DATE | ACT. REPORTED | % BIAS |
|-------------------------|------------|------------------------|--------------------------|--------------------------|---------------|
| 70218162-C | 9081-01 | SAIC-1 | 12-Apr-05 | YES | 4.18 |
| | 9133-01 | SAIC-1 | 22-Apr-05 | YES | -0.83 |
| | 9171-01 | SAIC-1 | 29-Apr-05 | YES | -1.57 |
| | 9208-01 | SAIC-1 | 3-May-05 | YES | -3.85 |
| | 9240-01 | SAIC-1 | 11-May-05 | YES | -4.99 |
| | 9271-01 | SAIC-1 | 19-May-05 | YES | -4.91 |
| | 9299-01 | SAIC-1 | 27-May-05 | YES | -8.94 |
| | 9329-01 | SAIC-1 | 2-Jun-05 | YES | -3.42 |
| 70860162-C | 9478-01 | SAIC-1 | 28-Jun-05 | YES | -0.72 |
| 70218162-E | 9081-02 | SAIC-2 | 12-Apr-05 | YES | 2.74 |
| | 9133-02 | SAIC-2 | 21-Apr-05 | YES | 5.02 |
| | 9171-02 | SAIC-2 | 29-Apr-05 | YES | 5.99 |
| | 9208-02 | SAIC-2 | 3-May-05 | YES | 2.64 |
| | 9240-02 | SAIC-2 | 11-May-05 | YES | 4.22 |
| | 9271-02 | SAIC-2 | 19-May-05 | YES | 0.28 |
| | 9299-02 | SAIC-2 | 27-May-05 | YES | -1.40 |
| | 9329-02 | SAIC-2 | 2-Jun-05 | YES | 0.67 |
| 70860162-E | 9478-02 | SAIC-2 | 28-Jun-05 | YES | 2.28 |
| 70218162-D | 9081-03 | SA2C | 12-Apr-05 | YES | -0.31 |
| | 9136-03 | SA2C | 25-Apr-05 | YES | -1.19 |
| | 9171-03 | SA2C | 29-Apr-05 | YES | -3.64 |
| | 9208-03 | SA2C | 3-May-05 | YES | -0.73 |
| | 9240-03 | SA2C | 11-May-05 | YES | -1.46 |
| | 9271-03 | SA2C | 19-May-05 | YES | 30.69 |
| | 9299-03 | SA2C | 27-May-05 | YES | -1.14 |
| | 9329-03 | SA2C | 2-Jun-05 | YES | -0.74 |
| 70860162-D | 9478-03 | SA2C | 28-Jun-05 | YES | -0.35 |

TABLE 10

FRAMATOME ANP ENVIRONMENTAL LABORATORY
 ENVIRONMENTAL INTRA-LABORATORY AND INTER-LABORATORY
 DATA SUMMARY BIAS AND PRECISION BY MEDIA
 JANUARY-JUNE 2005

| | Bias Criteria (1) | | | | Precision Criteria (2), (3) | | | |
|---------------------------------------|-------------------|-------------|-------------|------------|-----------------------------|------------|-------------|------------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Air Filter | | | | | | | | |
| Gross Alpha | 1 | 2 | 1 | 2 | 6 | 0 | 0 | 0 |
| Gross Beta | 127 | 8 | 0 | 0 | 6 | 0 | 0 | 0 |
| Gamma | 10 | 8 | 8 | 1 | 27 | 0 | 0 | 0 |
| Sr-89 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 |
| Sr-90 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 |
| II. Charcoal | | | | | | | | |
| Gamma-Quantitative | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamma-Screening | 55 | 11 | 3 | 0 | 0 | 0 | 0 | 0 |
| III. Milk | | | | | | | | |
| Gamma | 47 | 12 | 1 | 0 | 55 | 3 | 2 | 0 |
| Iodine (LL) | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Sr-89 | 4 | 2 | 2 | 0 | 8 | 0 | 0 | 0 |
| Sr-90 | 5 | 1 | 2 | 0 | 8 | 0 | 0 | 0 |
| IV. Soil/Sediment | | | | | | | | |
| Am-241 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamma | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| V. Water | | | | | | | | |
| Am-241 | 2 | 1 | 10 | 0 | 5 | 0 | 8 | 0 |
| C-14 | 2 | 3 | 3 | 0 | 0 | 0 | 8 | 0 |
| Cm-244 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 |
| Fe-55 | 1 | 4 | 5 | 0 | 3 | 0 | 4 | 0 |
| Gross Alpha | 10 | 4 | 7 | 0 | 3 | 0 | 6 | 0 |
| Gross Beta | 8 | 16 | 1 | 0 | 8 | 1 | 0 | 0 |
| Gamma | 25 | 30 | 1 | 0 | 46 | 2 | 8 | 0 |
| Iodine (LL) | 5 | 2 | 1 | 0 | 6 | 2 | 0 | 0 |
| Ni-63 | 3 | 3 | 3 | 0 | 2 | 1 | 4 | 0 |
| Pu-238 | 1 | 5 | 0 | 0 | 0 | 0 | 6 | 0 |
| Pu-239 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 0 |
| Pu-241 | 3 | 5 | 3 | 0 | 3 | 0 | 8 | 0 |
| Sr-89 | 2 | 2 | 2 | 0 | 6 | 0 | 0 | 0 |
| Sr-90 | 3 | 2 | 7 | 0 | 2 | 2 | 8 | 0 |
| Tritium | 23 | 8 | 0 | 0 | 27 | 2 | 2 | 0 |
| Tc-99 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Total Number in Range: | 349 | 134 | 66 | 3 | 240 | 13 | 64 | 0 |
| Percentage of Total Processed: | 63.2 | 24.3 | 12.0 | 0.5 | 75.7 | 4.1 | 20.2 | 0.0 |
| Sum of Analyses: | 552 | | | | 317 | | | |

(1) Percent Bias by Deviation Category as noted in Table 1, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 1, Footnote (2)

(3) Most Precision data generated from non-positive client samples for specific contractual evaluation

* Total may not equal 100 due to rounding.

** Totals summarize Internal PCs, NIST MAP, and Analytics Cross Check programs

TABLE 11

**FRAMATOME ANP ENVIRONMENTAL LABORATORY
ENVIRONMENTAL INTRA-LABORATORY AND INTER-LABORATORY
DATA SUMMARY BIAS AND PRECISION BY ANALYSIS TYPE
JANUARY-JUNE 2005**

| | Bias Criteria (1) | | | | Precision Criteria (2), (3) | | | |
|--------------------------------|-------------------|------|------|-----|-----------------------------|-----|------|-----|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Gross Alpha | | | | | | | | |
| Air Filter | 1 | 2 | 1 | 2 | 6 | 0 | 0 | 0 |
| Water | 10 | 4 | 7 | 0 | 3 | 0 | 6 | 0 |
| II. Am-241, Cm-244 | | | | | | | | |
| Water | 2 | 3 | 11 | 0 | 8 | 0 | 8 | 0 |
| III. C-14 | | | | | | | | |
| Water | 2 | 3 | 3 | 0 | 0 | 0 | 8 | 0 |
| IV. Fe-55 | | | | | | | | |
| Water | 1 | 4 | 5 | 0 | 3 | 0 | 4 | 0 |
| V. Gross Beta | | | | | | | | |
| Air Filter | 127 | 8 | 0 | 0 | 6 | 0 | 0 | 0 |
| Water | 8 | 16 | 1 | 0 | 8 | 1 | 0 | 0 |
| VI. Gamma | | | | | | | | |
| Air Filter | 10 | 8 | 8 | 1 | 27 | 0 | 0 | 0 |
| Charcoal-Quantitative | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Charcoal-Screening | 55 | 11 | 3 | 0 | 0 | 0 | 0 | 0 |
| Milk | 47 | 12 | 1 | 0 | 55 | 3 | 2 | 0 |
| Water | 25 | 30 | 1 | 0 | 46 | 2 | 8 | 0 |
| VII. Iodine (LL) | | | | | | | | |
| Milk | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Water | 5 | 2 | 1 | 0 | 6 | 2 | 0 | 0 |
| VIII. Ni-63 | | | | | | | | |
| Water | 3 | 3 | 3 | 0 | 2 | 1 | 4 | 0 |
| IX. Pu-238, Pu-239 | | | | | | | | |
| Water | 1 | 5 | 3 | 0 | 3 | 0 | 6 | 0 |
| X. Pu-241 | | | | | | | | |
| Water | 3 | 5 | 3 | 0 | 3 | 0 | 8 | 0 |
| XI. Sr-89 | | | | | | | | |
| Air Filter | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 |
| Milk | 4 | 2 | 2 | 0 | 8 | 0 | 0 | 0 |
| Water | 2 | 2 | 2 | 0 | 6 | 0 | 0 | 0 |
| XII. Sr-90 | | | | | | | | |
| Air Filter | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 |
| Milk | 5 | 1 | 2 | 0 | 8 | 0 | 0 | 0 |
| Water | 3 | 2 | 7 | 0 | 2 | 2 | 8 | 0 |
| XIII. Tritium | | | | | | | | |
| Water | 23 | 8 | 0 | 0 | 27 | 2 | 2 | 0 |
| XIV. Tc-99 | | | | | | | | |
| Water | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Total Number in Range: | 349 | 134 | 66 | 3 | 240 | 13 | 64 | 0 |
| Percentage of Total Processed: | 63.2 | 24.3 | 12.0 | 0.5 | 75.7 | 4.1 | 20.2 | 0.0 |
| Sum of Analyses: | 552 | | | | 317 | | | |

(1) Percent Bias by Deviation Category as noted in Table 1, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 1, Footnote (2)

(3) Most Precision data generated from non-positive client samples for specific contractual evaluation

* Total may not equal 100 due to rounding.

** Totals summarize Internal PCs, NIST MAP, and Analytics Cross Check programs

TABLE 12

ENVIRONMENTAL BIAS AND PRECISION BY YEAR

| Year | Percent Bias Deviation from Known | | | | | Percent Precision Deviation from Mean | | | | |
|--|--------------------------------------|--------------|--------------|--------------------------|----------------------|--|--------------|--------------|--------------------------|----------------------|
| | Bias Criteria* (1) | | | | | Precision Criteria* (2) | | | | |
| | 1 | 2 | 3 | Outside Criteria 4 | % Within Criteria | 1 | 2 | 3 | Outside Criteria 4 | % Within Criteria |
| 2005 | 349 | 134 | 66 | 3 | 99.5 | 240 | 13 | 64 | 0 | 100.0 |
| 2004 | 405 | 130 | 91 | 6 | 99.1 | 204 | 27 | 191 | 2 | 99.5 |
| 2003 | 572 | 182 | 74 | 13 | 98.5 | 354 | 55 | 106 | 1 | 99.8 |
| 2002 | 619 | 170 | 74 | 7 | 99.2 | 411 | 44 | 16 | 3 | 99.4 |
| 2001 | 383 | 115 | 80 | 22 | 96.3 | 330 | 45 | 19 | 2 | 99.5 |
| 2000 | 368 | 143 | 63 | 18 | 97.0 | 342 | 70 | 36 | 1 | 99.8 |
| 1999 | 323 | 100 | 44 | 13 | 97.3 | 301 | 46 | 10 | 2 | 99.4 |
| 1998 | 375 | 100 | 21 | 7 | 98.6 | 355 | 56 | 21 | 4 | 99.1 |
| 1997 | 351 | 118 | 46 | 11 | 97.9 | 306 | 46 | 11 | 0 | 100.0 |
| 1996 | 616 | 187 | 104 | 24 | 97.4 | 696 | 71 | 33 | 3 | 99.6 |
| 1995 | 291 | 75 | 37 | 12 | 97.1 | 200 | 43 | 24 | 0 | 100.0 |
| 1994 | 359 | 116 | 54 | 14 | 97.4 | 265 | 61 | 10 | 1 | 99.7 |
| 1993 | 262 | 121 | 60 | 29 | 93.9 | 227 | 59 | 26 | 1 | 99.7 |
| 1992 | 438 | 206 | 84 | 21 | 97.2 | 656 | 112 | 29 | 1 | 99.9 |
| 1991 | 504 | 174 | 92 | 19 | 97.6 | 710 | 82 | 30 | 4 | 99.5 |
| 1990 | 519 | 153 | 56 | 34 | 95.5 | 644 | 97 | 20 | 2 | 99.7 |
| 1989 | 448 | 171 | 70 | 28 | 96.1 | 599 | 76 | 35 | 4 | 99.4 |
| 1988 | 425 | 141 | 66 | 22 | 96.6 | 536 | 76 | 20 | 1 | 99.8 |
| 1987 | 450 | 187 | 65 | 27 | 96.3 | 623 | 80 | 15 | 3 | 99.6 |
| 1986 | 558 | 185 | 70 | 27 | 96.8 | 700 | 82 | 33 | 0 | 100.0 |
| 1985 | 449 | 177 | 92 | 25 | 96.6 | 561 | 93 | 28 | 0 | 100.0 |
| 1984 | 479 | 254 | 104 | 31 | 96.4 | 699 | 127 | 24 | 0 | 100.0 |
| 1983 | 475 | 211 | 108 | 36 | 95.7 | 639 | 113 | 46 | 4 | 99.5 |
| 1982 | 341 | 109 | 135 | 30 | 95.1 | 496 | 112 | 135 | 12 | 98.4 |
| 1981 | 175 | 116 | 152 | 29 | 93.9 | 286 | 72 | 46 | 1 | 99.8 |
| 1980 | 160 | 115 | 167 | 37 | 92.3 | 335 | 96 | 59 | 1 | 99.8 |
| 1979 | 80 | 51 | 68 | 20 | 90.9 | 230 | 73 | 51 | 16 | 95.7 |
| 1978 | 112 | 90 | 40 | 20 | 92.4 | 259 | 73 | 29 | 14 | 96.3 |
| 1977 | 28 | 18 | 12 | 8 | 87.9 | 75 | 39 | 5 | 7 | 94.4 |
| Total # in Range: | 10,914 | 4,049 | 2,195 | 593 | 96.7 | 12,279 | 2,039 | 1,172 | 90 | 99.4 |
| % of all Analyses in Range* | 61.5 | 22.8 | 12.4 | 3.3 | | 78.8 | 13.1 | 7.5 | 0.6 | |
| Total Number | 17,751 | | | | | 15,580 | | | | |

* Total may not equal 100 due to rounding.

(1) Deviation Categories 1-3 as noted in Table 1, Footnote (1)

(2) Deviation Categories 1-3 as noted in Table 1, Footnote (2)

TABLE 13

**ANALYTICS RADIOCHEMISTRY CROSSCHECK PROGRAM RESULTS BY
FRAMATOME ANP ENVIRONMENTAL LABORATORY
ACCEPTANCE CRITERIA, MEDIA, AND MEASUREMENT CATEGORIES
JANUARY-JUNE 2005**

| | Bias Criteria (1) | | | | Precision Criteria (2) | | | |
|---------------------------------------|--------------------------|-------------|-------------|------------|-------------------------------|-------------|-------------|------------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Water | | | | | | | | |
| Fe-55 | 2 | 1 | 0 | 0 | 0 | 2 | 1 | 0 |
| Sr-89 | 1 | 2 | 0 | 0 | 1 | 2 | 0 | 0 |
| Sr-90 | 0 | 2 | 1 | 0 | 1 | 2 | 0 | 0 |
| Total Number in Range: | 3 | 5 | 1 | 0 | 2 | 6 | 1 | 0 |
| Percentage of Total Processed: | 33.3 | 55.6 | 11.1 | 0.0 | 22.2 | 66.7 | 11.1 | 0.0 |
| Sum of Analyses: | 9 | | | | 9 | | | |

(1) Percent Bias by Deviation Category as noted in Table 12, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 12, Footnote (2)

* Total may not equal 100 due to rounding

TABLE 13

PART 50/61 PROCESS CONTROL ANALYSIS RESULTS BY
FRAMATOME ANP ENVIRONMENTAL LABORATORY
ACCEPTANCE CRITERIA, MEDIA AND MEASUREMENT CATEGORIES
JANUARY – JUNE 2005
(Continued)

(1) Percent Bias by Deviation Category

1 = >0 and ≤ 5

2 = >5 and ≤ 10

3 = >10 and ≤ 15 (or within 2 sigma of known, see Reference 1)

For Gross Alpha and Beta
In water,

3 = >10 and ≤ 25 (or within 2 sigma of known)

For Alpha Spectrometry*,

3 = >10 and ≤ 20 (or within 2 sigma of known)

For Uranium-Total, Pu-241,
Zn-65 on an air filter, C-14,

3 = >10 and ≤ 20 (or within 2 sigma of known)

4 = Outside criteria

(2) Percent Precision by Deviation Category

1 = >0 and ≤ 5

2 = >5 and ≤ 10

3 = >10 and ≤ 15 (or within 2 sigma of mean, see Reference 1)

4 = Outside criteria

* Isotopic Uranium (U-234, 235, 238)
Isotopic Thorium (Th-230, 232)
Np-237
Am-241/Cm-242, 243/244
Pu-alpha (Pu-238, 239, 240)
Ra-226

** Total may not equal 100 due to rounding.

TABLE 14

FRAMATOME ANP ENVIRONMENTAL LABORATORY
 ANALYTICS RADIOCHEMISTRY CROSS-CHECK
 PERFORMANCE EVALUATION

| Sample Number | Quarter/Year | Sample Media | Nuclide | Units | Mean | | Ratio | Evaluation |
|---------------|--------------|--------------|---------|--------|----------------|-------------|---------------------|------------|
| | | | | | Reported Value | Known Value | E-LAB/ Analytics | |
| A17776-162 | 1st/2005 | Liquid | Fe-55 | uCi/cc | 2.06E-04 | 2.12E-04 | 0.97 | Agreement |
| A17777-162 | 1st/2005 | Liquid | Sr-89 | uCi/cc | 1.62E-03 | 1.63E-03 | 0.99 | Agreement |
| A17777-162 | 1st/2005 | Liquid | Sr-90 | uCi/cc | 1.84E-04 | 2.06E-04 | 0.89 | Agreement |
| A18125-162 | 2nd/2005 | Liquid | Fe-55 | uCi/cc | 1.38E-03 | * | | |
| A18126-162 | 2nd/2005 | Liquid | Sr-89 | uCi/cc | 1.04E-03 | * | | |
| A18126-162 | 2nd/2005 | Liquid | Sr-90 | uCi/cc | 9.14E-04 | * | | |

* - Results submitted to Analytics, pending final report issuance.

TABLE 15

NIST MAP ANALYSIS RESULTS BY
 FRAMATOME ANP ENVIRONMENTAL LABORATORY
 ACCEPTANCE CRITERIA, MEDIA, AND MEASUREMENT CATEGORIES
 JANUARY-JUNE 2005

| | Bias Criteria (1) | | | | Precision Criteria (2) | | | |
|---------------------------------------|-------------------|-------------|-------------|------------|------------------------|------------|------------|------------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Water | | | | | | | | |
| Am-241 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 |
| Cm-244 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 |
| Fe-55 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 |
| Gamma | 4 | 14 | 0 | 0 | 18 | 0 | 0 | 0 |
| H-3 | 9 | 0 | 0 | 0 | 9 | 0 | 0 | 0 |
| Ni-63 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 |
| Pu-239 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 0 |
| Pu-241 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Tc-99 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Total Number in Range: | 19 | 20 | 9 | 0 | 47 | 1 | 0 | 0 |
| Percentage of Total Processed: | 39.6 | 41.7 | 18.8 | 0.0 | 97.9 | 2.1 | 0.0 | 0.0 |
| Sum of Analyses: | 48 | | | | 48 | | | |

(1) Percent Bias by Deviation Category as noted in Table 1, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 1, Footnote (2)

* Total may not equal 100 due to rounding

TABLE 16

SUMMARY OF FRAMATOME ANP ENVIRONMENTAL LABORATORY
 NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)
 TRACEABILITY RESULTS
 JANUARY-JUNE 2005

| NIST Standard Number | Reference Date of Standard | Radionuclide | Matrix | E-LAB Measurement Technique | Mean Percent Deviation From NIST |
|----------------------|----------------------------|--------------|--------|--------------------------------------|----------------------------------|
| 1707-12 | 30-Aug-04 | Tc-99 | Liquid | Liquid Scintillation Counter #2 | -1.91 |
| 1720-04 | 10-Nov-04 | Am-241 | Liquid | Alpha Spectroscopy Units #33, 34, 35 | -10.85 |
| 1720-04 | 10-Nov-04 | Cm-244 | Liquid | Alpha Spectroscopy Units #33, 34, 35 | -9.46 |
| 1720-04 | 10-Nov-04 | Pu-239 | Liquid | Alpha Spectroscopy Units #33, 34, 35 | -15.99 |
| 1720-04 | 10-Nov-04 | Pu-241 | Liquid | Liquid Scintillation Counter #2 | -1.97 |
| 1743-05 | 10-Jan-05 | H-3 | Liquid | Liquid Scintillation Counter #2 | 1.87 |
| 1743-05 | 10-Jan-05 | Fe-55 | Liquid | Liquid Scintillation Counter #2 | 10.74 |
| 1743-05 | 10-Jan-05 | Ni-63 | Liquid | Liquid Scintillation Counter #2 | -9.72 |
| 1751-02 | 2-Mar-05 | H-3 | Liquid | Liquid Scintillation Counter #4 | 2.56 |
| 1751-02 | 2-Mar-05 | I-131(LL) | Liquid | Beta-Gamma Coincidence Unit #1 | -5.59 |
| 1751-02 | 2-Mar-05 | I-131 | Liquid | Gamma Spectroscopy #2 | -6.41 |
| 1751-02 | 2-Mar-05 | I-131 | Liquid | Gamma Spectroscopy #4 | -5.31 |
| 1751-02 | 2-Mar-05 | I-131 | Liquid | Gamma Spectroscopy #5 | -5.31 |
| 1751-05 | 2-Mar-05 | H-3 | Liquid | Liquid Scintillation Counter #4 | 3.06 |
| 1751-05 | 2-Mar-05 | I-131(LL) | Liquid | Beta-Gamma Coincidence Unit #2 | -8.61 |
| 1751-05 | 2-Mar-05 | I-131 | Liquid | Gamma Spectroscopy #2 | -8.42 |
| 1751-05 | 2-Mar-05 | I-131 | Liquid | Gamma Spectroscopy #4 | -5.59 |
| 1751-05 | 2-Mar-05 | I-131 | Liquid | Gamma Spectroscopy #5 | -4.67 |

Data on NIST MAP program is repeated in Table 4 for Environmental QC data.

TABLE 17

INTRA-LABORATORY PART 50/61 PROCESS CONTROL RESULTS BREAKDOWN BY
 FRAMATOME ANP ENVIRONMENTAL LABORATORY
 ACCEPTANCE CRITERIA, MEDIA AND MEASUREMENT CATEGORIES
 JANUARY-JUNE 2005

| | Bias Criteria (1) | | | | Precision Criteria (2) | | | |
|---------------------------------------|-------------------|-------------|-------------|------------|------------------------|-------------|------------|------------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Filter | | | | | | | | |
| Alpha | | | | | | | | |
| Am-241 | | | | | | | | |
| Fe-55 | | | | | | | | |
| Gamma | | | | | | | | |
| Sr-89 | | | | | | | | |
| Sr-90 | | | | | | | | |
| II. Liquid | | | | | | | | |
| Alpha | 2 | 2 | 4 | 0 | 0 | 0 | 0 | 0 |
| Am-241 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 |
| Beta | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C-14 | 1 | 1 | 1 | 0 | 0 | 1 | 2 | 0 |
| Cm-243/4 | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 |
| Fe-55 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 |
| Gamma | 10 | 2 | 0 | 0 | 12 | 0 | 0 | 0 |
| H-3 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| I-129 | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 0 |
| Ni-63 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 |
| Np-237 | 2 | 2 | 2 | 0 | 2 | 4 | 0 | 0 |
| Pu-238 | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 |
| Pu-241 | 4 | 2 | 0 | 0 | 5 | 1 | 0 | 0 |
| Sr-89 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Sr-90 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 |
| Tc-99 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Number in Range: | 29 | 17 | 14 | 2 | 45 | 7 | 2 | 0 |
| Percentage of Total Processed: | 46.8 | 27.4 | 22.6 | 3.2 | 83.3 | 13.0 | 3.7 | 0.0 |
| Sum of Analyses: | 62 | | | | 54 | | | |

(1) Percent Bias by Deviation Category as noted in Table 13, Footnote (1)
 (2) Percent Precision by Deviation Category as noted in Table 13, Footnote (2)
 * Total may not equal 100 due to rounding.

TABLE 18

PART 50/61 ANALYSIS RESULTS BREAKDOWN BY
 FRAMATOME ANP ENVIRONMENTAL LABORATORY
 ACCEPTANCE CRITERIA, MEDIA AND MEASUREMENT CATEGORIES
 JANUARY-JUNE 2005

| | Bias Criteria (1) | | | | Precision Criteria (2) | | | |
|---|-------------------|-------------|-------------|------------|------------------------|-------------|------------|------------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Filter | | | | | | | | |
| Alpha | | | | | | | | |
| Am-241 | | | | | | | | |
| Fe-55 | | | | | | | | |
| Gamma | | | | | | | | |
| Sr-89 | | | | | | | | |
| Sr-90 | | | | | | | | |
| II. Liquid | | | | | | | | |
| Alpha | 2 | 2 | 4 | 0 | 0 | 0 | 0 | 0 |
| Am-241 | 0 | 2 | 4 | 0 | 6 | 0 | 0 | 0 |
| Beta | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C-14 | 1 | 1 | 1 | 0 | 0 | 1 | 2 | 0 |
| Cm-243/4 | 2 | 3 | 1 | 0 | 6 | 0 | 0 | 0 |
| Fe-55 | 2 | 4 | 3 | 0 | 6 | 2 | 1 | 0 |
| Gamma | 14 | 16 | 0 | 0 | 30 | 0 | 0 | 0 |
| H-3 | 12 | 0 | 0 | 0 | 12 | 0 | 0 | 0 |
| I-129 | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 0 |
| Ni-63 | 0 | 3 | 3 | 0 | 5 | 1 | 0 | 0 |
| Np-237 | 2 | 2 | 2 | 0 | 2 | 4 | 0 | 0 |
| Pu-238 | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 |
| Pu-239 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 0 |
| Pu-241 | 7 | 2 | 0 | 0 | 8 | 1 | 0 | 0 |
| Sr-89 | 4 | 2 | 0 | 0 | 4 | 2 | 0 | 0 |
| Sr-90 | 0 | 4 | 2 | 0 | 4 | 2 | 0 | 0 |
| Tc-99 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Total Number In Range: | 51 | 42 | 24 | 2 | 94 | 14 | 3 | 0 |
| Percentage of Total Processed: | 42.9 | 35.3 | 20.2 | 1.7 | 84.7 | 12.6 | 2.7 | 0.0 |
| Sum of Analyses: | 119 | | | | 111 | | | |

(1) Percent Bias by Deviation Category as noted in Table 13, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 13, Footnote (2)

* Total may not equal 100 due to rounding.

** Totals summarize Internal PCs, NIST MAP, and Analytics Cross Check programs

TABLE 19

PART 50/61 BIAS AND PRECISION BY YEAR (1)

| Year | Percent Bias Deviation from Known | | | | | Percent Precision Deviation from Mean | | | | |
|--|--------------------------------------|--------------|-------------|--------------------------|----------------------|--|-------------|------------|--------------------------|----------------------|
| | Bias Criteria (2) | | | | | Precision Criteria (2) | | | | |
| | 1 | 2 | 3 | Outside Criteria 4 | % Within Criteria | 1 | 2 | 3 | Outside Criteria 4 | % Within Criteria |
| 2005 | 51 | 42 | 24 | 2 | 98.3 | 94 | 14 | 3 | 0 | 100.0 |
| 2004 | 73 | 45 | 36 | 9 | 94.5 | 140 | 10 | 1 | 0 | 100.0 |
| 2003 | 144 | 91 | 51 | 9 | 96.9 | 249 | 18 | 2 | 0 | 100.0 |
| 2002 | 215 | 94 | 49 | 8 | 97.8 | 300 | 24 | 5 | 2 | 99.4 |
| 2001 | 159 | 90 | 46 | 24 | 92.5 | 238 | 46 | 6 | 0 | 100.0 |
| 2000 | 151 | 72 | 28 | 23 | 91.6 | 220 | 38 | 16 | 4 | 98.6 |
| 1999 | 111 | 59 | 14 | 7 | 96.3 | 168 | 13 | 5 | 2 | 98.9 |
| 1998 | 90 | 68 | 24 | 7 | 96.3 | 160 | 22 | 7 | 0 | 100.0 |
| 1997 | 99 | 43 | 33 | 8 | 95.6 | 168 | 13 | 2 | 0 | 100.0 |
| 1996 | 194 | 80 | 33 | 17 | 94.8 | 285 | 31 | 8 | 0 | 100.0 |
| 1995 | 112 | 47 | 35 | 7 | 96.5 | 173 | 15 | 4 | 0 | 100.0 |
| 1994 | 125 | 39 | 25 | 5 | 97.4 | 158 | 22 | 5 | 1 | 99.5 |
| 1993 | 154 | 51 | 32 | 17 | 93.3 | 208 | 34 | 7 | 0 | 100.0 |
| 1992 | 116 | 86 | 38 | 7 | 97.2 | 207 | 27 | 5 | 0 | 100.0 |
| 1991 | 126 | 77 | 53 | 35 | 88.0 | 223 | 28 | 10 | 5 | 98.1 |
| 1990 | 116 | 65 | 31 | 21 | 91.0 | 199 | 35 | 6 | 0 | 100.0 |
| 1989 | 73 | 71 | 51 | 26 | 88.2 | 152 | 40 | 24 | 8 | 96.4 |
| 1988 | 30 | 19 | 13 | 13 | 82.7 | 43 | 13 | 6 | 9 | 87.3 |
| Total # in Range: | 2,139 | 1,139 | 616 | 245 | 94.1 | 3,385 | 443 | 122 | 31 | 99.2 |
| % of all Analyses in Range* | 51.7 | 27.5 | 14.9 | 5.9 | | 85.0 | 11.1 | 3.1 | 0.8 | |
| Sum of Analyses | 4,139 | | | | | 3,981 | | | | |

* Total may not equal 100 due to rounding.

(1) This breakdown excludes the 71 verification analyses associated with the startup of this area of the Laboratory during 1988-89.

(2) Deviation Categories 1-4 as noted in Table 13, Footnote (1)

TABLE 20

**BIOASSAY ANALYSIS RESULTS BREAKDOWN BY
FRAMATOME ANP ENVIRONMENTAL LABORATORY
ACCEPTANCE CRITERIA, MEDIA AND MEASUREMENT CATEGORIES
JANUARY-JUNE 2005**

| | Bias Criteria (1) | | | | Precision Criteria (2) | | | |
|--|-------------------|-----|-----|-----|------------------------|-----|-----|-----|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| i. Urine (3) | | | | | | | | |
| Gamma | | | | | | | | |
| H-3 | | | | | | | | |
| Total Number in Range: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Percentage of Total Processed*: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Sum of Analyses: | 0 | | | | 0 | | | |

- (1) Percent Bias by Deviation Category as noted in Table 13, Footnote (1)
- (2) Percent Precision by Deviation Category as noted in Table 13, Footnote (2)
- (3) There were no internal or external bioassay QC samples analyzed during this period.
- * Total may not equal 100 due to rounding

TABLE 21

LAWRENCE LIVERMORE NATIONAL LABORATORY (LLNL)
 BIOASSAY THYROID RADIOIODINE INTERCOMPARISON PROJECT (TRIP)

| TRIP ID | RADIO-NUCLIDE | REPORTED VALUE (dpm) | REPORTED UNCERTAINTY (dpm) | LLNL CERTIFIED VALUE (dpm) | LLNL CERTIFIED UNCERTAINTY (dpm) | BIAS % | ANSI 13.30 BIAS CRITERIA |
|---------|---------------|----------------------|----------------------------|----------------------------|----------------------------------|--------|--------------------------|
| 1204 | I-125 | 1.39E+06 | 2.21E+05 | 1.03E+06 | 3.09E+04 | 35.0 | PASS |
| 1204 | I-131 | 8.11E+06 | 8.92E+05 | 7.82E+06 | 2.35E+05 | 3.7 | PASS |

TABLE 22

**CONDITION REPORT (CR) STATUS
(JANUARY-JUNE 2005)**

| CR # | (OPEN) INITIATION DATE | (CLOSED) CLOSE-OUT DATE | DESCRIPTION | STATUS AS OF 06/30/04 |
|----------|------------------------------|-------------------------------|---|--|
| CR 04-18 | 30-Nov-04 | | Internal process checks for I-129 for the first and second quarters of 2004 had positive biases greater than the acceptance limit. | Testing indicates that a bias exists with either the I-129 source or the gamma spectroscopy detector calibration. A new NIST source was recently received. Recalibration of the gamma spectroscopy detector is pending creation of the calibrated geometry. |
| CR 04-21 | 15-Dec-04 | 9-Mar-05 | Read & Sign training not completed for a new chemist. | Chemist was trained to the appropriate information. Additional Read & Sign training forms were not completed as required. These have now been completed. The training procedure is being revised specifically for the indoctrination training of new employees. |
| CR 04-24 | 15-Dec-04 | 6-Jun-05 | Three weaknesses noted in Safety Manual compliance (eyewash flushing, NFPA labels missing on chemicals, hazardous chemical list needs updated). | All personnel have been retrained to the OSHA requirement for flushing eyewashes. The hazardous chemical list has been reviewed and updated. Chemical labeling has been verified. A revision to the requirements for labeling is in progress. |
| CR 05-01 | 11-Jan-05 | 20-Jan-05 | LIMS MDC value for corporate account updated mistakenly. Should have been only one plant in the corporation. | LIMS accounts for remaining plants in corporation were corrected. Samples were reanalyzed in attempt to meet required MDCx. Procedures were updated to require independent check on LIMS account updates. |
| CR 05-02 | 24-Jan-05 | 7-Feb-05 | Tritium environmental composite sample missing one of three samples. | Sample receipt failed to utilize LIMS templates and did not enter hold for composite statement. Sample was disposed of prior to successful completion of composite. Personnel have been retrained to use templates for sample log-in and disposal is not being conducted until completion of all quarterly composites. |
| CR 05-03 | 24-Jan-05 | 7-Feb-05 | Vegetation samples for I-131(LL) failed to meet client required MDC values. | Management failed to properly control sample processing status during employee transitions. Additional resources were added to process to ensure completion of all in-house samples. Chemists have been counseled on tracking sample status and vegetation processing. |
| CR 05-04 | 24-Jan-05 | 9-Mar-05 | LIMS fields for several samples improperly completed. | Sample reports were corrected and re-issued or re-analyzed. Training was given the chemistry staff on proper data entry into LIMS. Training procedure was revised to add specific line item on data entry. |
| CR 05-05 | 30-Jan-05 | 2-Mar-05 | ERA gamma (Co-60) Proficiency Test sample failed due to data entry error. | Final data review was not conducted as usual since the employee responsible was away from the office. Personnel responsible were counseled to ensure data review of third party test data is conducted as required. |
| CR 05-06 | 15-Feb-05 | | Fe-55 Part 50/61 QC sample failed with negative bias. | The ICP and chemists were tested successfully on iron recovery analysis techniques. A new Fe-55 calibration for the liquid scintillation counter was put in place using a new primary NIST traceable standard. CR closure pending. |

TABLE 22
(continued)
CONDITION REPORT (CR) STATUS
(JANUARY-JUNE 2005)

| CR # | (OPEN) INITIATION DATE | (CLOSED) CLOSE-OUT DATE | DESCRIPTION | STATUS AS OF 06/30/04 |
|----------|------------------------------|-------------------------------|--|--|
| CR 05-07 | 2-Mar-05 | 17-Mar-05 | Sr-89/90 QC failed due to incorrect sample volume used. | Chemist made a transcription error when recording the sample volume. The corrected volume resulted in acceptable results for both Sr-89 and Sr-90. All personnel were reminded of the need for self-checking when entering data. |
| CR 05-08 | 23-Mar-05 | 13-Apr-05 | False positive report of tritium in soil. | The procedure was revised to incorporate stronger precautions concerning the potential for radon daughter contamination bleed through. The sample was reanalyzed to obtain a valid tritium result. |
| CR 05-09 | 25-Mar-05 | 1-Jun-05 | Charcoal cartridge sample volume data mis-entered in LIMS. | The backup sample receipt technician failed to properly "roll-back" or correct the sample volume entered in LIMS. Staff performing LIMS data entry has been retrained to proper error correction steps. |
| CR 05-10 | 30-Mar-05 | | Analytics 4th quarter 2004 air particulate gross alpha QC failure. | Bias of -15.5% with limit of 15%. Sample recounted with no change. 1st quarter 2005 AP counted by GPC (20.8 pCi, -5.0% bias), gamma spectroscopy (24.3 pCi, +11% bias), and known (21.9 pCi). Contacting Analytics on AP prep details to determine cause of bias shift from one quarter to the next. |
| CR 05-11 | 30-Mar-05 | 2-Jun-05 | Analytics 4th quarter 2004 air particulate Fe-59 QC failure. | Bias of +15.3% with limit of 15%. Geometry of AP for QC sample and normal samples was evaluated. Calibration will be adjusted to address QC differences from calibration geometry. |
| CR 05-12 | 2-May-05 | 28-Jul-05 | Secondary Fe-55 source found contaminated. | Source container was found to have been inadvertently contaminated. Source and spike samples were disposed. |
| CR 05-13 | 24-May-05 | | MAPEP Am-241 in vegetation Warning. | MAPEP prepared vegetation is a fine, dry powdery material, unlike true environmental vegetation samples. Some losses were experienced during transfer for gamma counting. Handling precautions are being added to worksheet templates for MAPEP vegetation samples. |
| CR 05-14 | 24-May-05 | 28-Jul-05 | MAPEP Ni-63 in water False Negative. | No apparent cause identified for false negative result. Four samples of lower activities were analyzed concurrently and all passed the acceptance criteria. |

TABLE 23

UPDATED INSTRUMENTATION GROUP/ANALYTICAL SERVICES
SECTION PROCEDURES ISSUED DURING JANUARY-JUNE 2005

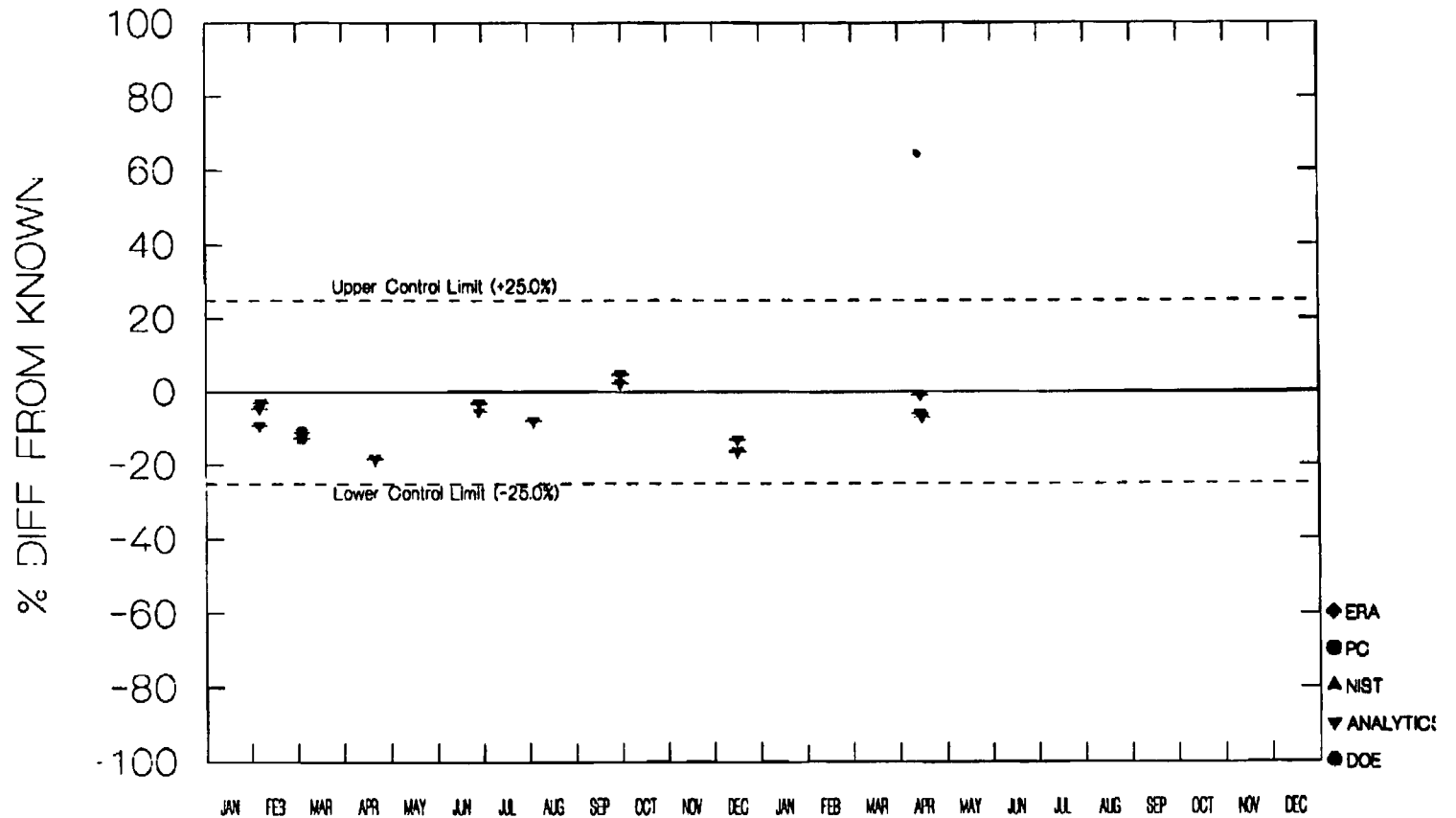
| PROC. NUMBER | TITLE | REV. | APPROVAL DATE | EFFECTIVE DATE |
|--------------|---|-------------------------|----------------------|----------------------|
| 304 | Environmental Sample Compositing | 0 | 02/02/05 | 02/02/05 |
| 320 | Preparation and Analysis of Environmental Water and Soil/Sediment/Sludge Samples for Gross Alpha and/or Gross Beta Radioactivity | 22 | 02/01/05 | 02/01/05 |
| 365 | The Sequential Determination of ⁵⁵ Fe, ⁶³ Ni, ^{89,90} Sr, ²⁴¹ Am, ²⁴² Cm, ^{243/244} Cm and ²³⁸ Pu, ^{239/240} Pu, ²⁴¹ Pu in Environmental and Bioassay Matrices | 13 | 03/17/05 | 03/27/05 |
| 373 | The Determination of Tritium in Environmental, Bioassay, and Plant Effluent Samples Using the Micro Distillation Apparatus | 2 | 04/13/05 | 04/13/05 |
| 450 | The Determination Of Gamma-Ray Emitting Radionuclides Using The Seeker Gamma Spectroscopy Software | 17 | 02/24/05 | 02/25/05 |
| 512 | Operation and Calibration of the Reuter-Stokes Pressurized Ion Chamber (PIC) | 6 | 05/16/05 | 05/16/05 |
| 682 | Integration of a New Client into LIMS | 1 | 01/20/05 | 01/20/05 |
| 683 | Integration of a New Product into LIMS | 1 | 01/17/05 | 01/17/05 |
| 750 | Laboratory Training and Qualification Guideline | 12 Interim Change | 03/01/05 06/14/05 | 03/01/05 06/14/05 |
| 760 | Chemical and Reagent Control | 13 | 04/15/05 | 04/15/05 |
| 1102 | Suggested Sample Collection, Preservation and Submittal Procedures For 10 CFR 50/61 Sample Analysis | 4 | 03/04/05 | 03/11/05 |
| 1136 | The Determination of Isotopic Americium, Curium, Plutonium, and Neptunium in 10CFR50 and 10CFR61 Media | 10 | 03/17/05 | 03/17/05 |
| 1137 | The Determination of Cerium-144 in 10 CFR 61 Matrices | 7 | 03/04/05 | 03/11/05 |
| 1190 | The Determination of Niobium-94 in 10 CFR 61 Media Using Anion Exchange Chromatography and Gamma Spectrometry | 3 | 03/04/05 | 03/11/05 |

APPENDIX A

INTER/INTRA-LABORATORY, ENVIRONMENTAL MONITORING ANALYTICS, DOE, ERA AND NIST QUALITY CONTROL PROGRAM RESULTS

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP GROSS ALPHA AIR PARTICULATE RESULT BIAS



ANALYSIS PERIOD 2004-2005

INTRALABORATORY CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: PARTICULATE FILTER

ISSUANCE DATE: 03/29/2005

REF. DATE: 12/09/2004

LAB SAMPLE NO: 855701 ANAL DATE: 12/16/2004
 LAB SAMPLE NO: 855702 ANAL DATE: ~~12/16/2004~~
 LAB SAMPLE NO: 855703 ANAL DATE: 12/16/2004

UNITS: pCi/Filter

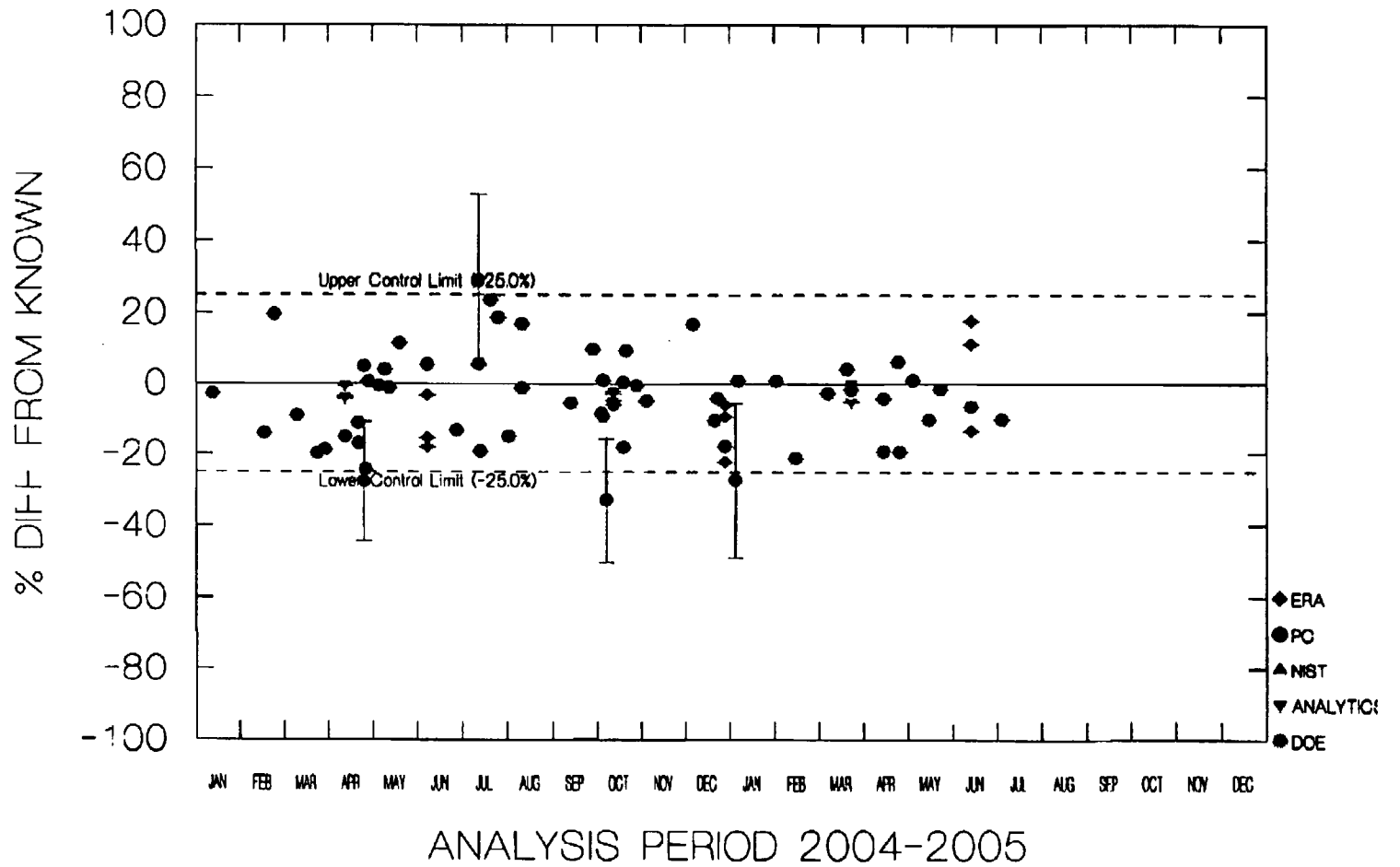
| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|------------------|------------------|-------------------|-----------|-------------|----------|----------|----------|
| Alpha | (246 ± 5)E-01 | (246 ± 5)E-01 | (256 ± 5)E-01 | | 29.50E 00 | -16.40* | -16.60* | -13.40 |
| | | | % DIFF FROM MEAN: | 24.94E 00 | | -1.10 | -1.40 | 2.50 |
| Beta | (2420 ± 10)E-01 | (2422 ± 10)E-01 | (2433 ± 10)E-01 | | 22.20E 01 | 9.00 | 9.10 | 9.60 |
| | | | % DIFF FROM MEAN: | 24.25E 01 | | -0.20 | -0.10 | 0.30 |

Mean of three analyses of Analytics air filter for Gross Alpha (bias = -15.5%) exceeded the ±15% bias limit. CR 05-10 was initiated to investigate the failure.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP GROSS ALPHA WATER RESULT BIAS



YR BATCH 24 QC CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: WATER

ISSUANCE DATE: 02/17/2005

REF. DATE: 03/08/2004

LAB SAMPLE NO: 850302

ANAL DATE: 01/04/2005
2/18/05

UNITS: pCi/L

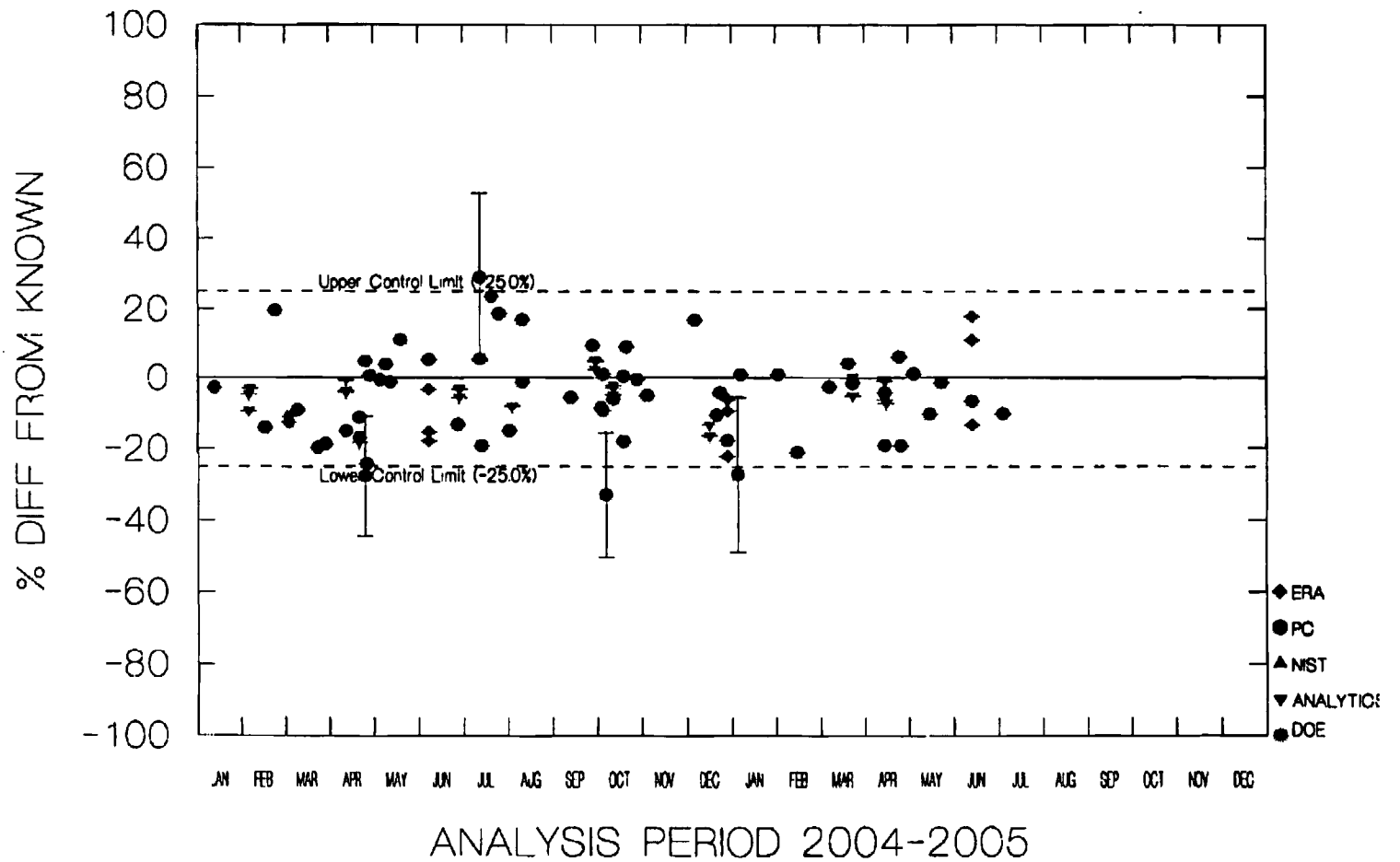
| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|-----------------|----------|----------|------|-------------|----------|----------|----------|
| Alpha | (403 ± 60)E-01 | | | | 55.40E 00 | -27.30 | | |
| Beta | (618 ± 44)E-01 | | | | 59.60E 00 | 3.70 | | |

Internal spike for Gross Alpha in water was analyzed according to specific client protocol. Sample activity was <10 times the MDC and the result met the client's QC criteria of ±60%.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP GROSS ALPHA RESULT BIAS



YR BATCH 25 QC CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: WATER

ISSUANCE DATE: 03/03/2005

REF. DATE: 08/28/2004

LAB SAMPLE NO: 871806 ANAL DATE: 02/23/2005

UNITS: pCi/L

| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|-----------------|----------|----------|------|-------------|----------|----------|----------|
| Am-241 | (498 ± 10)E-01 | | | | 64.10E 00 | -22.40 | | |

Internal spike for Am-241 in water was analyzed according to specific client protocol. The result met the client's QC criteria of ±30%.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

SAMPLE TYPE: VEGETATION

ISSUANCE DATE: 05/09/2005

REF. DATE: 01/01/2005

LAB SAMPLE NO: 885902 ANAL DATE: 04/18/2005

UNITS: Bq/SAMPLE

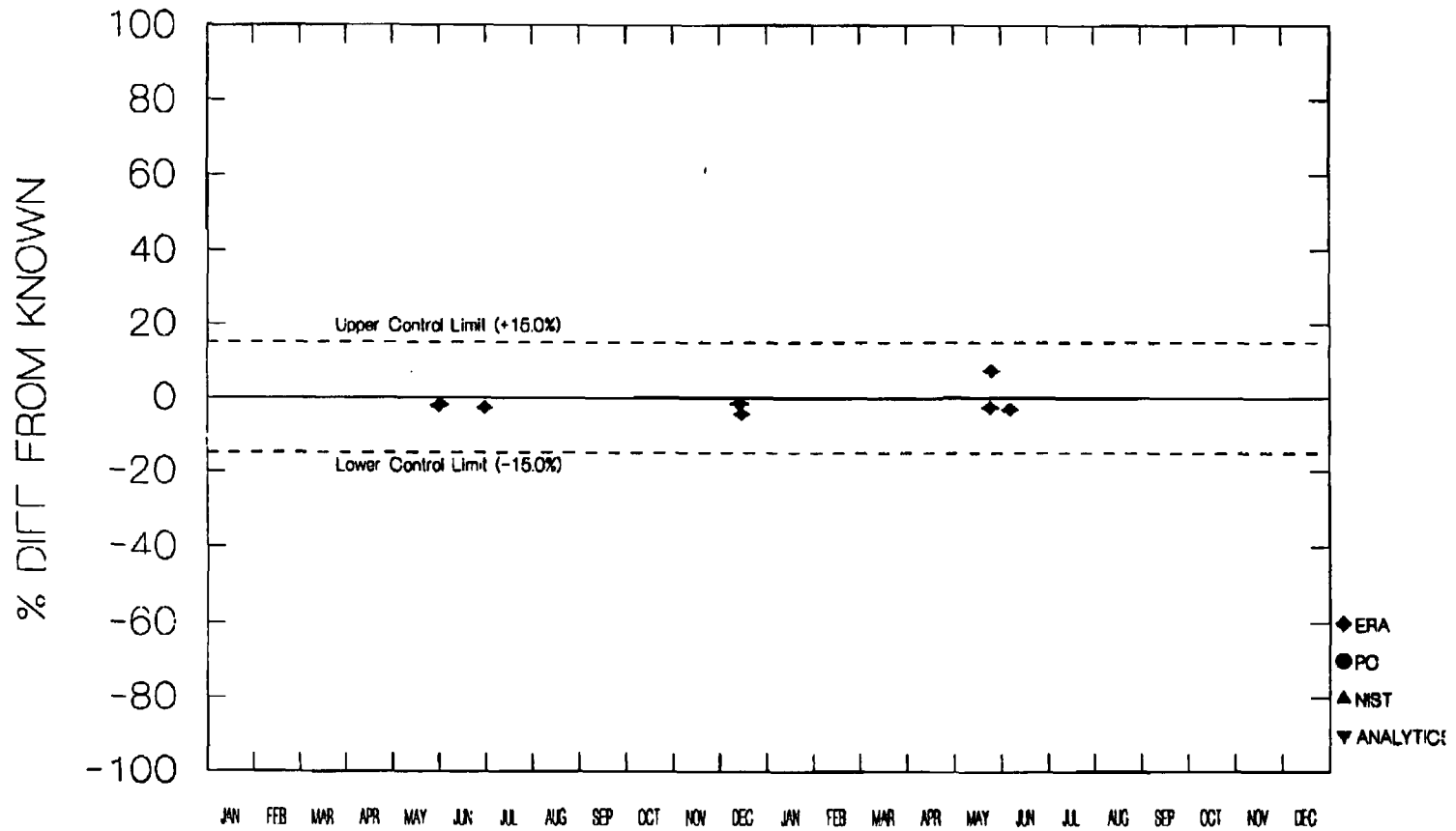
| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|------------------|----------|----------|------|----------------|-------------|-------------|-------------|
| Am-241 | (1097 ± 44)E-04 | | | | 1.45E-01 | -24.30* | | |

Single analysis of MAPEP vegetation sample for Am-241 (bias=-24.3%) exceeded the ±20% MAPEP bias limit. CR 05-13 was inflated to investigate the failure.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

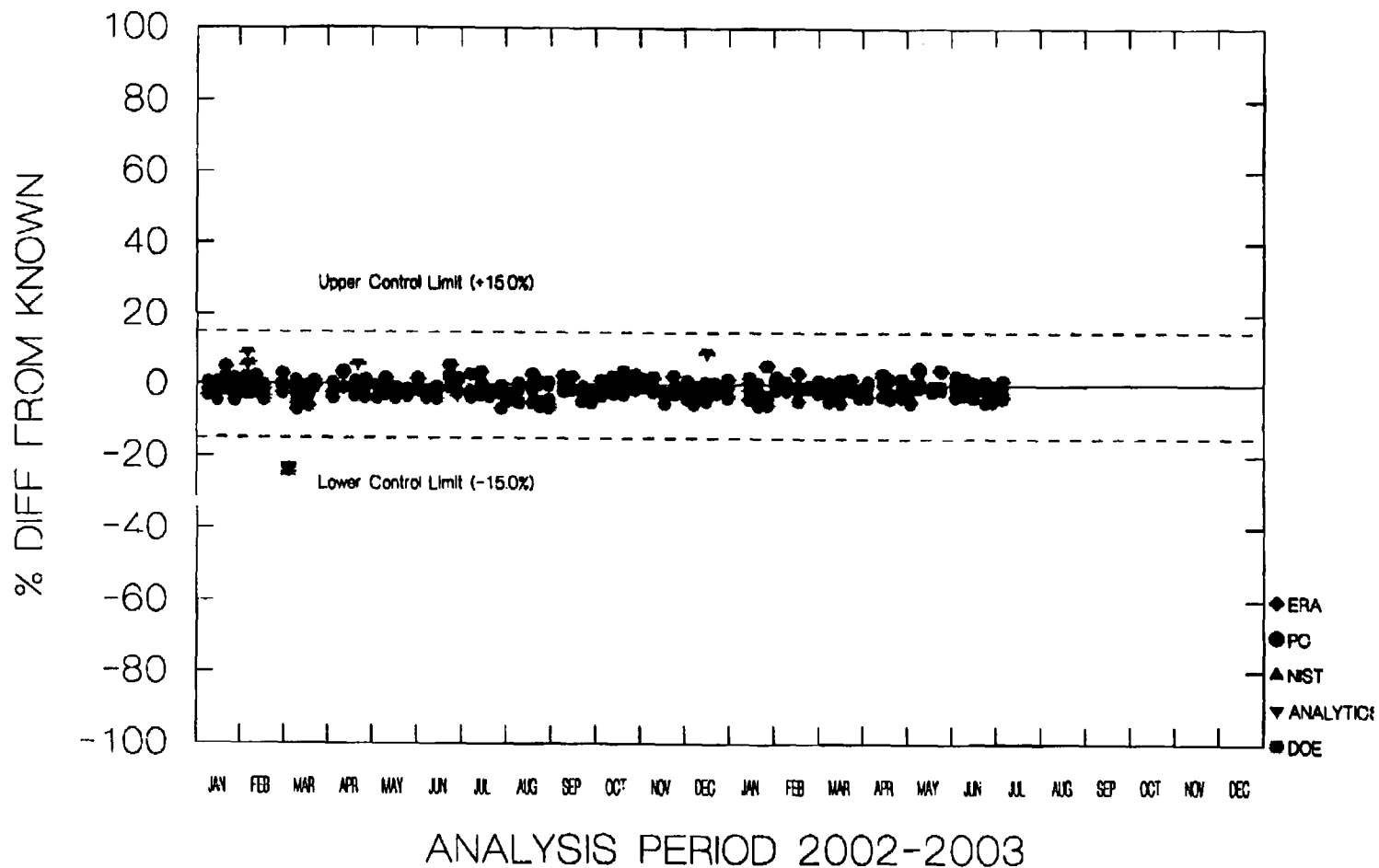
REMP Ba-133 RESULT BIAS



ANALYSIS PERIOD 2004-2005

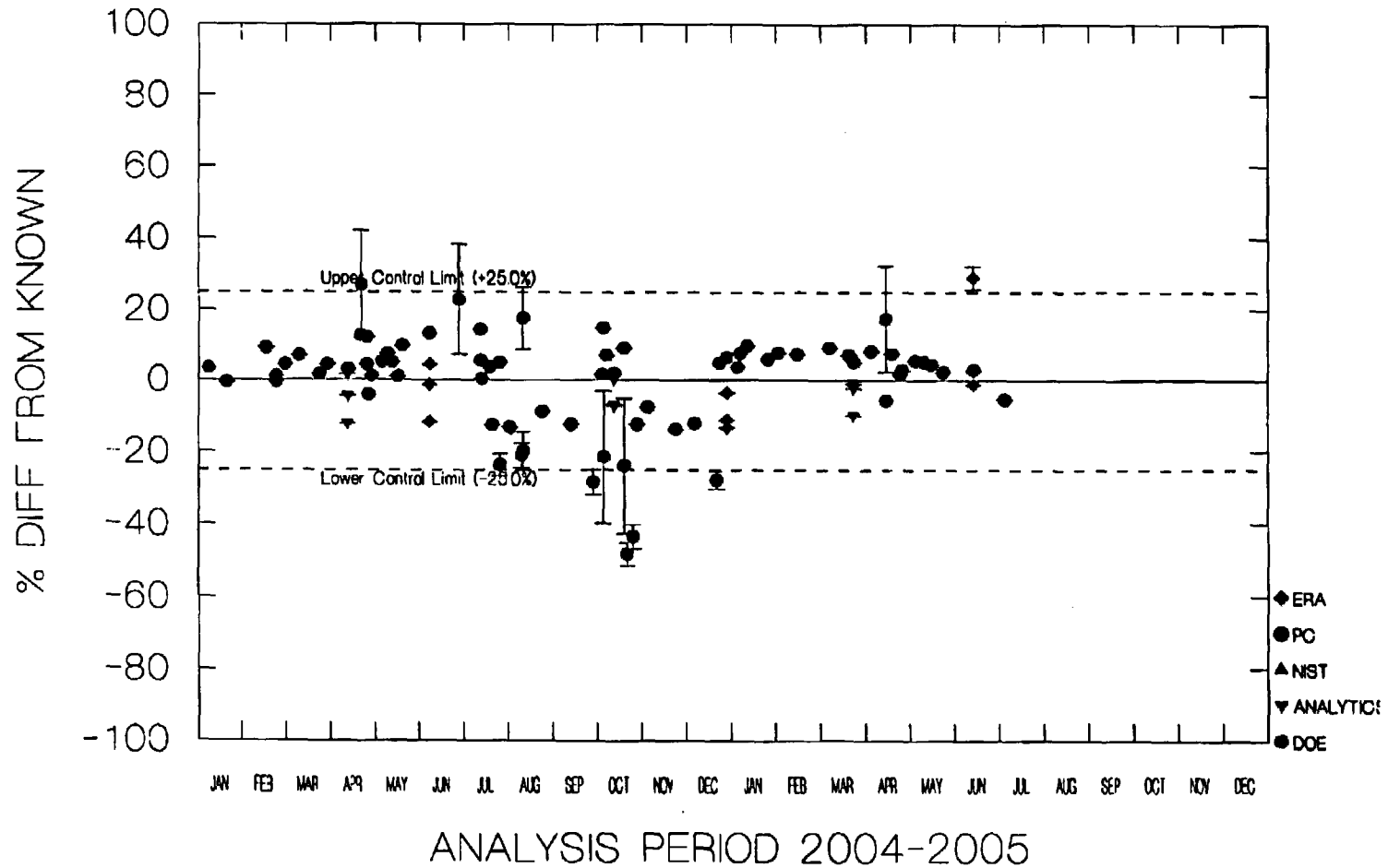
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP AIR PARTICULATE GROSS BETA RESULT BIAS



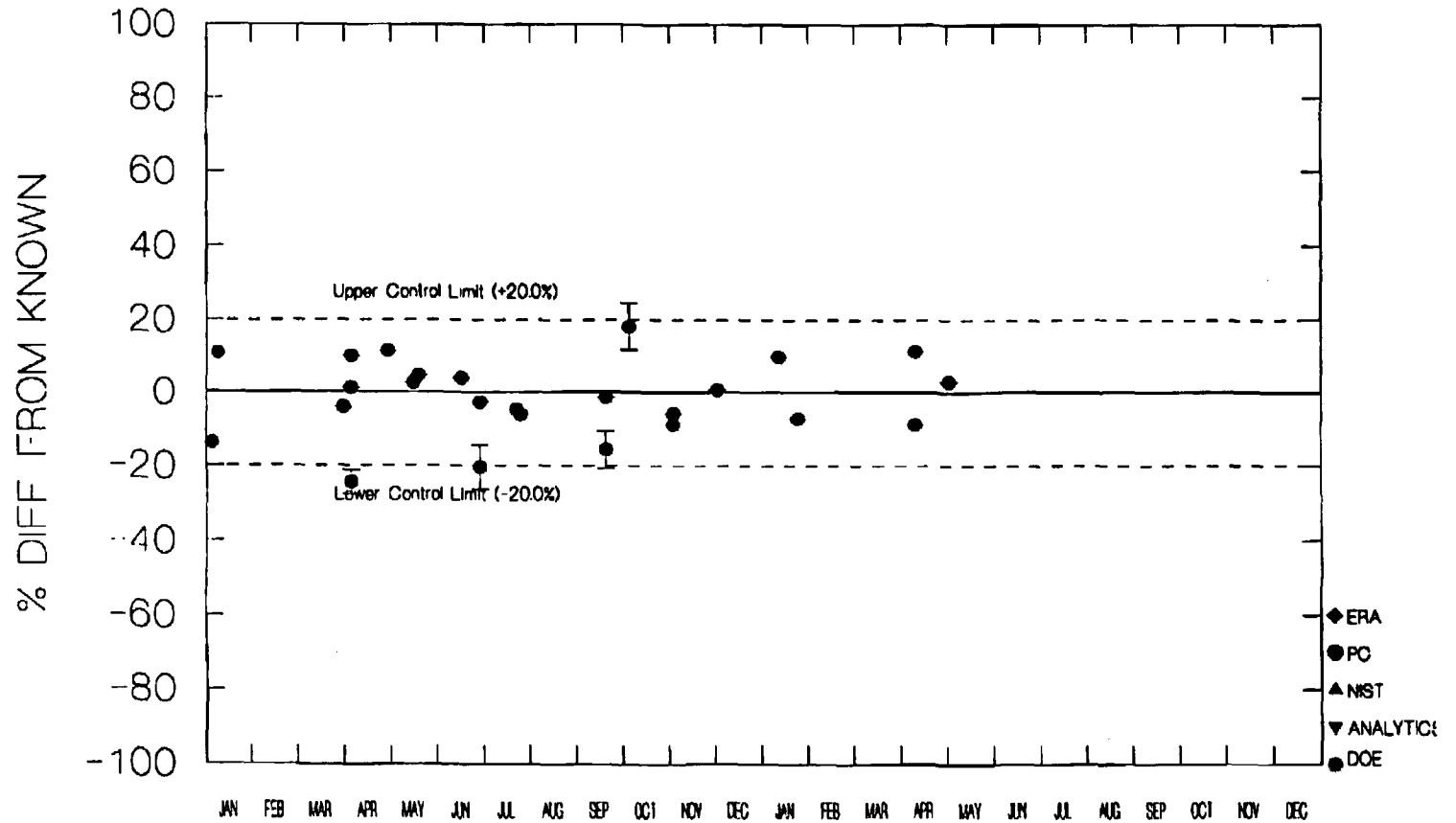
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP BETA (NON-AP) RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

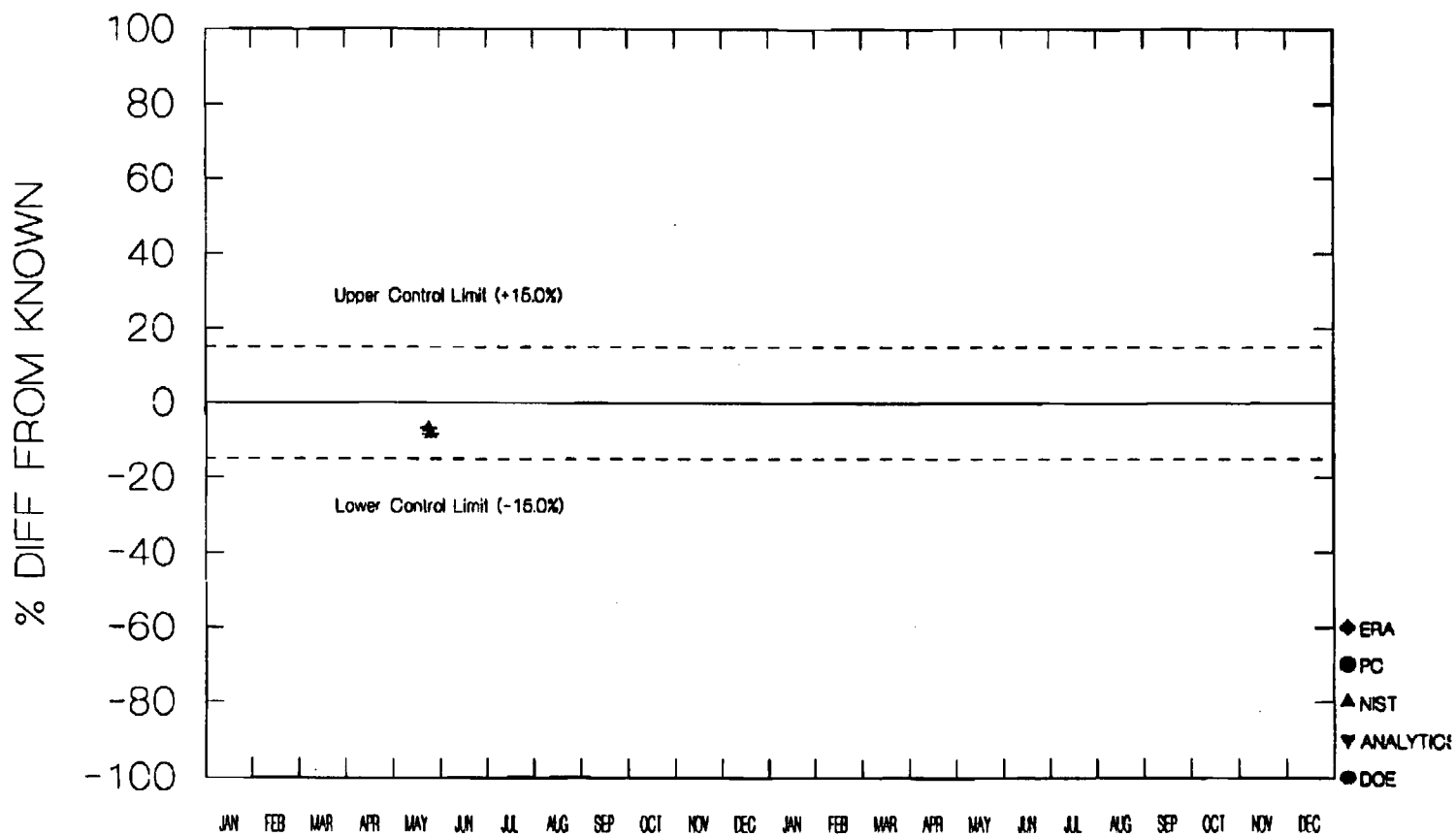
REMP C-14 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

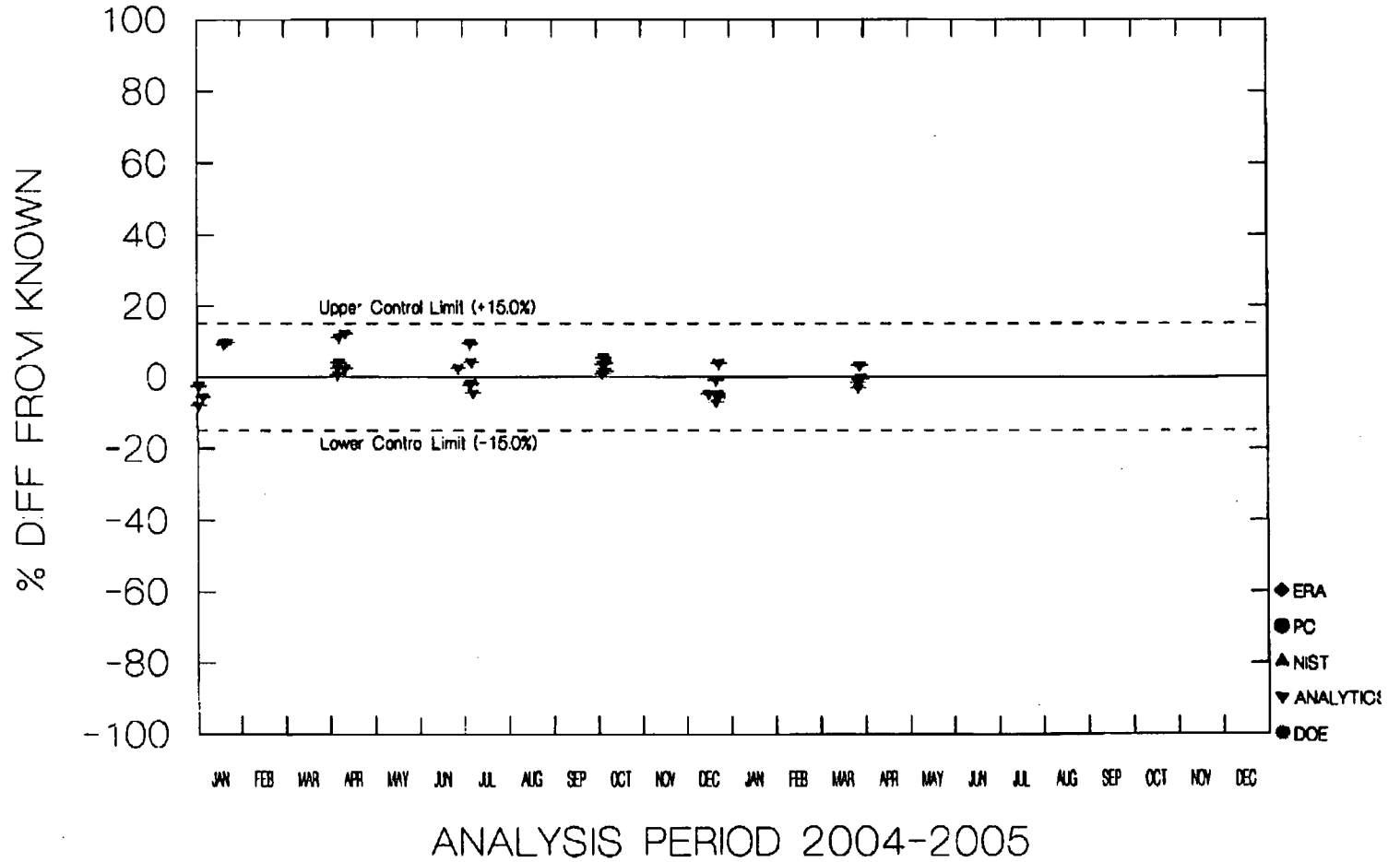
REMP Cd-109 RESULT BIAS



ANALYSIS PERIOD 2004-2005

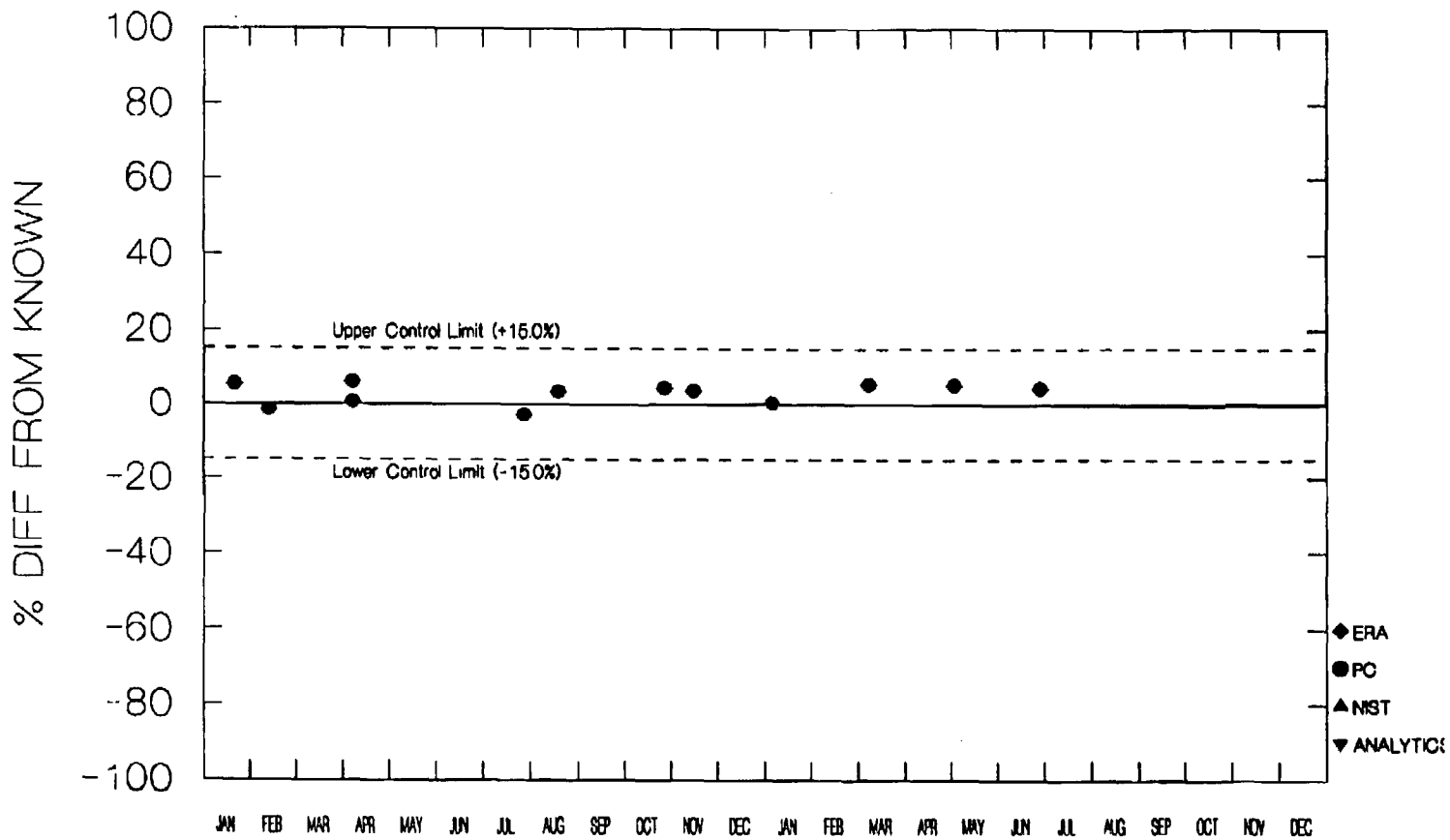
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Ce-141 RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

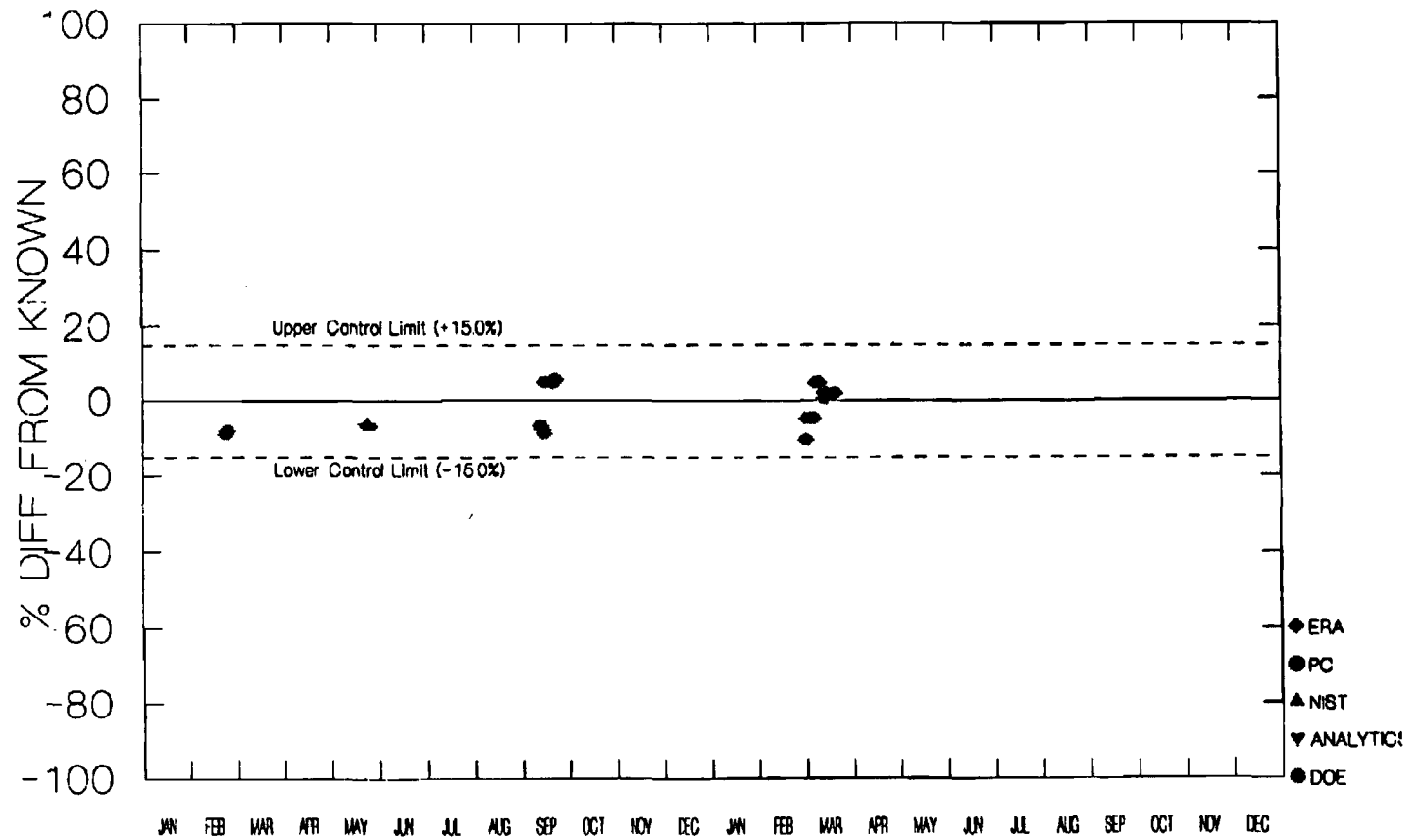
REMP CHARCOAL RESULT BIAS



ANALYSIS PERIOD 2002-2003

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

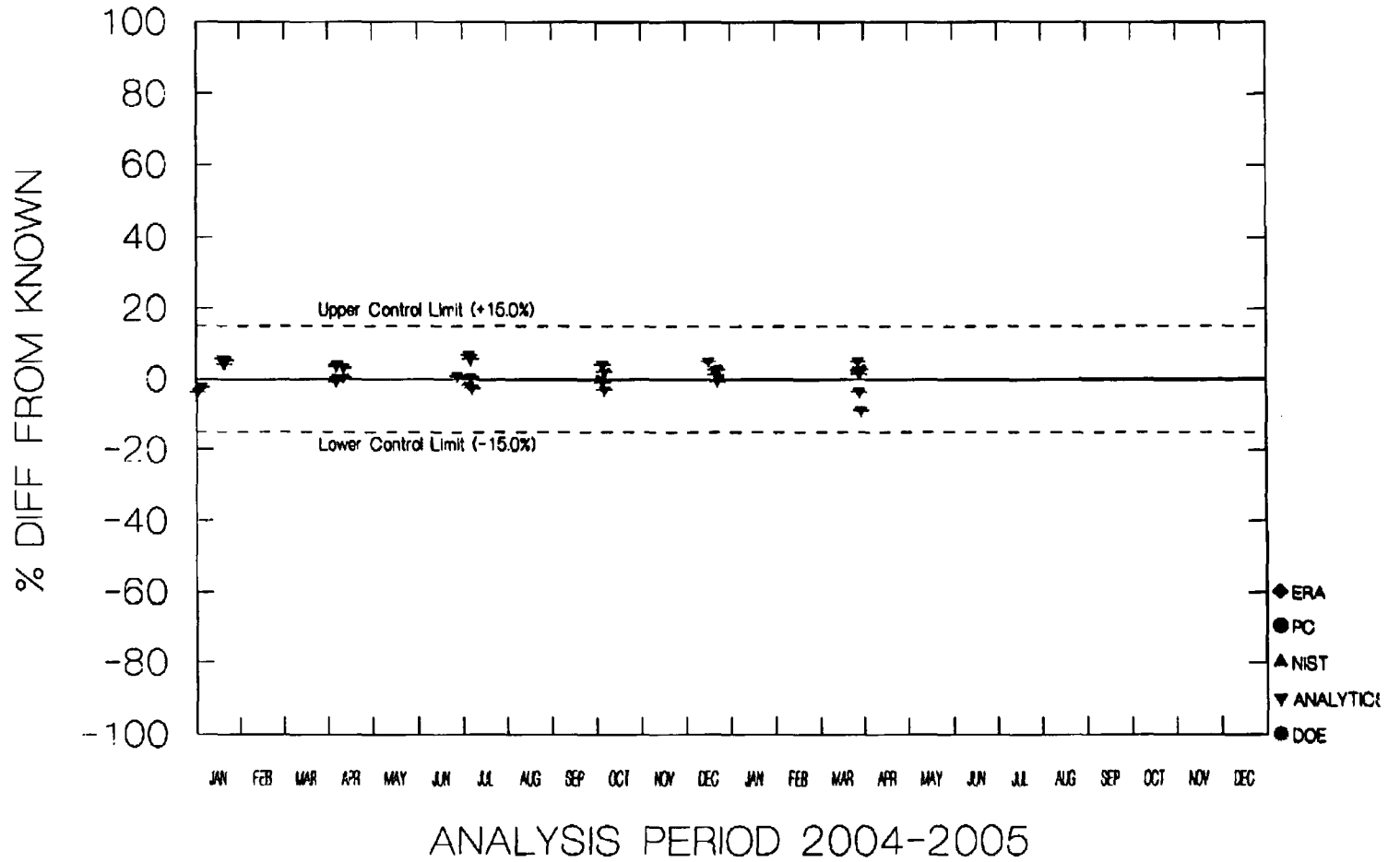
REMP Co-57 RESULT BIAS



ANALYSIS PERIOD 2004-2005

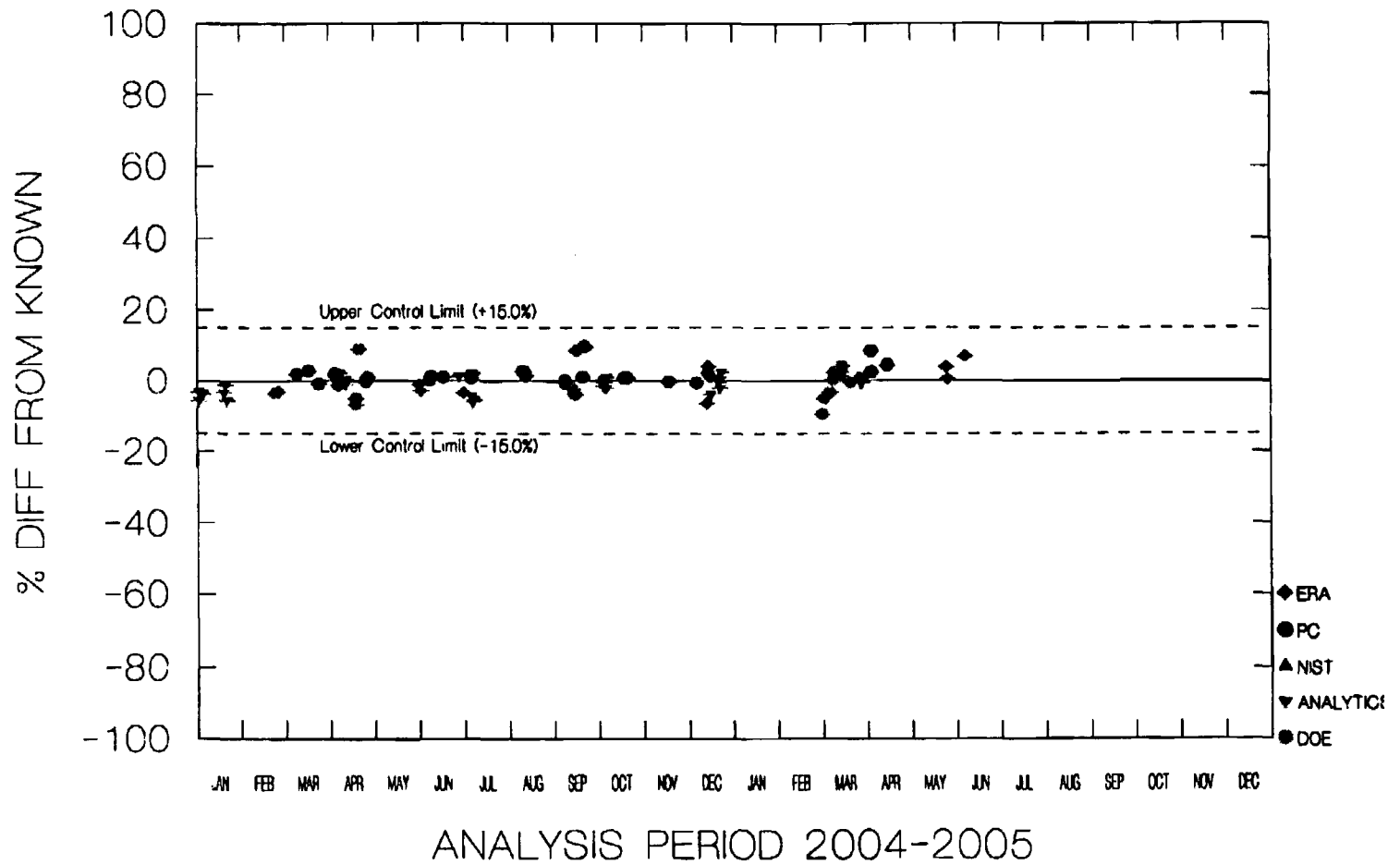
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Co-58 RESULT BIAS



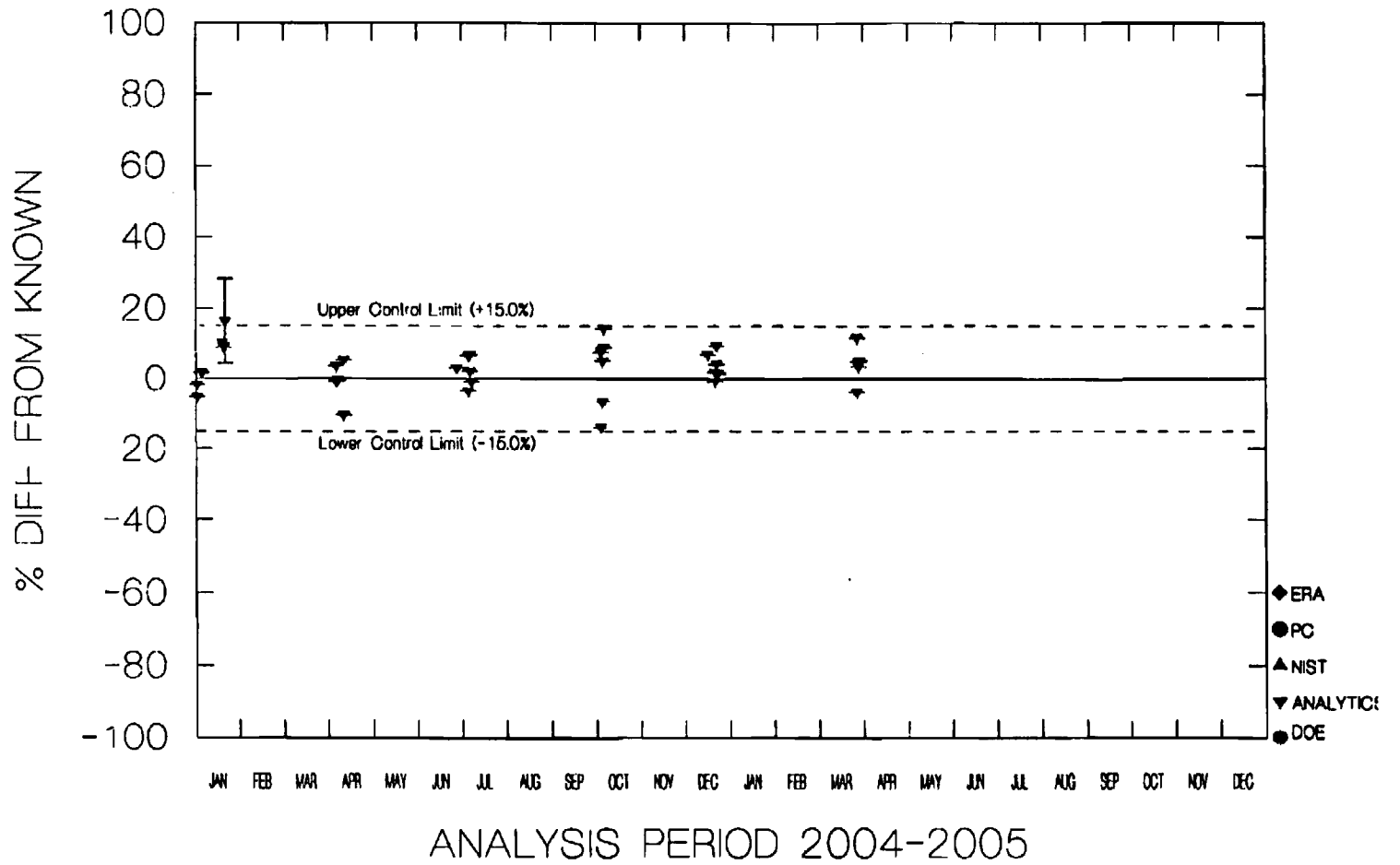
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Co-60 RESULT BIAS



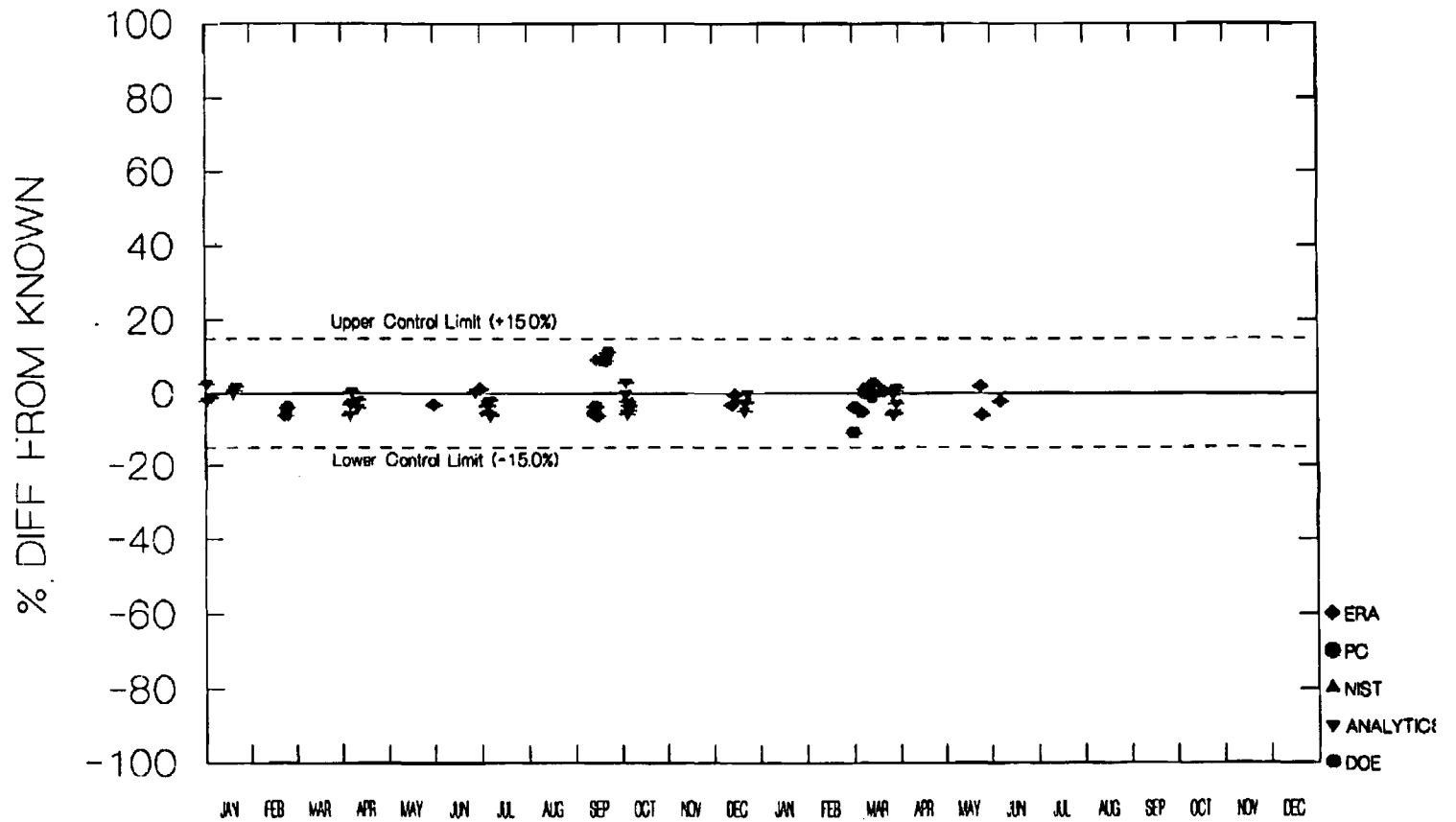
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Cr-51 RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

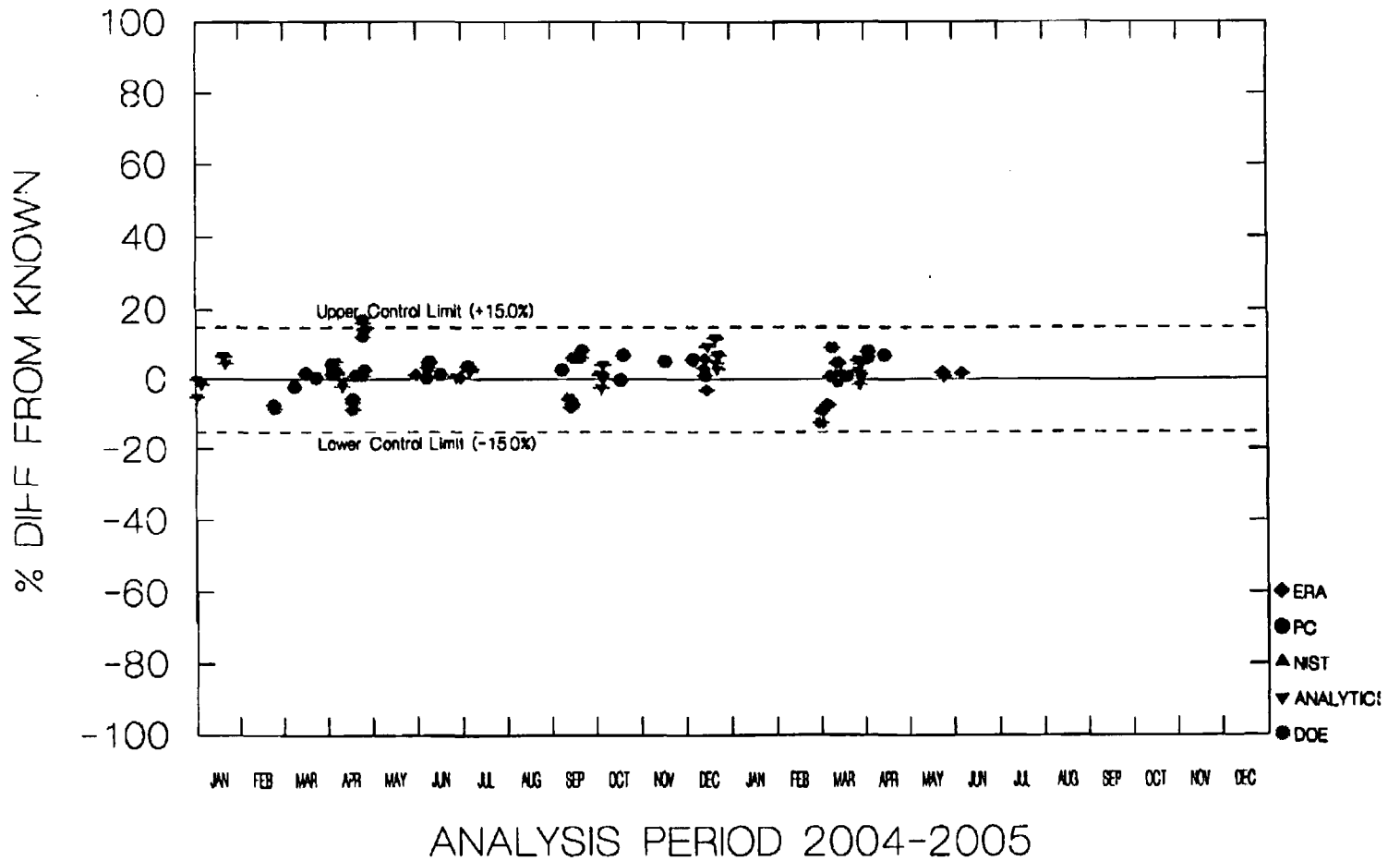
REMP Cs-134 RESULT BIAS



ANALYSIS PERIOD 2004-2005

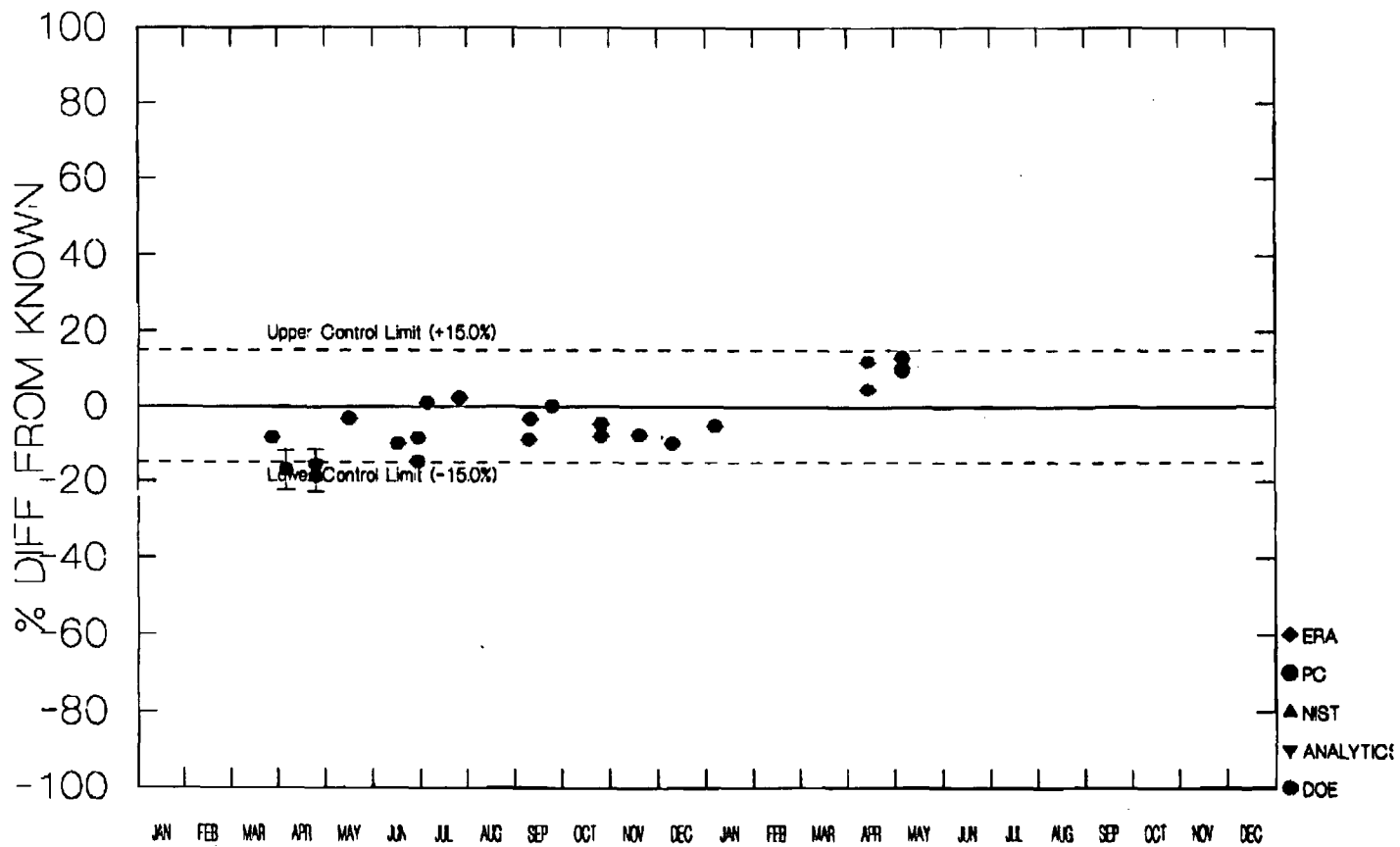
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Cs-137 RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

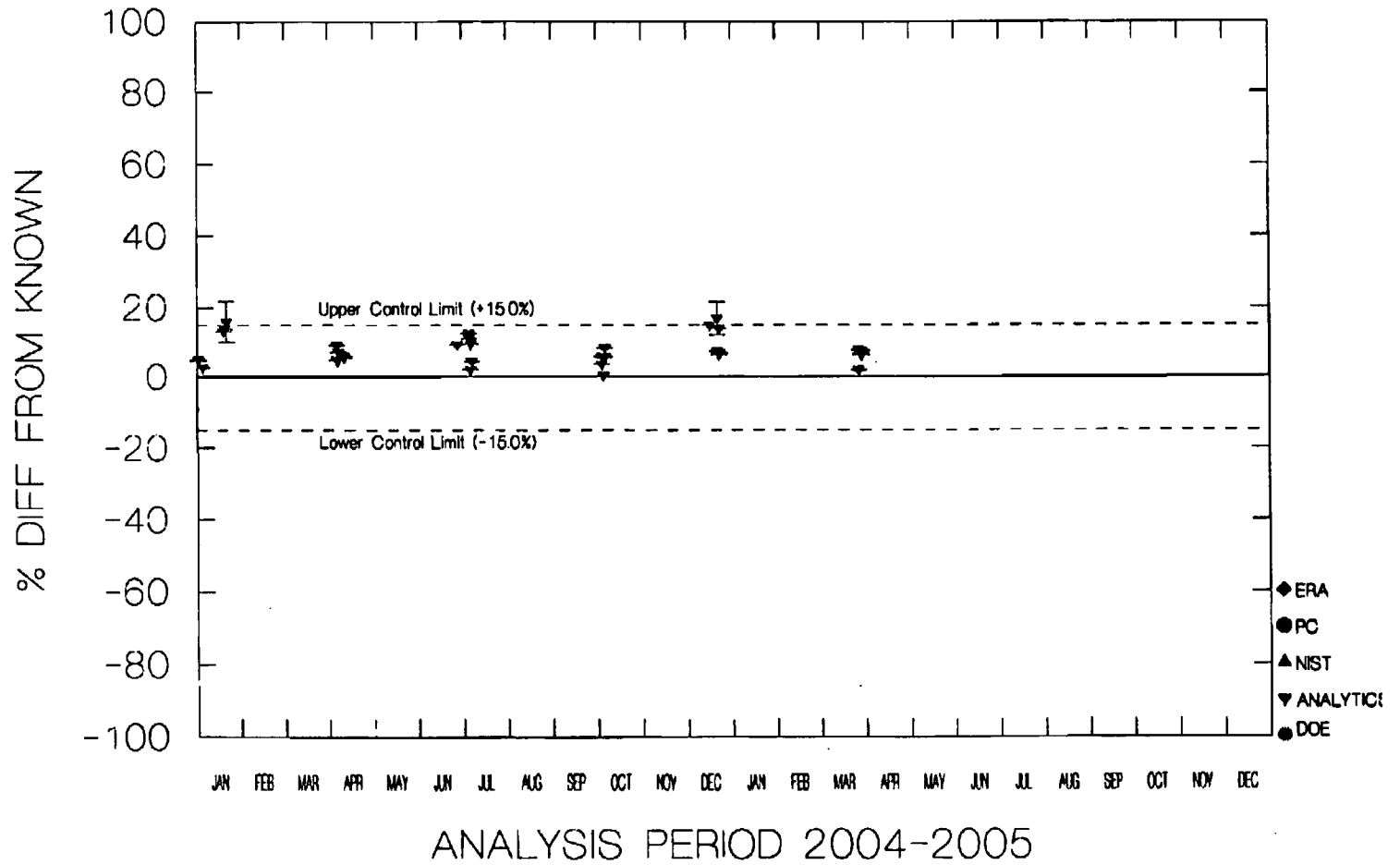
REMP Fe-55 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Fe-59 RESULT BIAS



INTRALABORATORY CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: PARTICULATE FILTER

ISSUANCE DATE: 03/30/2005

REF. DATE: 12/09/2004

LAB SAMPLE NO: 855704 ANAL DATE: 12/16/2004
 LAB SAMPLE NO: 855705 ANAL DATE: 12/21/2004
 LAB SAMPLE NO: 855706 ANAL DATE: 12/22/2004

UNITS: pCi/Filter

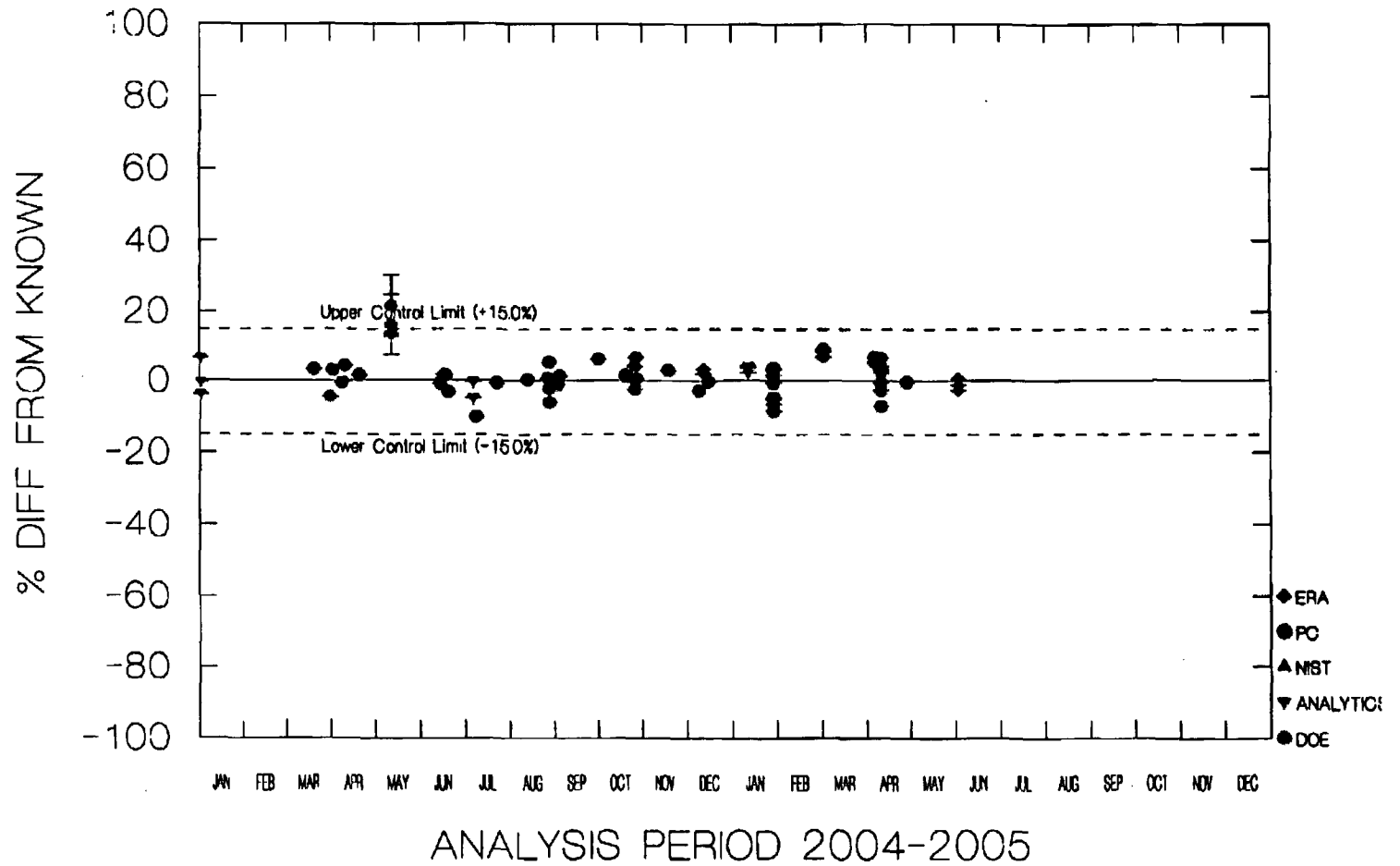
| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|------------------|------------------|---------------------------------------|-----------|-------------|----------------|----------------|----------------|
| Cs-137 | (688 ± 9)E-01 | (702 ± 10)E-01 | (673 ± 10)E-01 % DIFF FROM MEAN: | 68.76E 00 | 62.90E 00 | 9.30 0.00 | 11.70 2.10 | 7.00 -2.10 |
| Fe-59 | (696 ± 13)E-01 | (707 ± 14)E-01 | (690 ± 14)E-01 % DIFF FROM MEAN: | 69.77E 00 | 60.50E 00 | 15.00 -0.20 | 16.90* 1.30 | 14.00 -1.10 |
| Mn-54 | (759 ± 10)E-01 | (763 ± 11)E-01 | (766 ± 11)E-01 % DIFF FROM MEAN: | 76.27E 00 | 67.70E 00 | 12.10 -0.50 | 12.70 0.00 | 13.10 0.40 |
| Zn-65 | (1069 ± 20)E-01 | (1100 ± 21)E-01 | (1111 ± 21)E-01 % DIFF FROM MEAN: | 10.93E 01 | 97.70E 00 | 9.40 -2.20 | 12.60 0.60 | 13.70 1.60 |

Mean of three analyses of Analytics air filter for Fe-59 (bias = +15.3%) exceeded the ±15% bias limit. CR 05-11 was initiated to investigate the failure.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

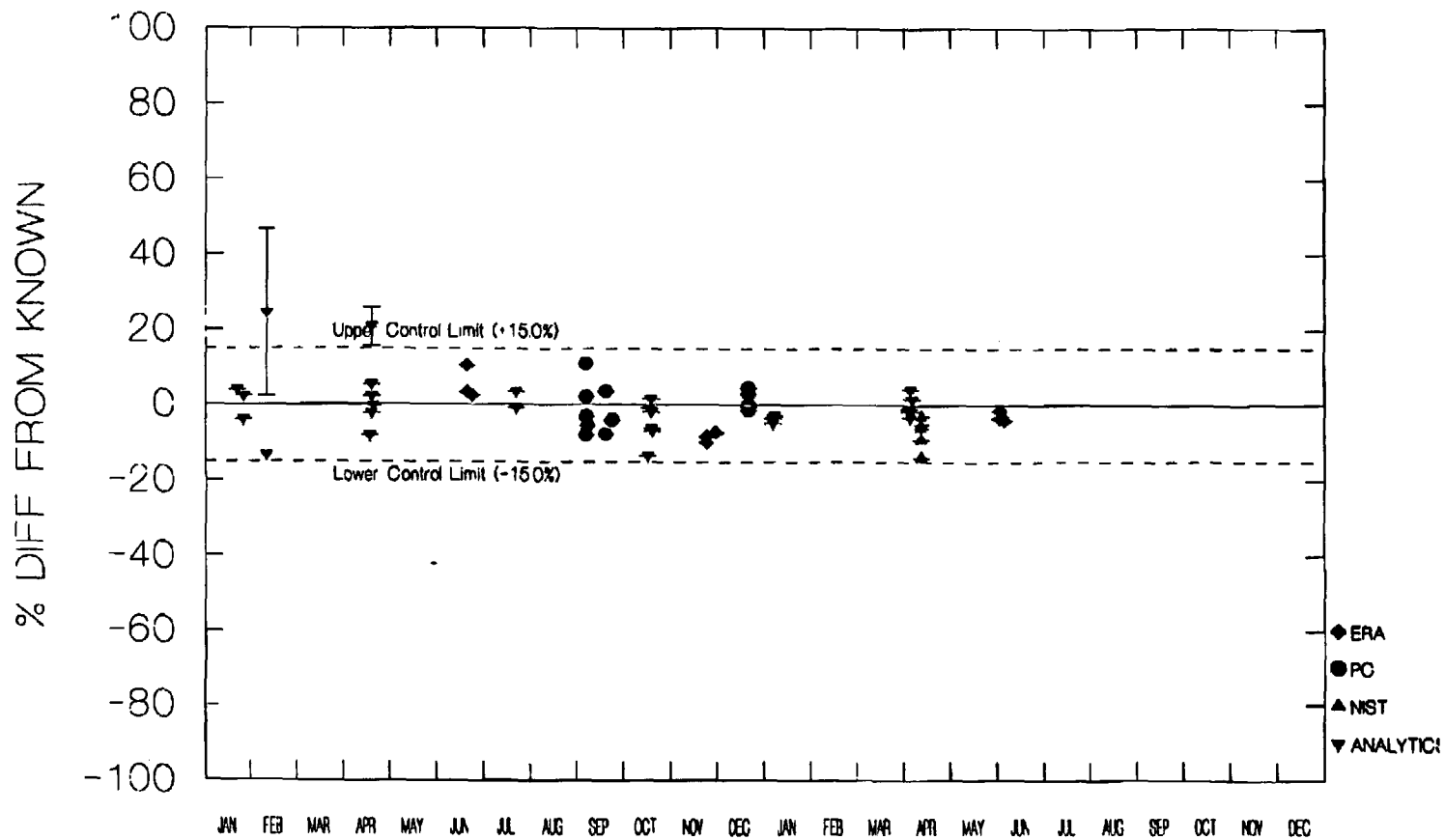
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP H-3 RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

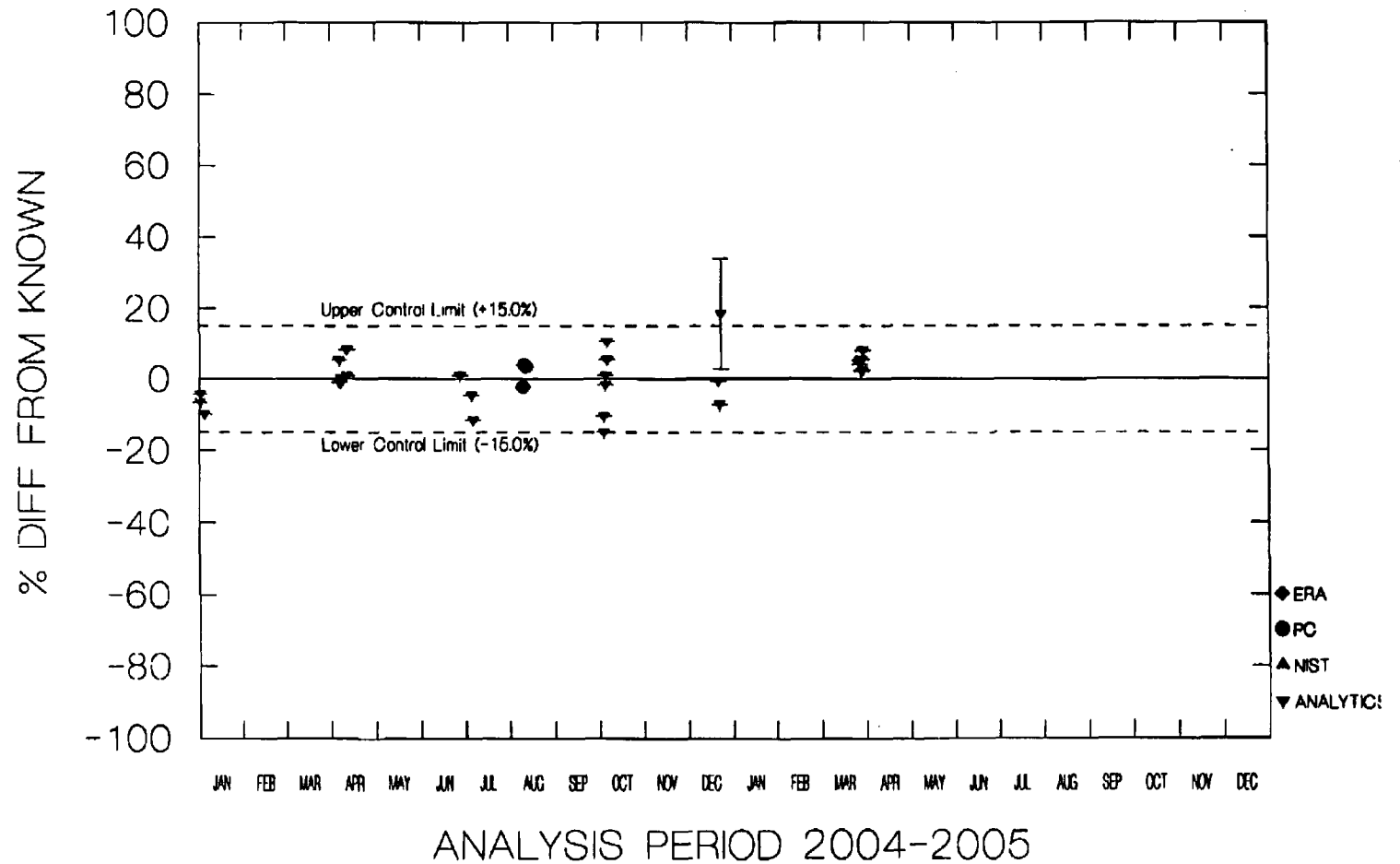
REMP I-131 LOW LEVEL RESULT BIAS



ANALYSIS PERIOD 2004-2005

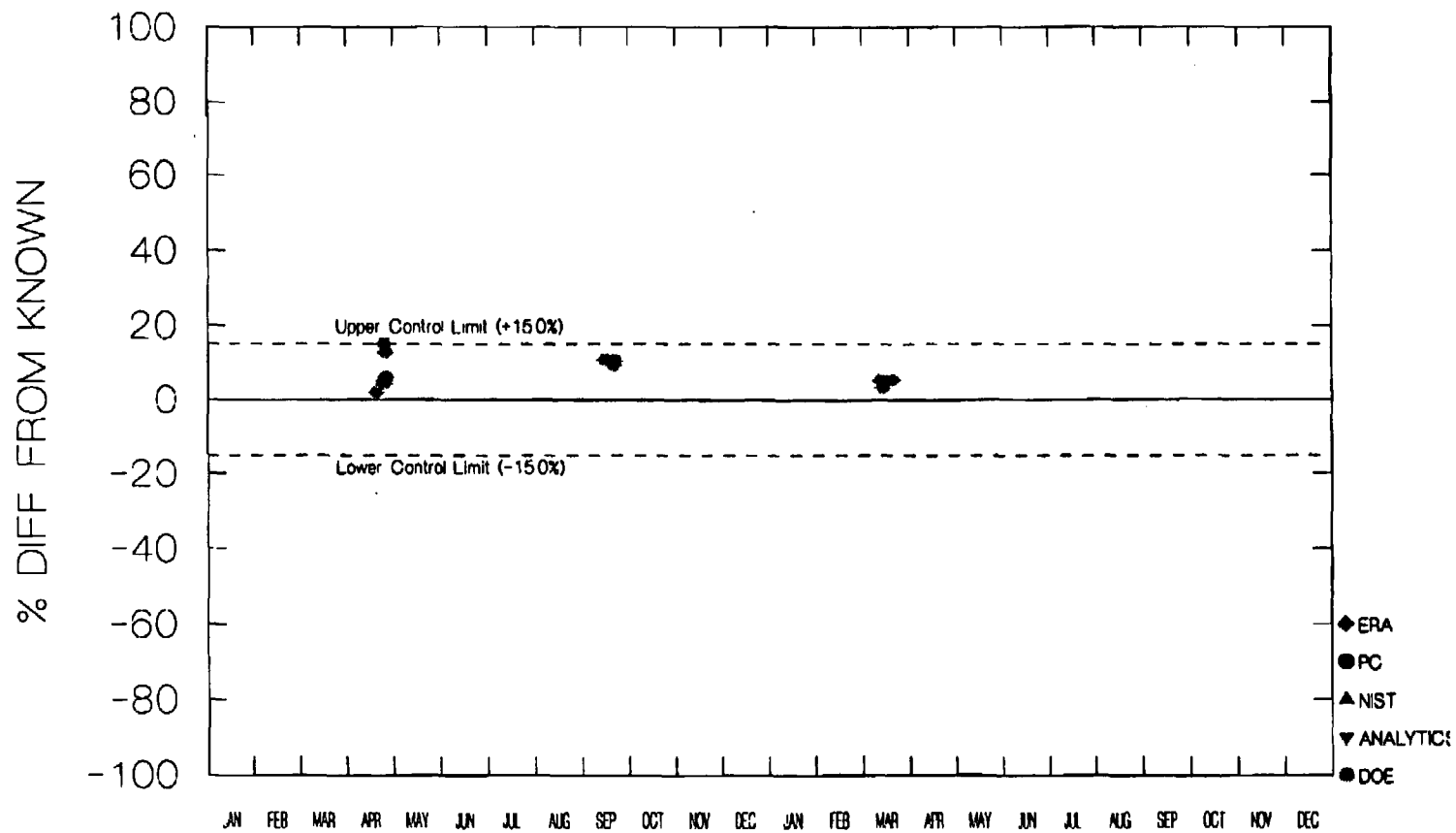
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP I-131 (Gamma) RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

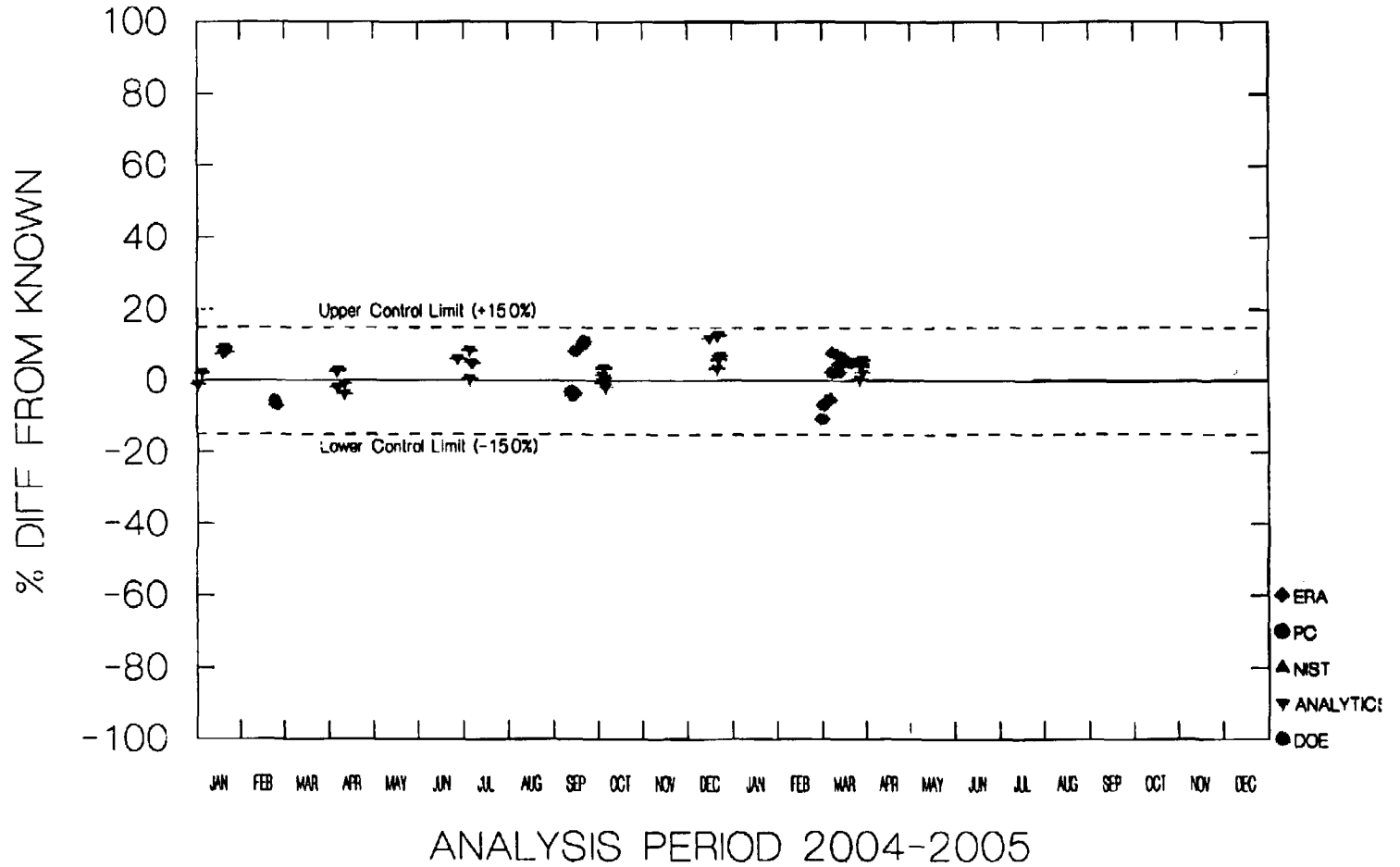
REMP K-40 RESULT BIAS



ANALYSIS PERIOD 2004-2005

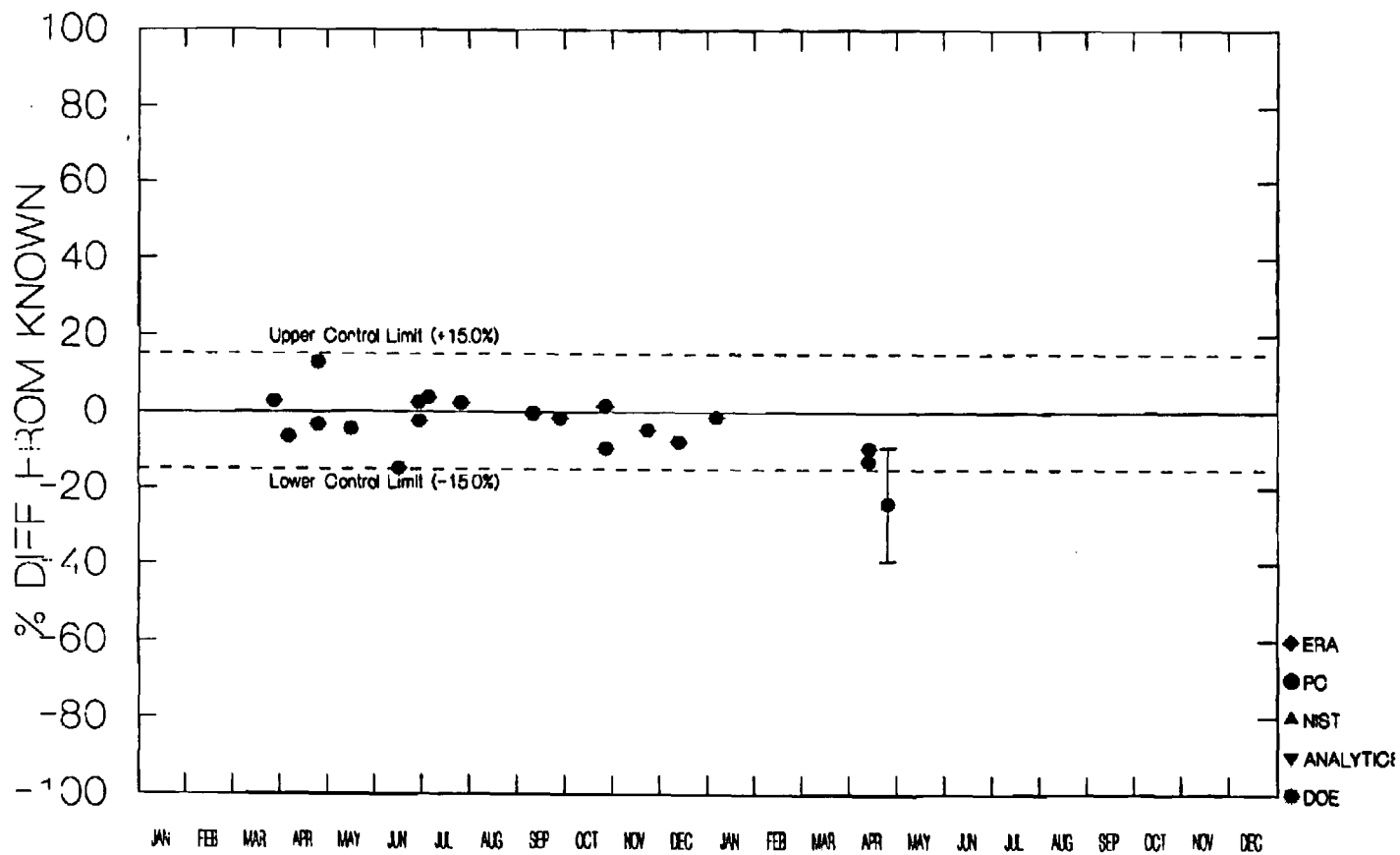
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Mn-54 RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Ni-63 RESULT BIAS



ANALYSIS PERIOD 2004-2005

YR BATCH 27 QC CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: WATER

ISSUANCE DATE: 06/09/2005

REF. DATE: 03/29/2005

LAB SAMPLE NO: 902402 ANAL DATE: 04/26/2005

UNITS: pCi/L

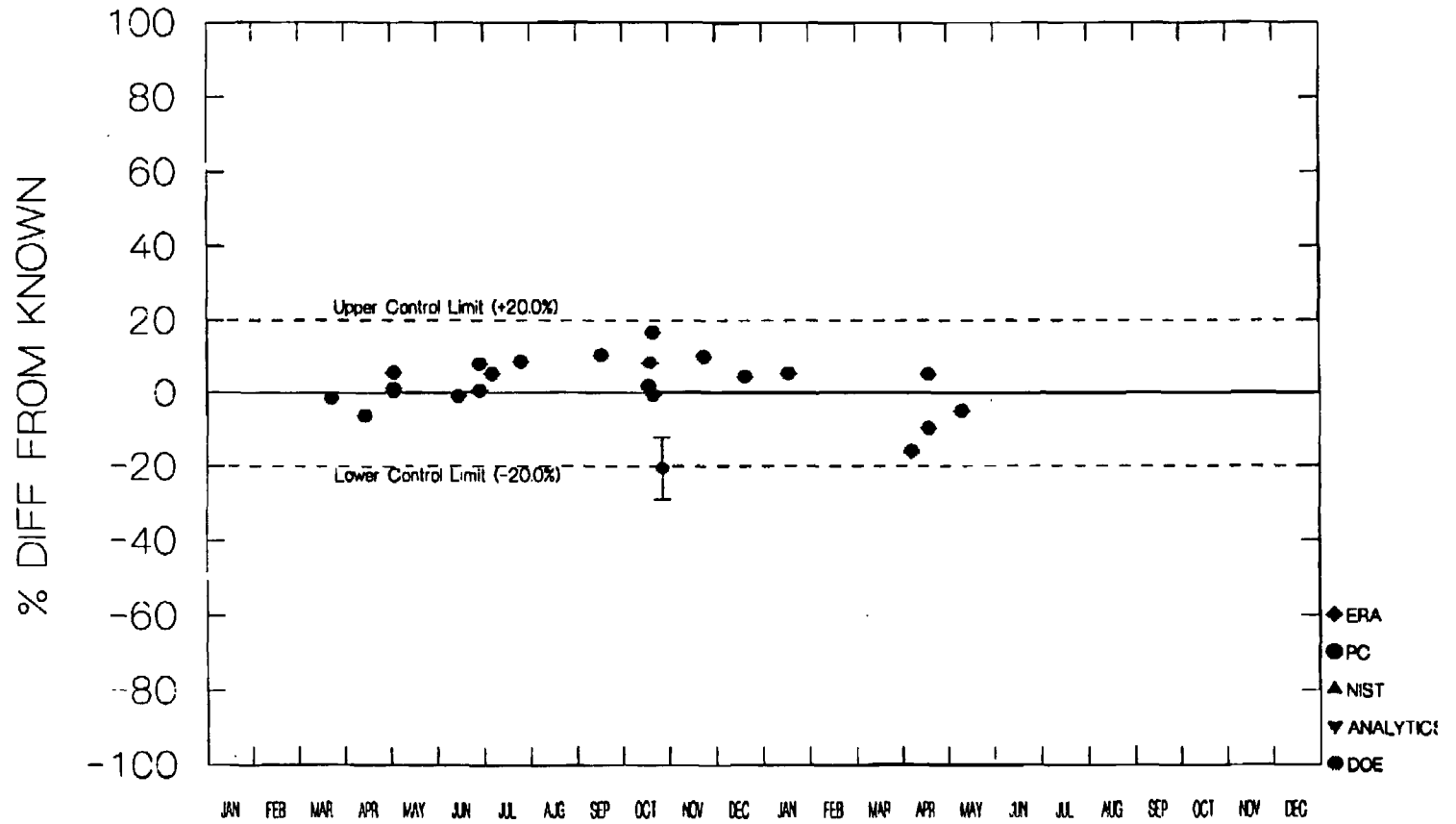
| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|-----------------|----------|----------|------|----------------|-------------|-------------|-------------|
| Ni-63 | (121 ± 12)E 00 | | | | 15.99E 01 | -24.30 | | |

Internal spike for Ni-63 in water was analyzed according to specific client protocol. Sample activity was <10 times the MDC and the result met the client's QC criteria of ±60%.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

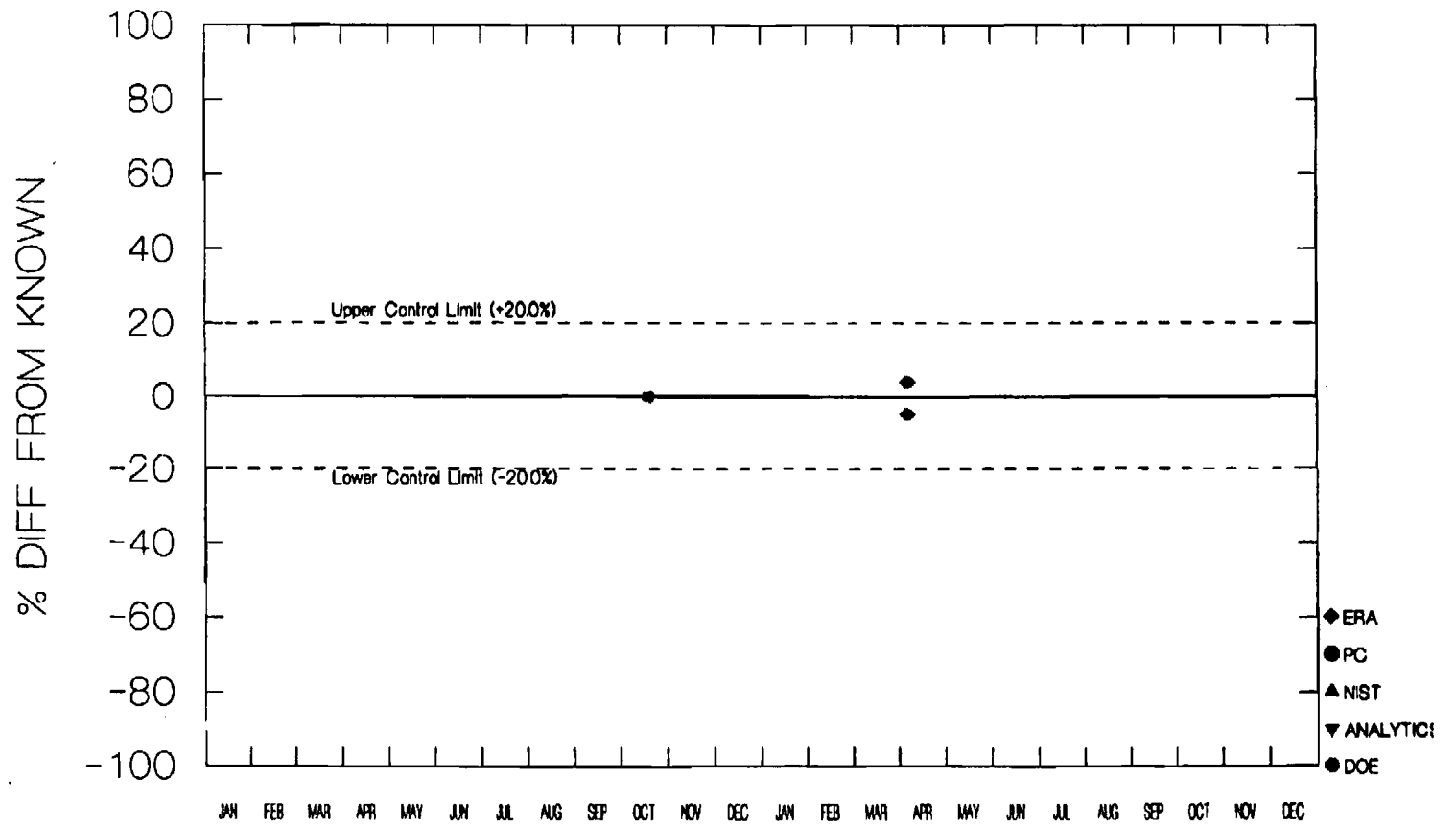
REMP Pu-238 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

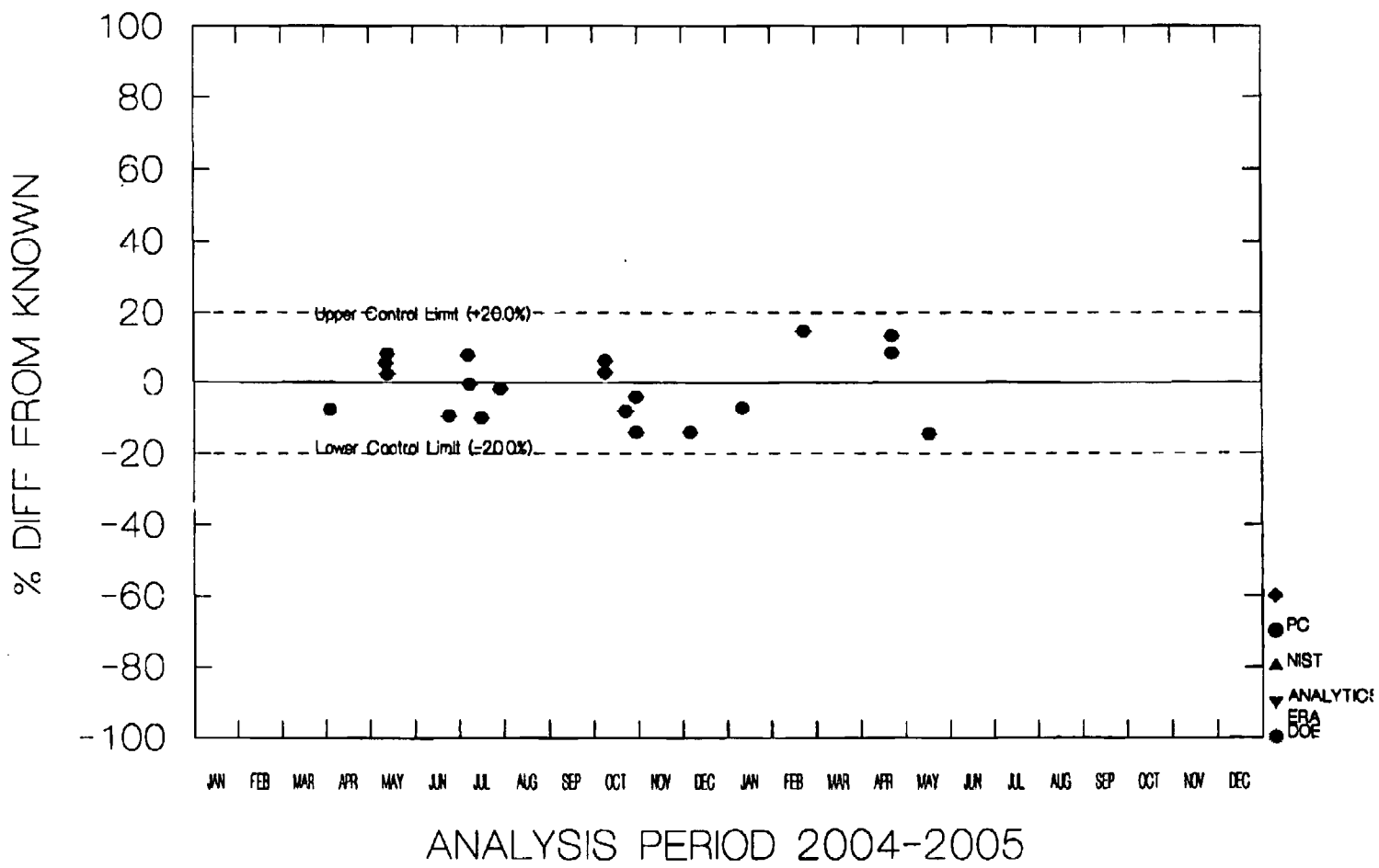
REMP PU-239 RESULT BIAS



ANALYSIS PERIOD 2004-2005

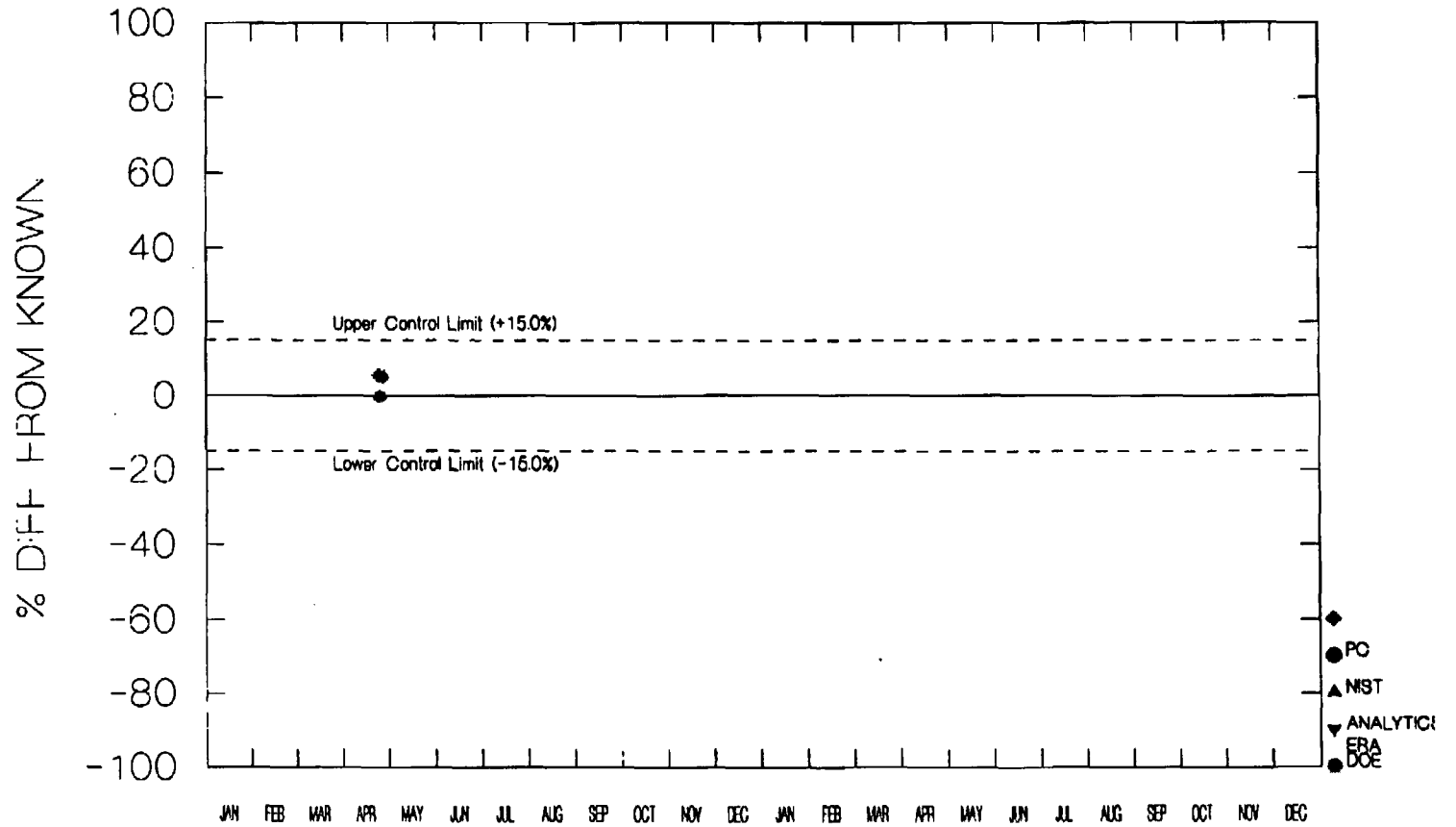
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Pu-241 RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

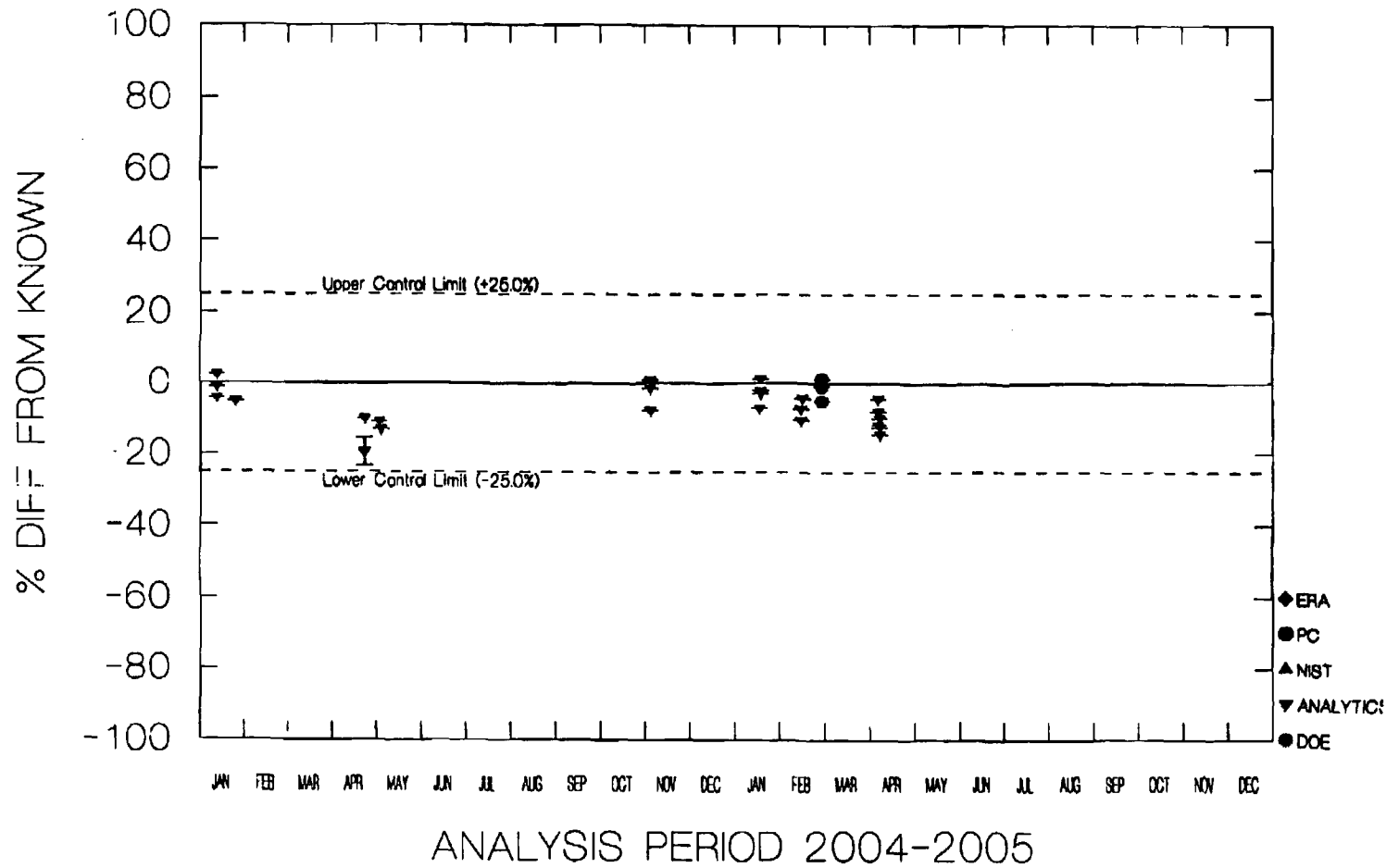
REMP Ra-228 BY GAMMA RESULT BIAS



ANALYSIS PERIOD 2004-2005

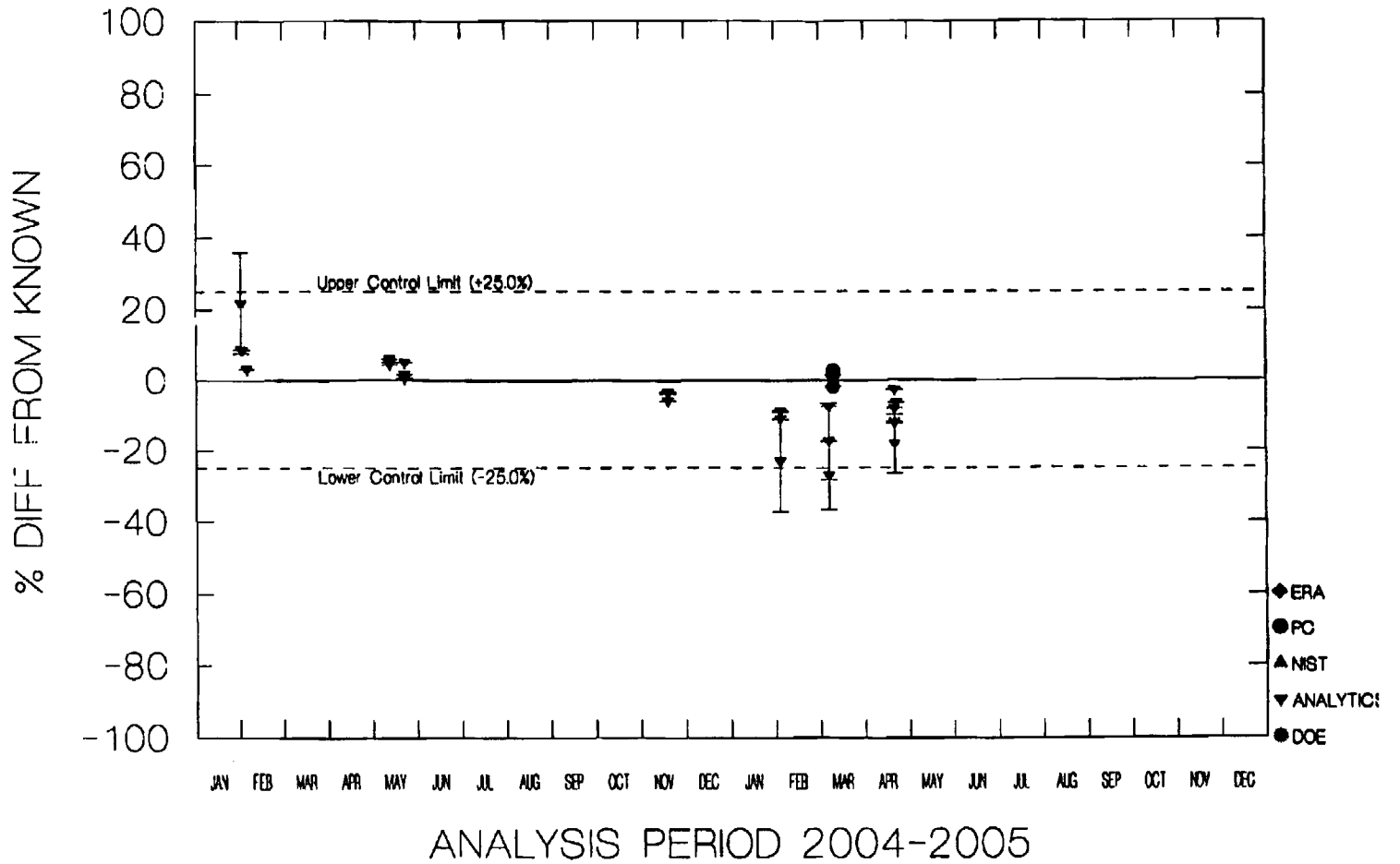
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Sr-89 (COMBINED WITH Sr-90) RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Sr-90 (COMBINED WITH Sr-89) RESULT BIAS



YR BATCH 26 QC CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: WATER

ISSUANCE DATE: 05/24/2005

REF. DATE: 03/29/2005

LAB SAMPLE NO: 899202 ANAL DATE: 04/20/2005

UNITS: pCi/L

| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|-----------------|----------|----------|------|-------------|----------|----------|----------|
| Sr-90 | (426 ± 33)E-01 | | | | 36.30E 00 | 17.40 | | |

Internal spike for Sr-90 in water was analyzed according to specific client protocol. Sample activity was <10 times the MDC and the result met the client's QC criteria of ±25%. The result was within 2 sigma of the known value.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

YR BATCH 26 QC CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: WATER

ISSUANCE DATE: 05/24/2005

REF. DATE: 03/15/2005

LAB SAMPLE NO: 899207 ANAL DATE: 04/20/2005

UNITS: pCi/L

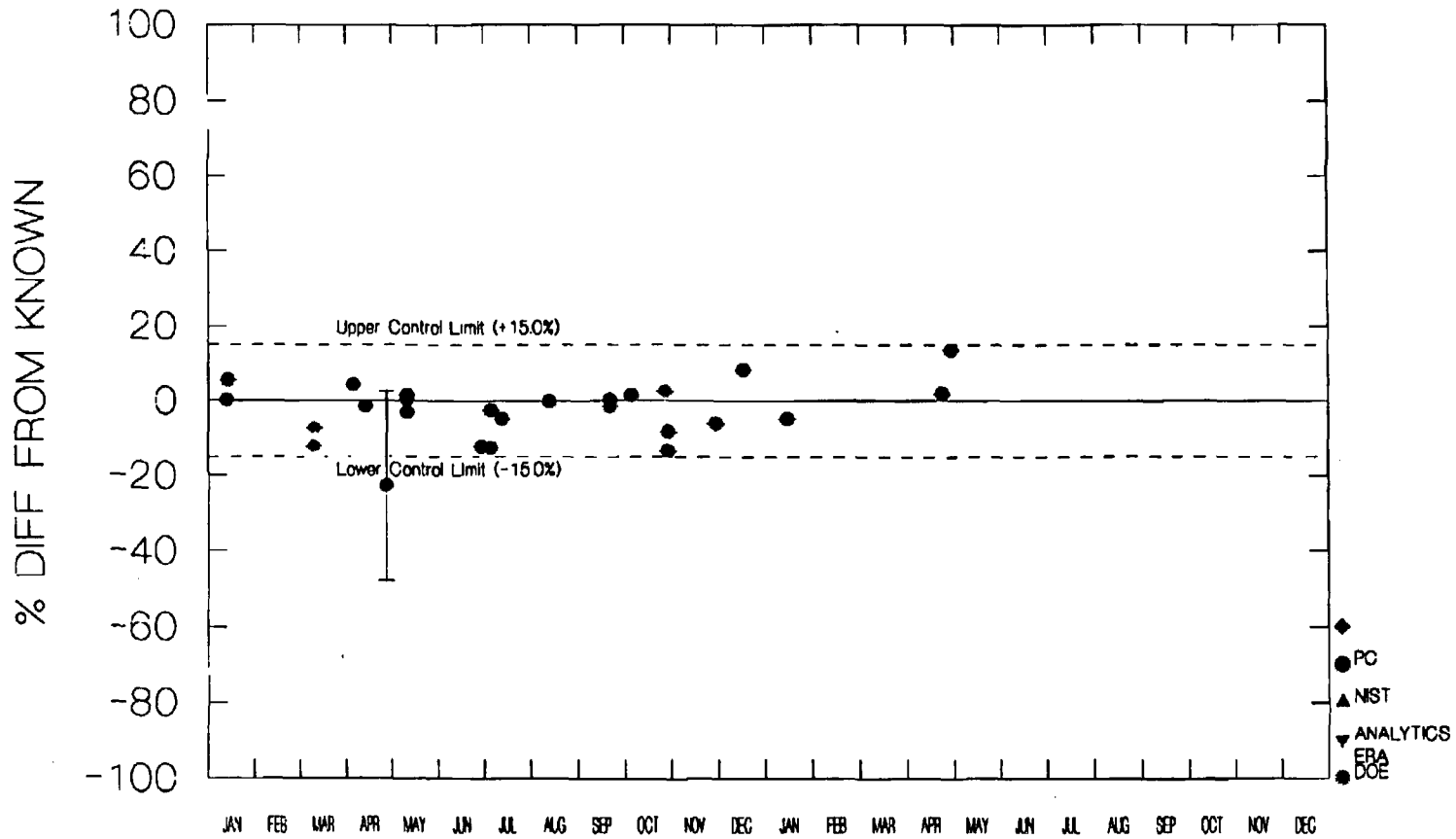
| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|-----------------|----------|----------|------|-------------|----------|----------|----------|
| Sr-90 | (486 ± 38)E-01 | | | | 39.90E 00 | 21.80 | | |

Internal spike for Sr-90 in water was analyzed according to specific client protocol. Sample activity was <10 times the MDC and the result met the client's QC criteria of ±25%.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

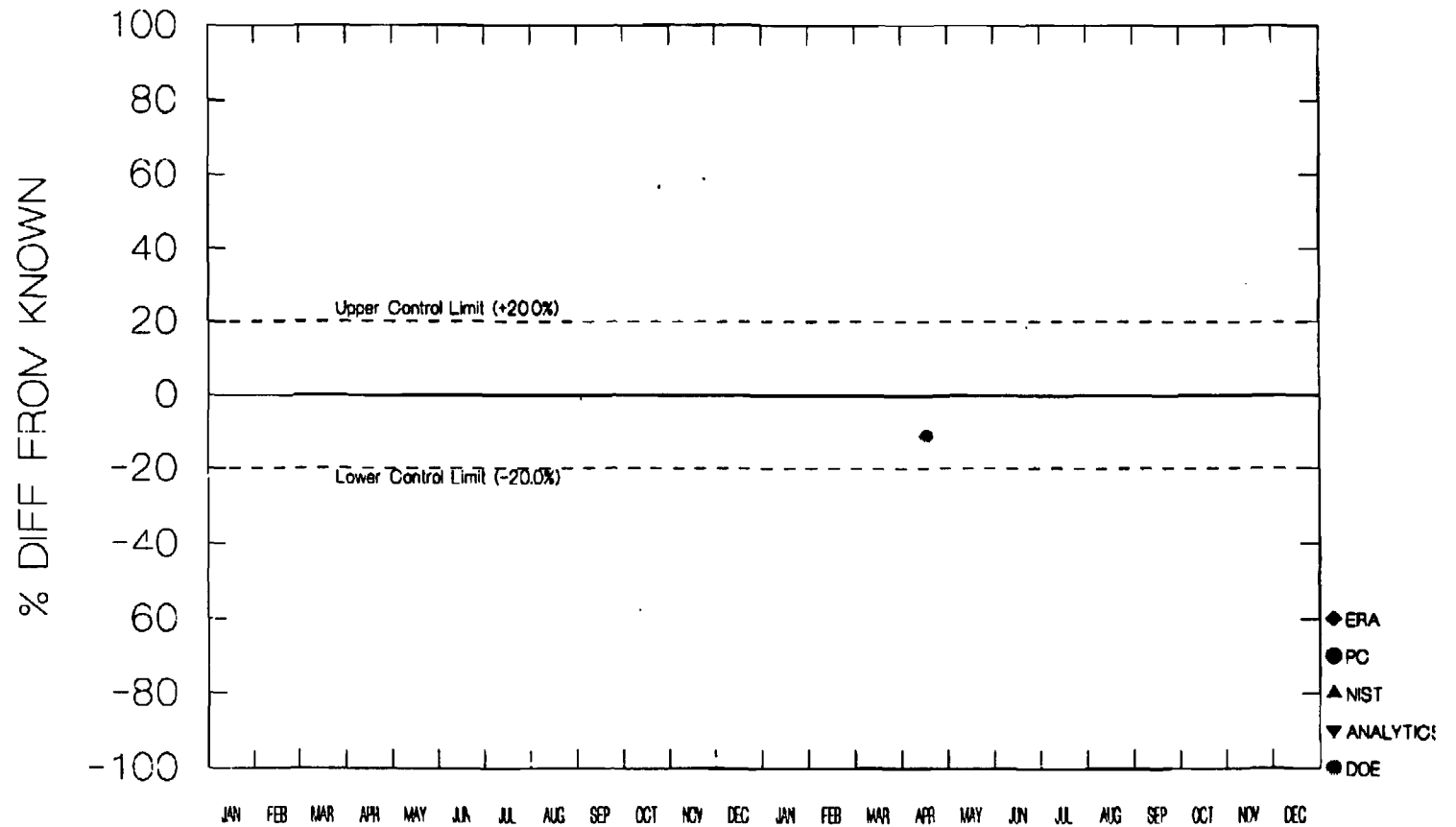
REMP Tc-99 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

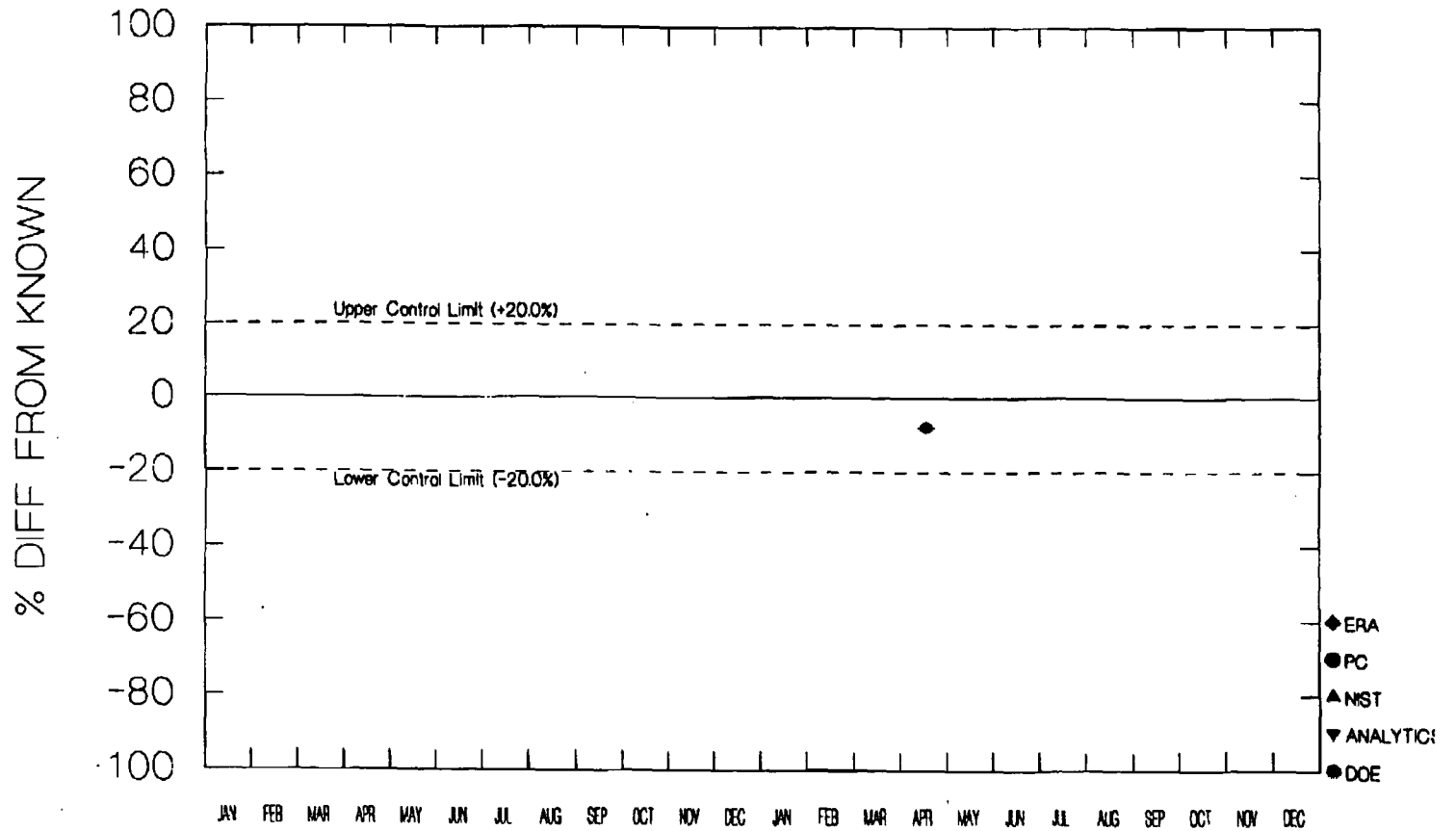
REMP U-234 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

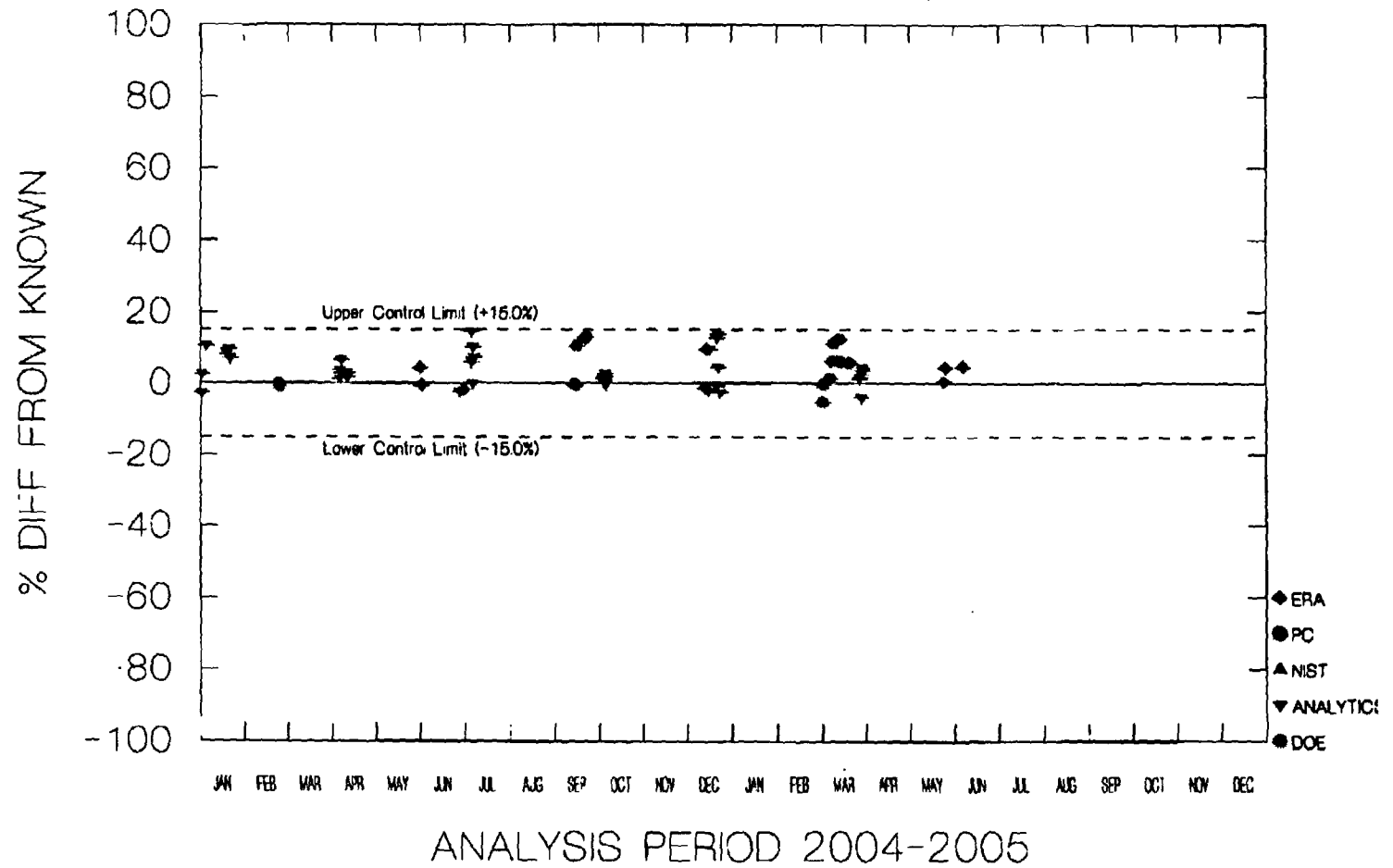
REMP U-238 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Zn-65 RESULT BIAS

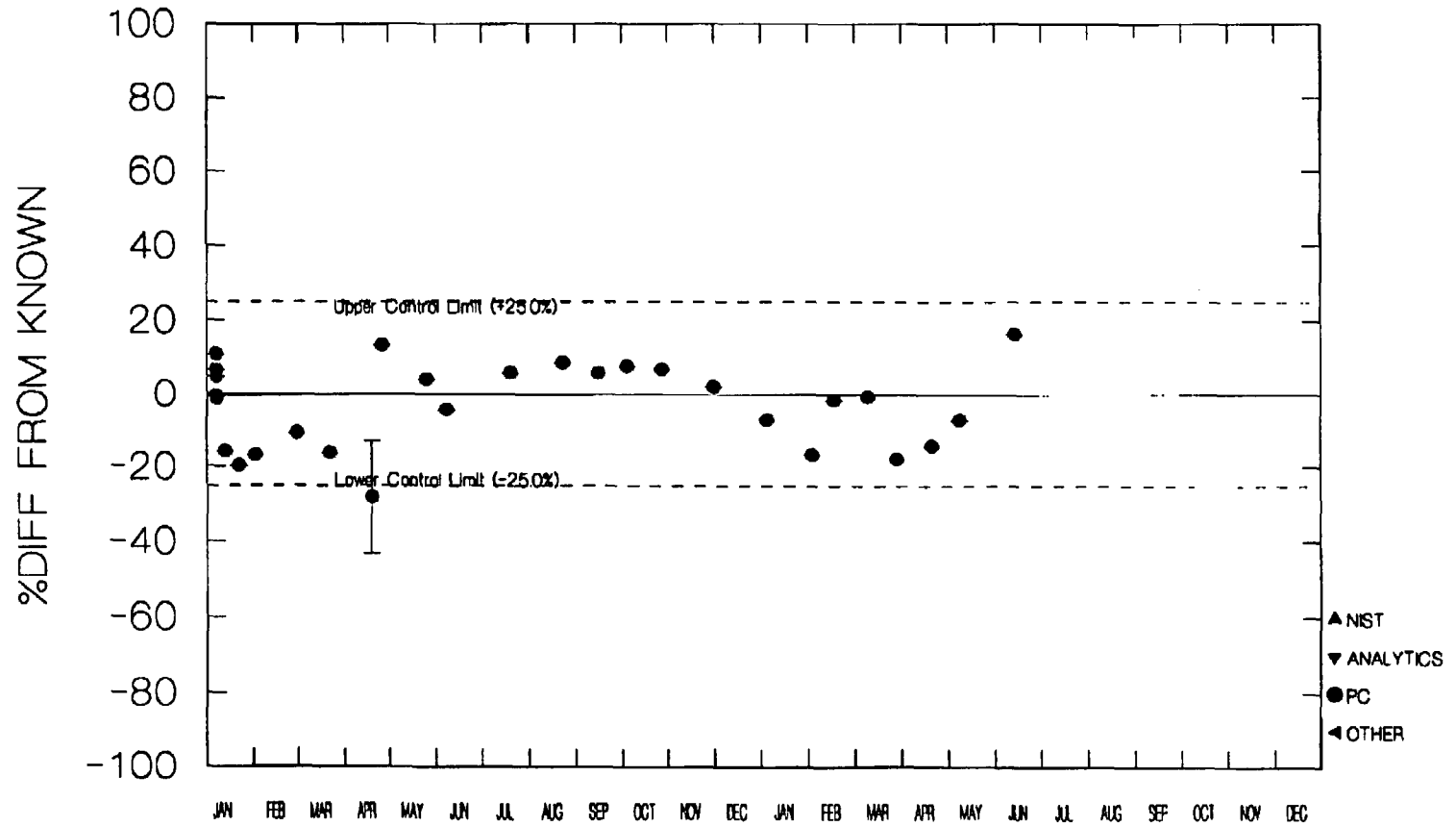


APPENDIX B

**EFFLUENT MONITORING AND WASTE CHARACTERIZATION
QUALITY CONTROL RESULTS
(10CFR PART 50/61)**

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

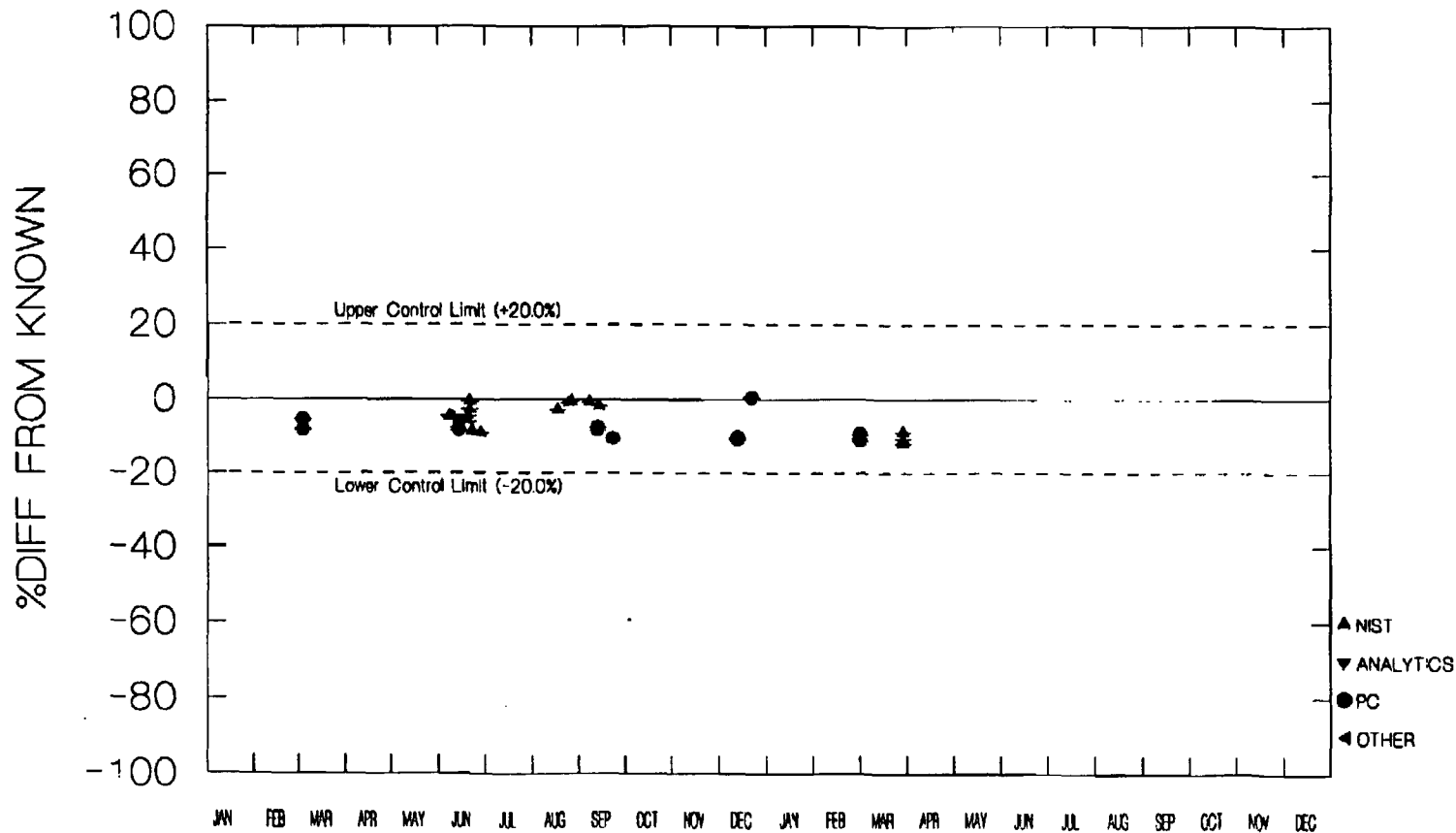
PART 50/61 GROSS ALPHA RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

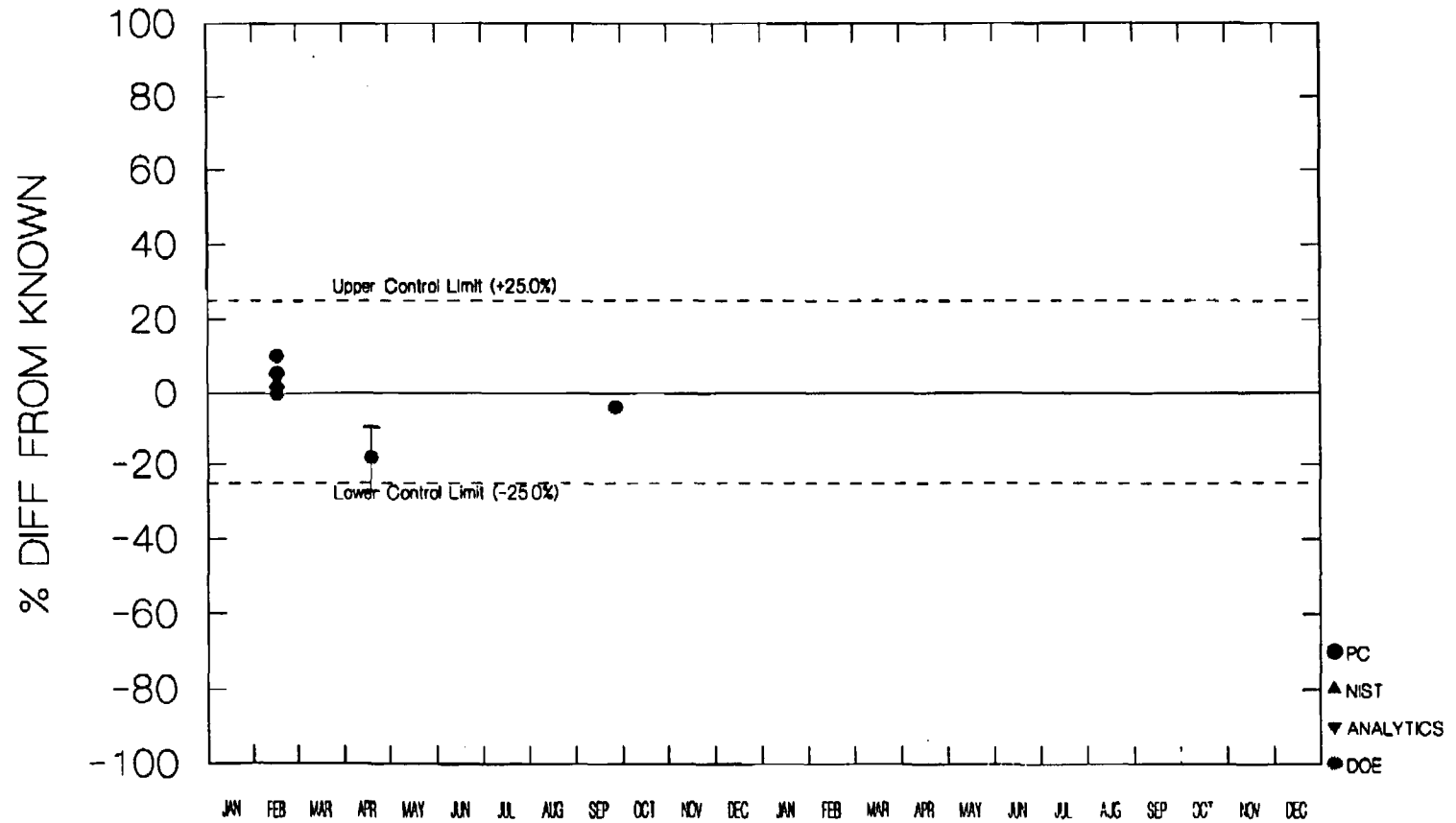
PART 50/61 Am-241 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

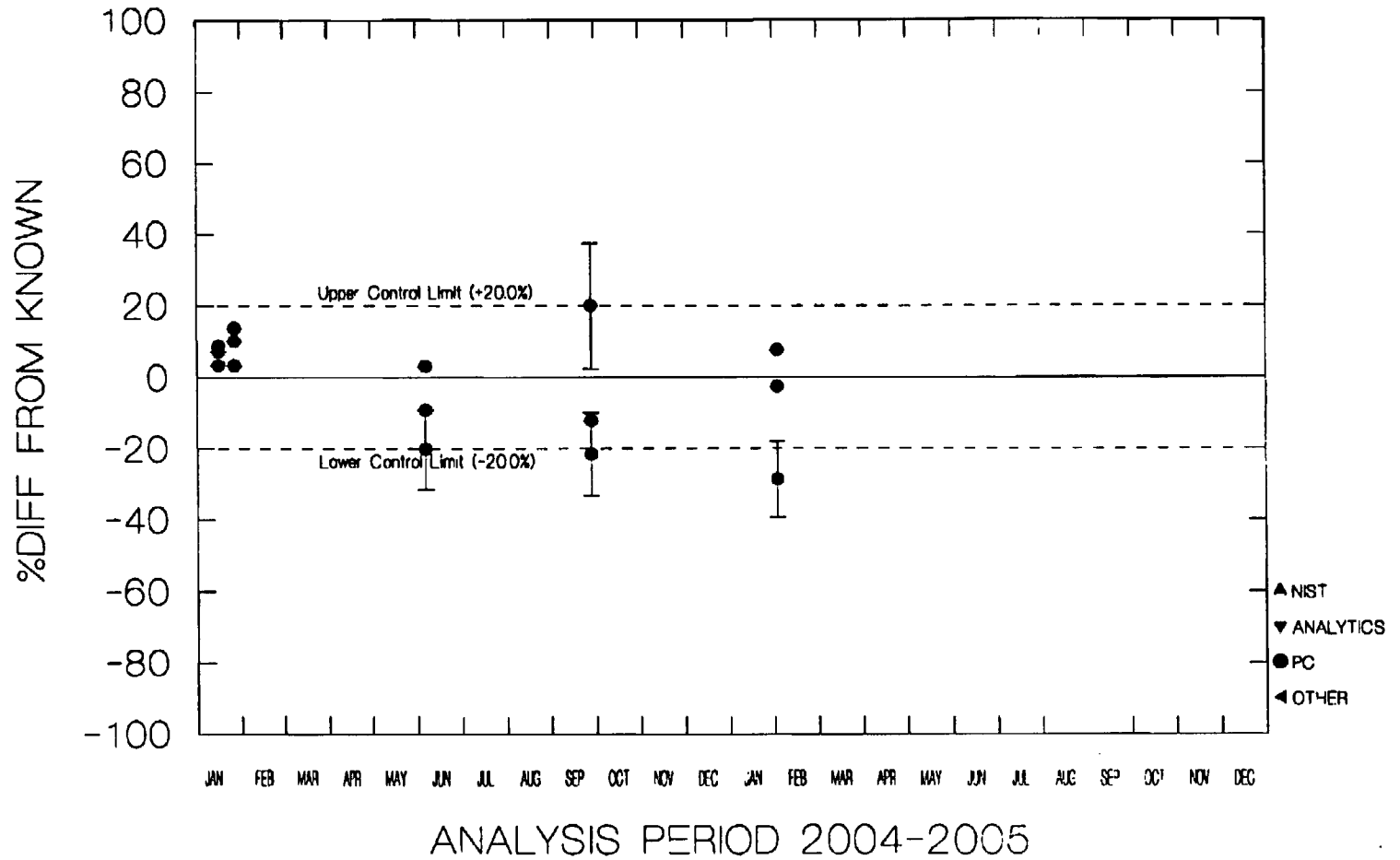
PART 50/61 Beta RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

PART 50/61 C-14 RESULT BIAS



PART 50/61 CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: LIQUID

ISSUANCE DATE: 02/15/2005

REF. DATE: 11/01/2004

LAB SAMPLE NO: Z22528 ANAL DATE: 01/20/2005
 LAB SAMPLE NO: Z22529 ANAL DATE: 01/20/2005
 LAB SAMPLE NO: Z22530 ANAL DATE: 01/20/2005

UNITS: uCi/g

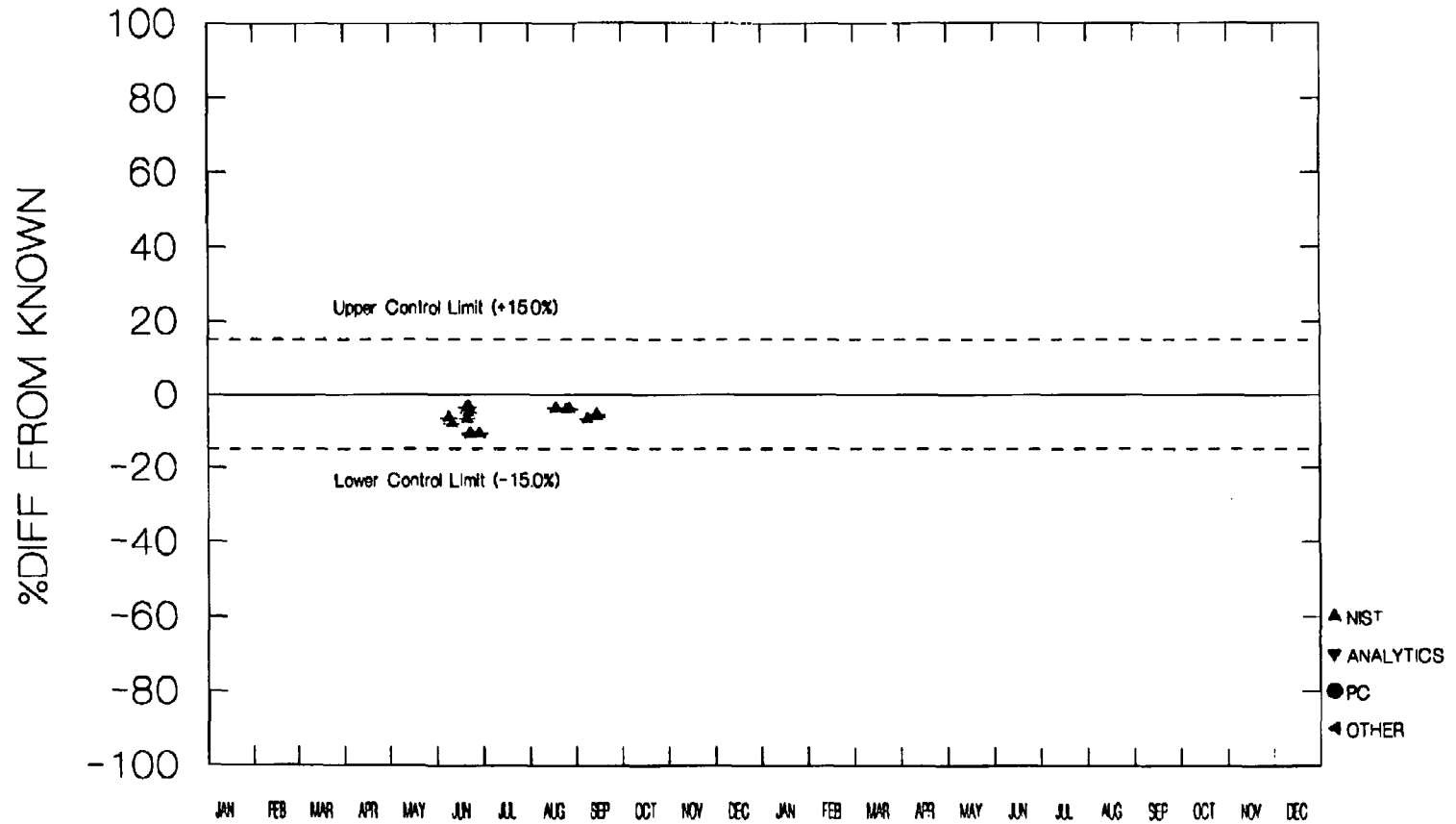
| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|-----------------|-----------------|-------------------|-----------|-------------|----------|----------|----------|
| H-3 | (954 ± 24)E-05 | (997 ± 25)E-05 | (955 ± 24)E-05 | | 99.40E-04 | -4.00 | 0.30 | -3.90 |
| | | | % DIFF FROM MEAN: | 96.87E-04 | | -1.50 | 2.90 | -1.40 |
| C-14 | (323 ± 24)E-04 | (292 ± 21)E-04 | (214 ± 16)E-04 | | 29.99E-03 | 7.70 | -2.60 | -28.60* |
| | | | % DIFF FROM MEAN: | 27.63E-03 | | 16.90 | 5.70 | -22.60* |
| Tc-99 | (266 ± 18)E-06 | (269 ± 19)E-06 | (297 ± 20)E-06 | | 29.32E-05 | -9.30 | -8.30 | 1.30 |
| | | | % DIFF FROM MEAN: | 27.73E-05 | | -4.10 | -3.00 | 7.10 |
| I-129 | (240 ± 14)E-06 | (266 ± 16)E-06 | (248 ± 15)E-06 | | 21.13E-05 | 13.60 | 25.90* | 17.40* |
| | | | % DIFF FROM MEAN: | 25.13E-05 | | -4.50 | 5.80 | -1.30 |

One analysis of Internal PC for C-14 in liquid had a bias that exceeded the ±20% internal acceptance limit. No CR was generated as the mean of three analyses was -7.9%, well within the acceptance limit.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

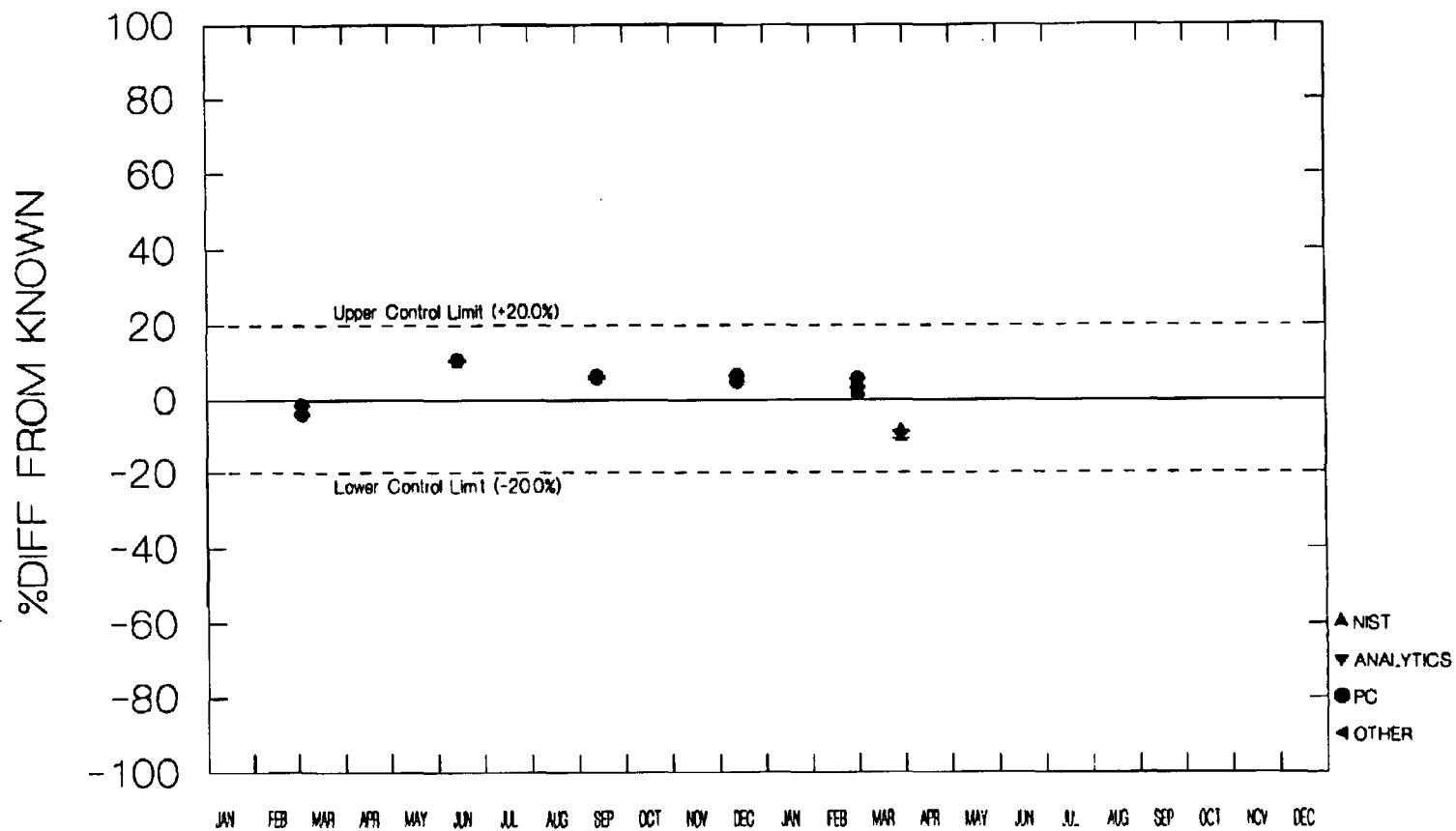
PART 50/61 Cd-109 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

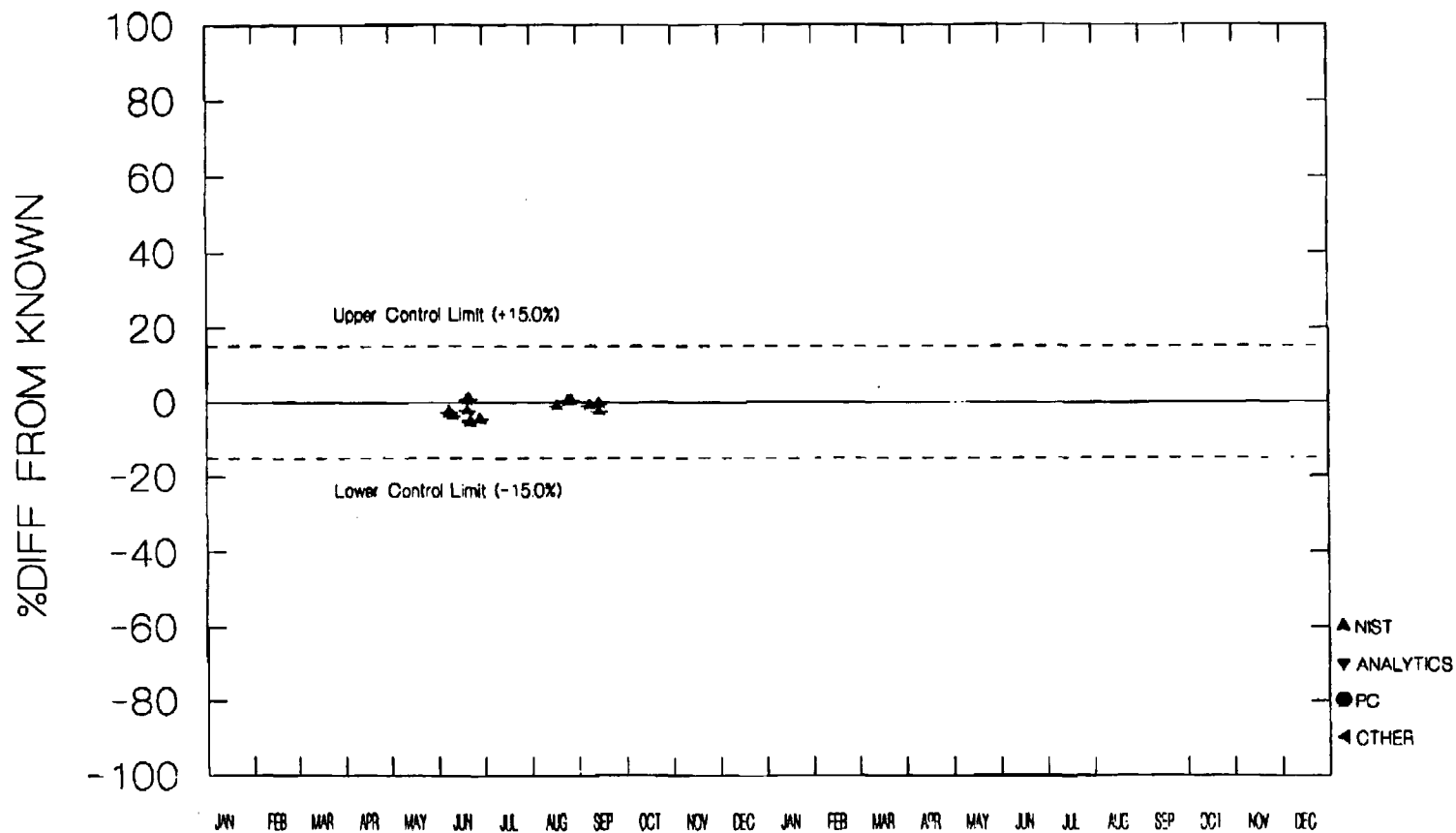
PART 50/61 Cm-243/244 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

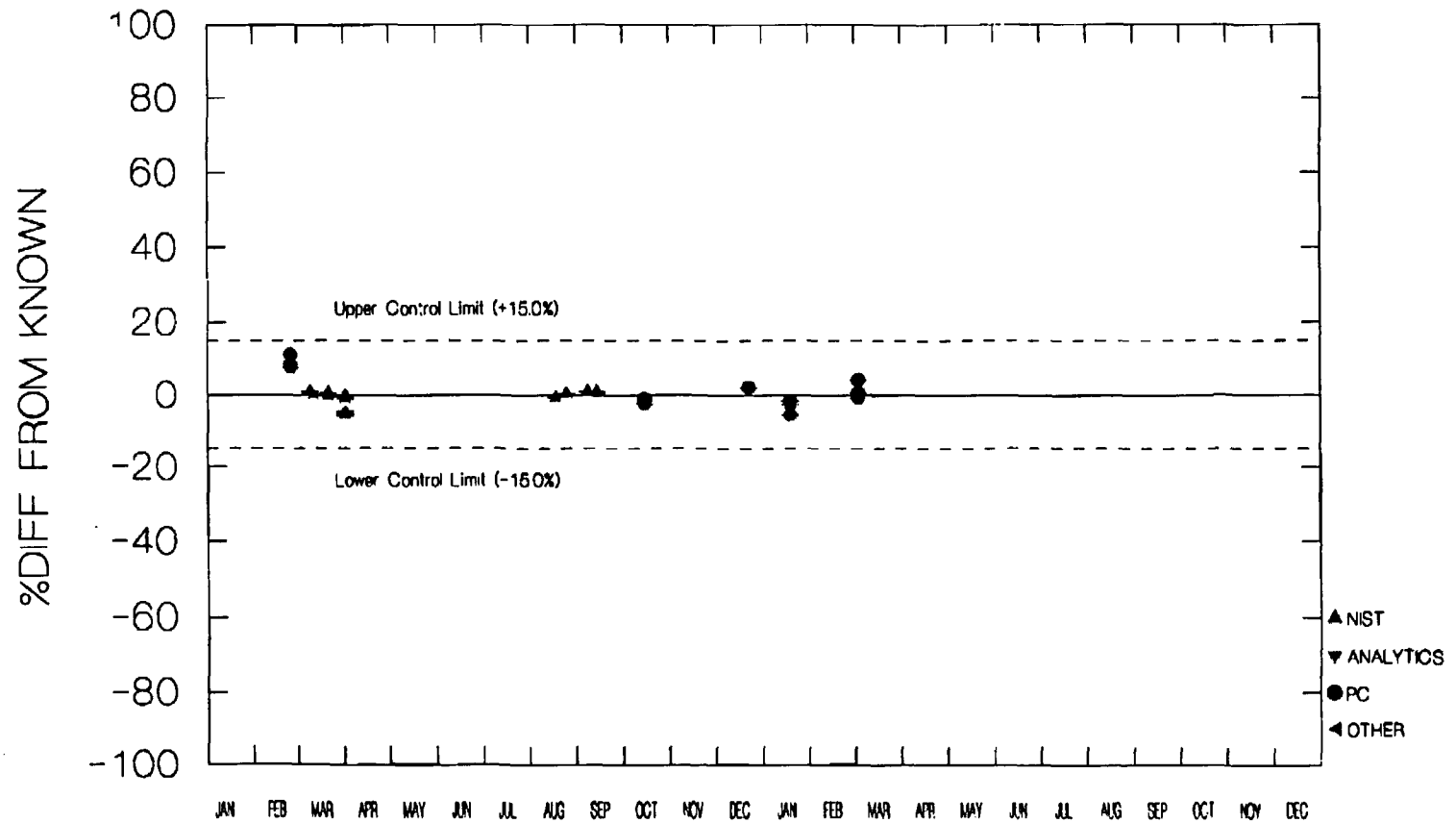
PART 50/61 Co-57 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

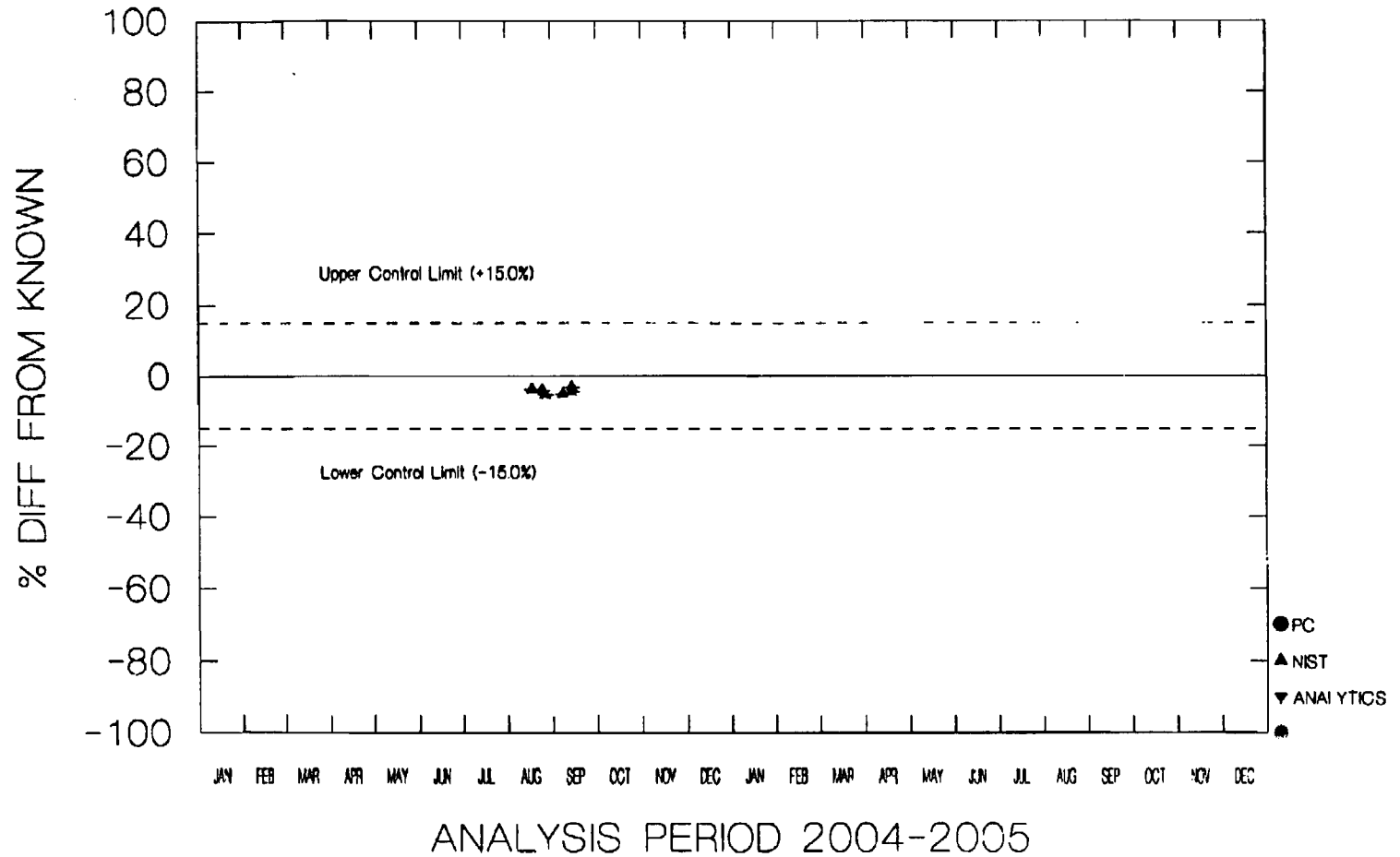
PART 50/61 Co-60 RESULT BIAS



ANALYSIS PERIOD 2004-2005

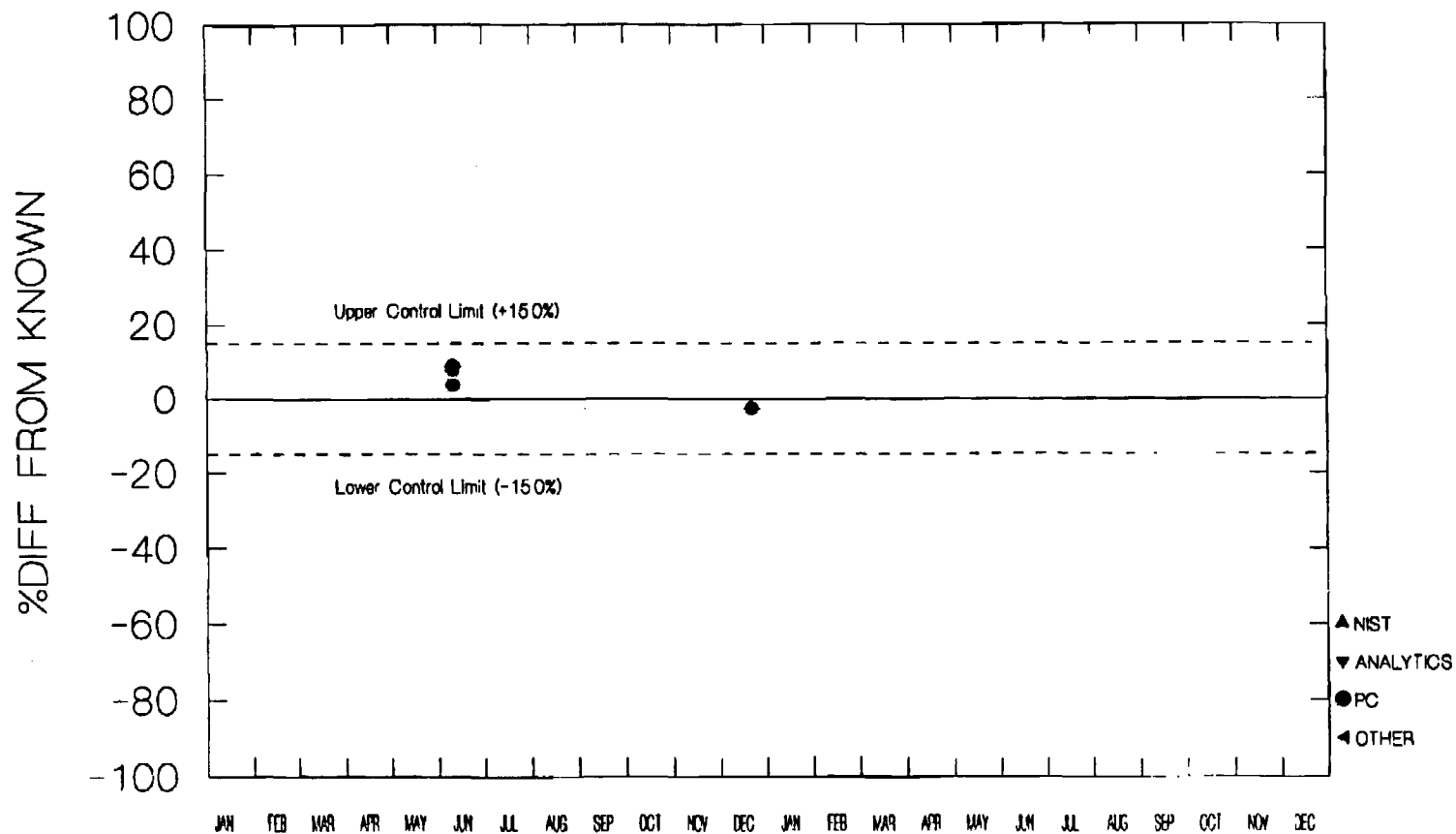
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

PART 50/61 Cs-134 RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

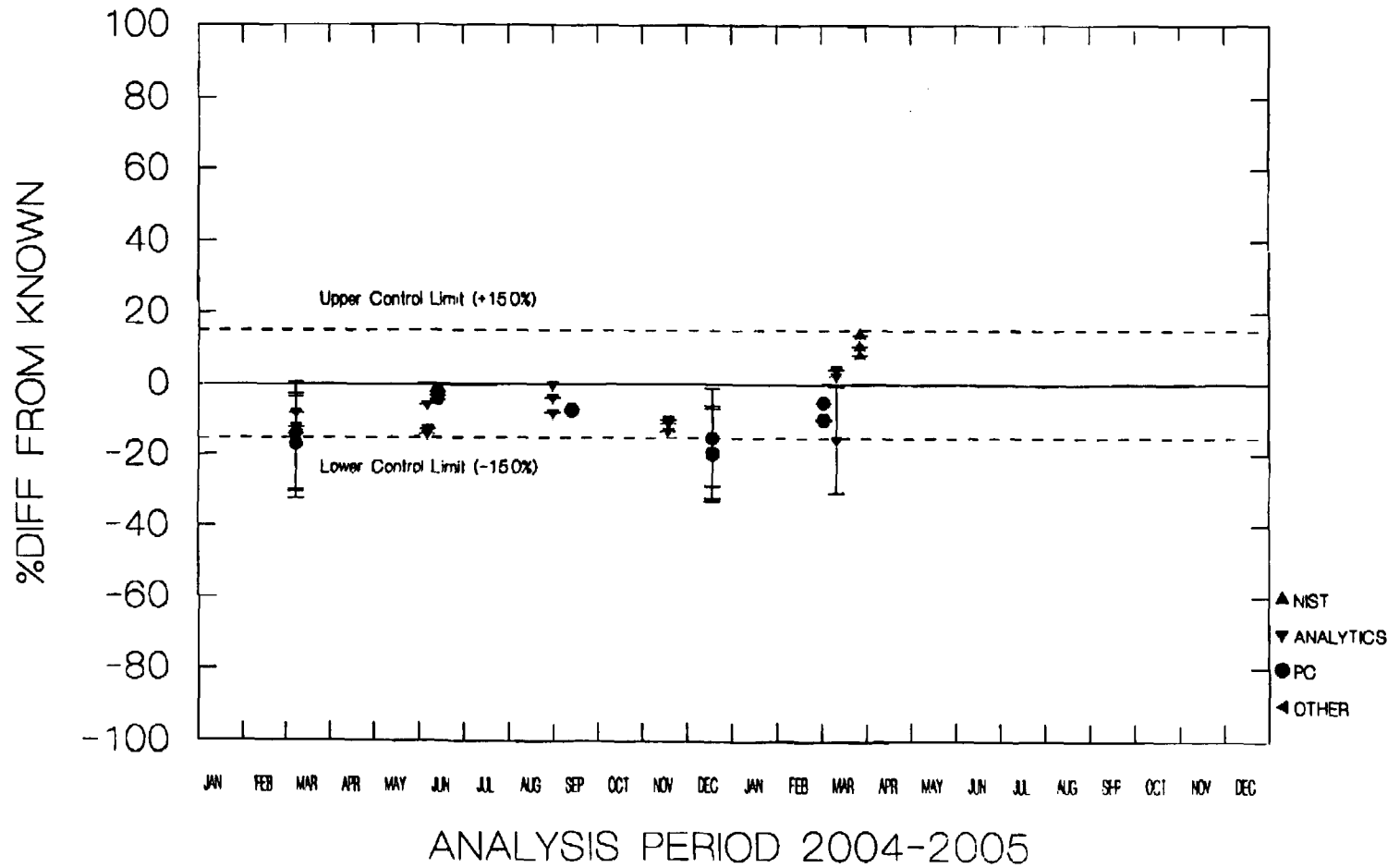
PART 50/61 Cs-137 RESULT BIAS



ANALYSIS PERIOD 2004-2005

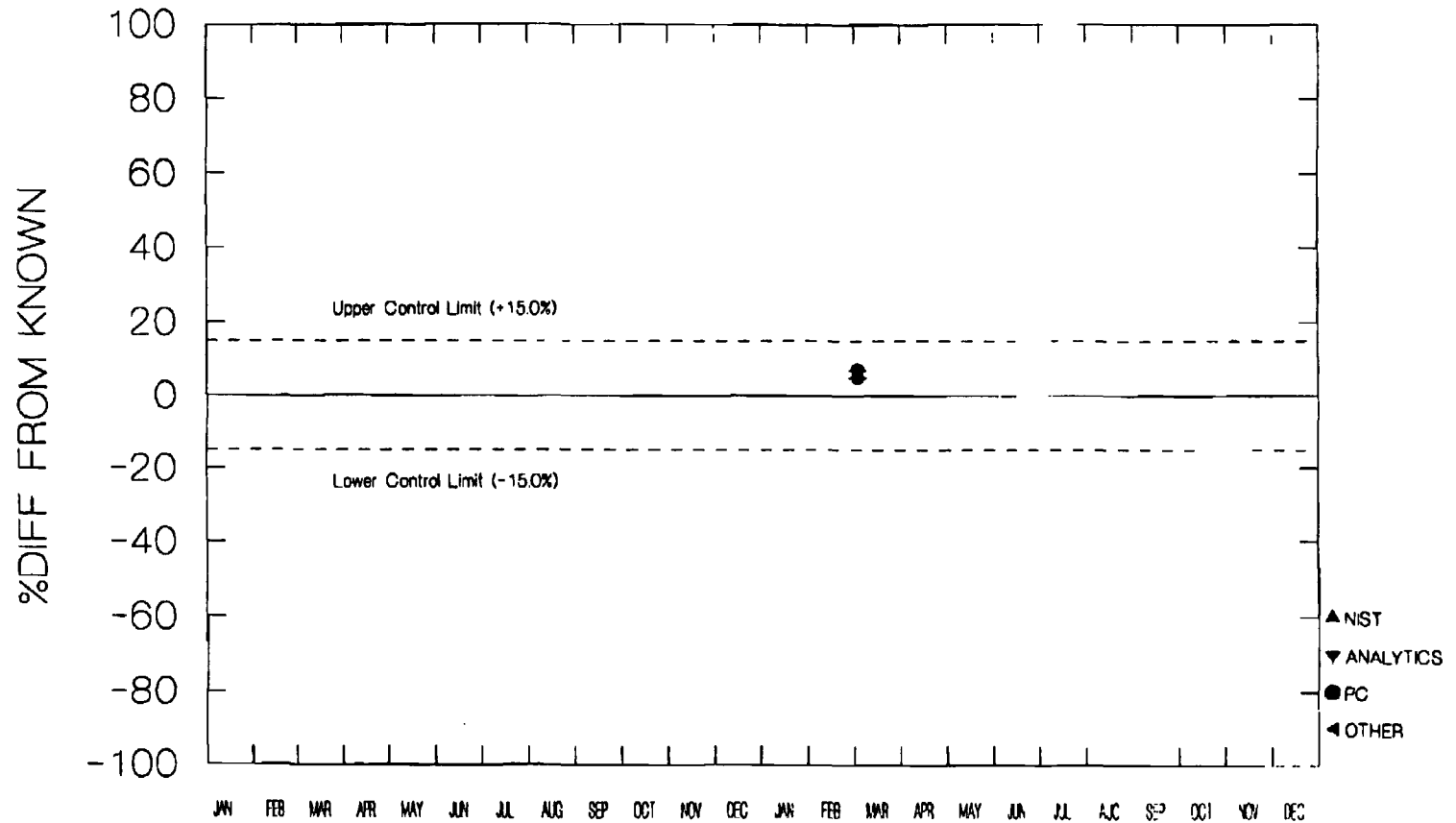
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

PART 50/61 Fe-55 RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

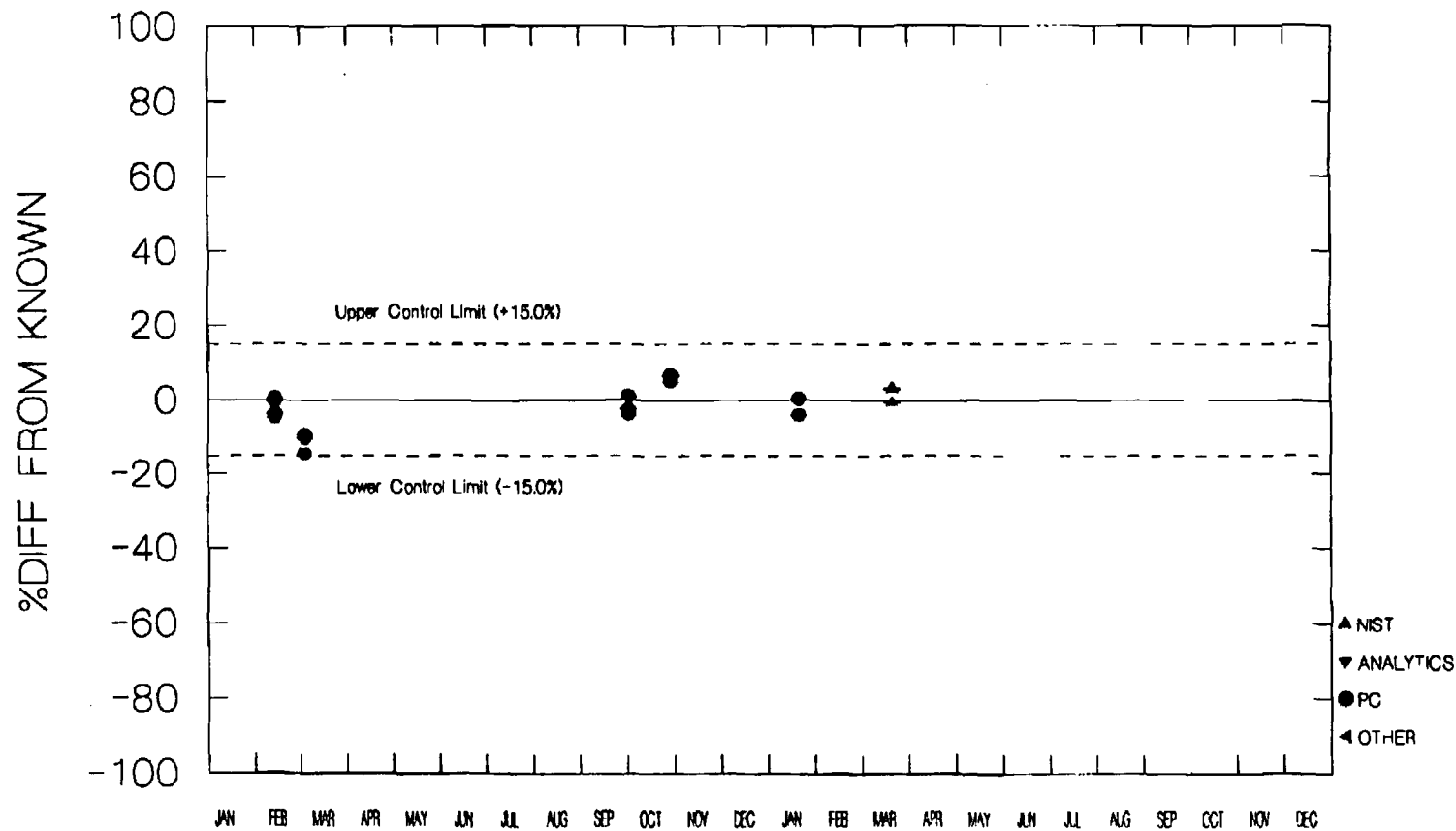
PART 50/61 Fe-59 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

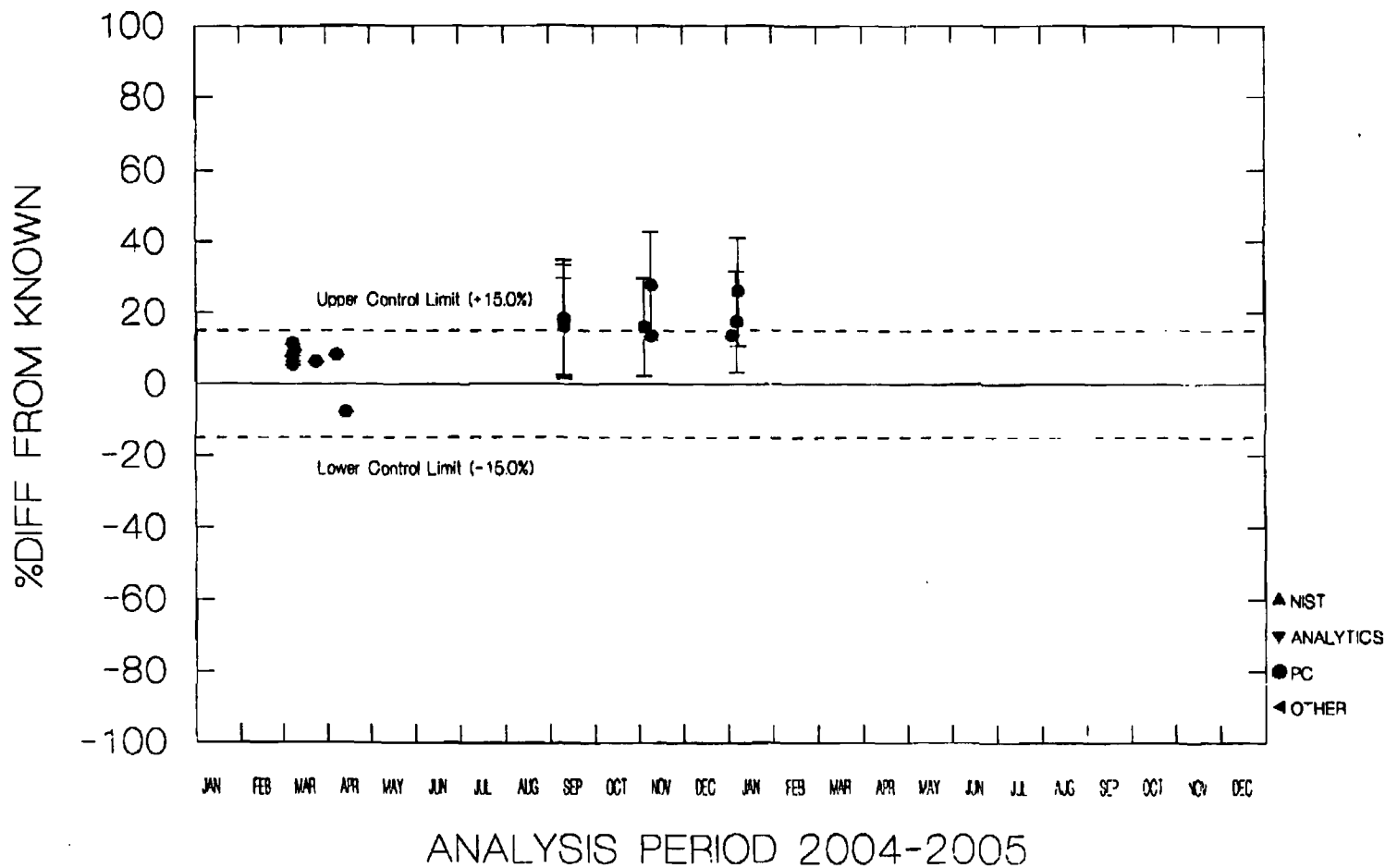
PART 50/61 H-3 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

PART 50/61 I-129 RESULT BIAS



PART 50/61 CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: LIQUID

ISSUANCE DATE: 02/15/2005

REF. DATE: 11/01/2004

LAB SAMPLE NO: Z22528 ANAL DATE: 01/20/2005
 LAB SAMPLE NO: Z22529 ANAL DATE: 01/20/2005
 LAB SAMPLE NO: Z22530 ANAL DATE: 01/20/2005

UNITS: uCi/g

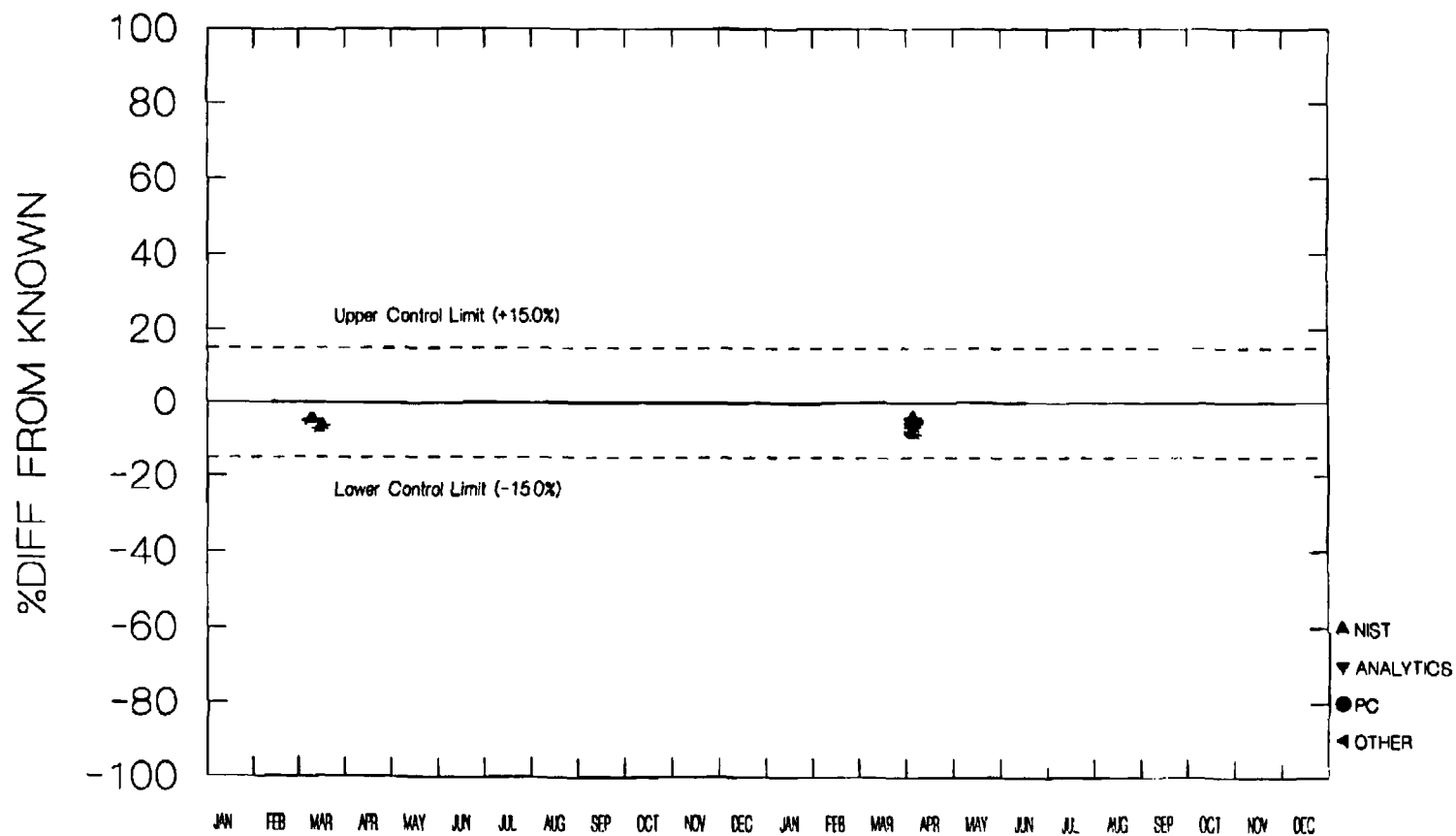
| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|-----------------|-----------------|-------------------|-----------|-------------|----------|----------|----------|
| H-3 | (934 ± 24)E-05 | (997 ± 25)E-05 | (955 ± 24)E-05 | | 99.40E-04 | -4.00 | 0.30 | -3.90 |
| | | | % DIFF FROM MEAN: | 96.87E-04 | | -1.50 | 2.90 | -1.40 |
| C-14 | (323 ± 24)E-04 | (292 ± 21)E-04 | (214 ± 16)E-04 | | 29.99E-03 | 7.70 | -2.60 | -28.60* |
| | | | % DIFF FROM MEAN: | 27.63E-03 | | 16.90 | 5.70 | -22.60* |
| Tc-99 | (266 ± 18)E-06 | (269 ± 19)E-06 | (297 ± 20)E-06 | | 29.32E-05 | -9.30 | -8.30 | 1.30 |
| | | | % DIFF FROM MEAN: | 27.73E-05 | | -4.10 | -3.00 | 7.10 |
| I-129 | (240 ± 14)E-06 | (266 ± 16)E-06 | (248 ± 15)E-06 | | 21.13E-05 | 13.60 | 25.90* | 17.40* |
| | | | % DIFF FROM MEAN: | 25.13E-05 | | -4.50 | 5.80 | -1.30 |

Two analyses of internal PC for I-129 in liquid had biases that exceeded the ±15% internal acceptance limit. CR 04-18, generated in 2004, is tracking corrective actions for the I-129 failure.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

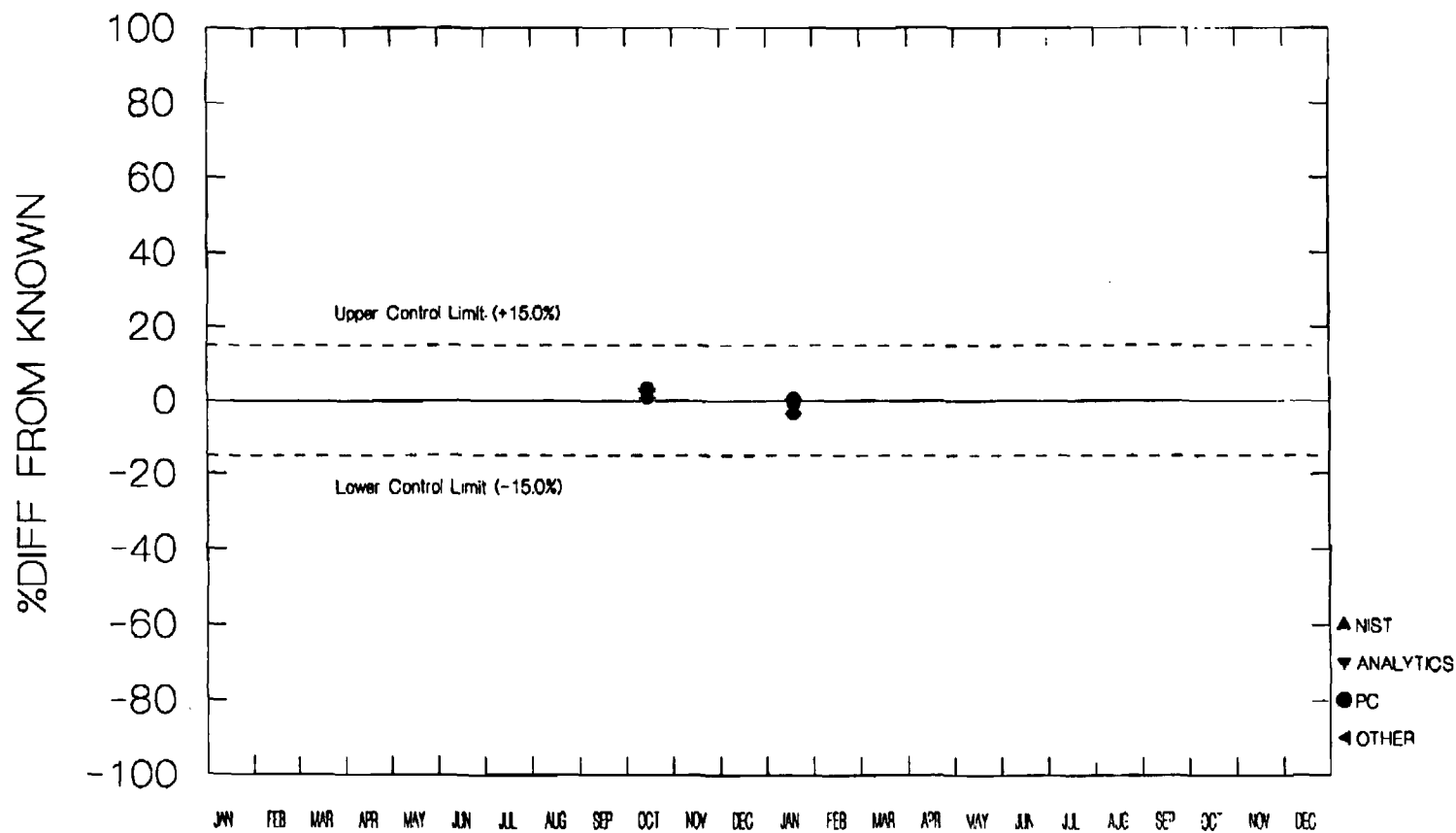
PART 50/61 I-131 (Gamma) RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

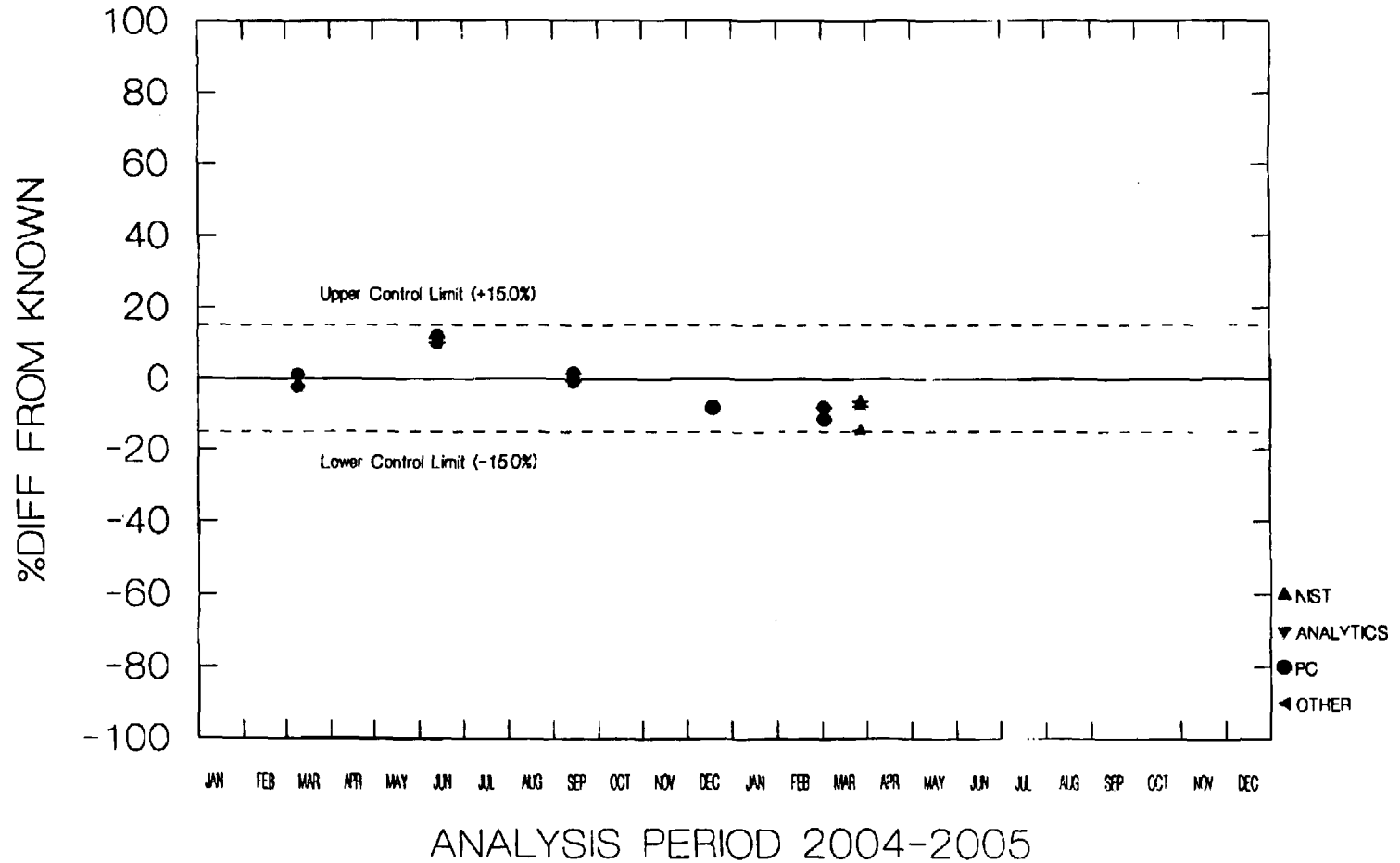
PART 50/61 Mn-54 RESULT BIAS



ANALYSIS PERIOD 2004-2005

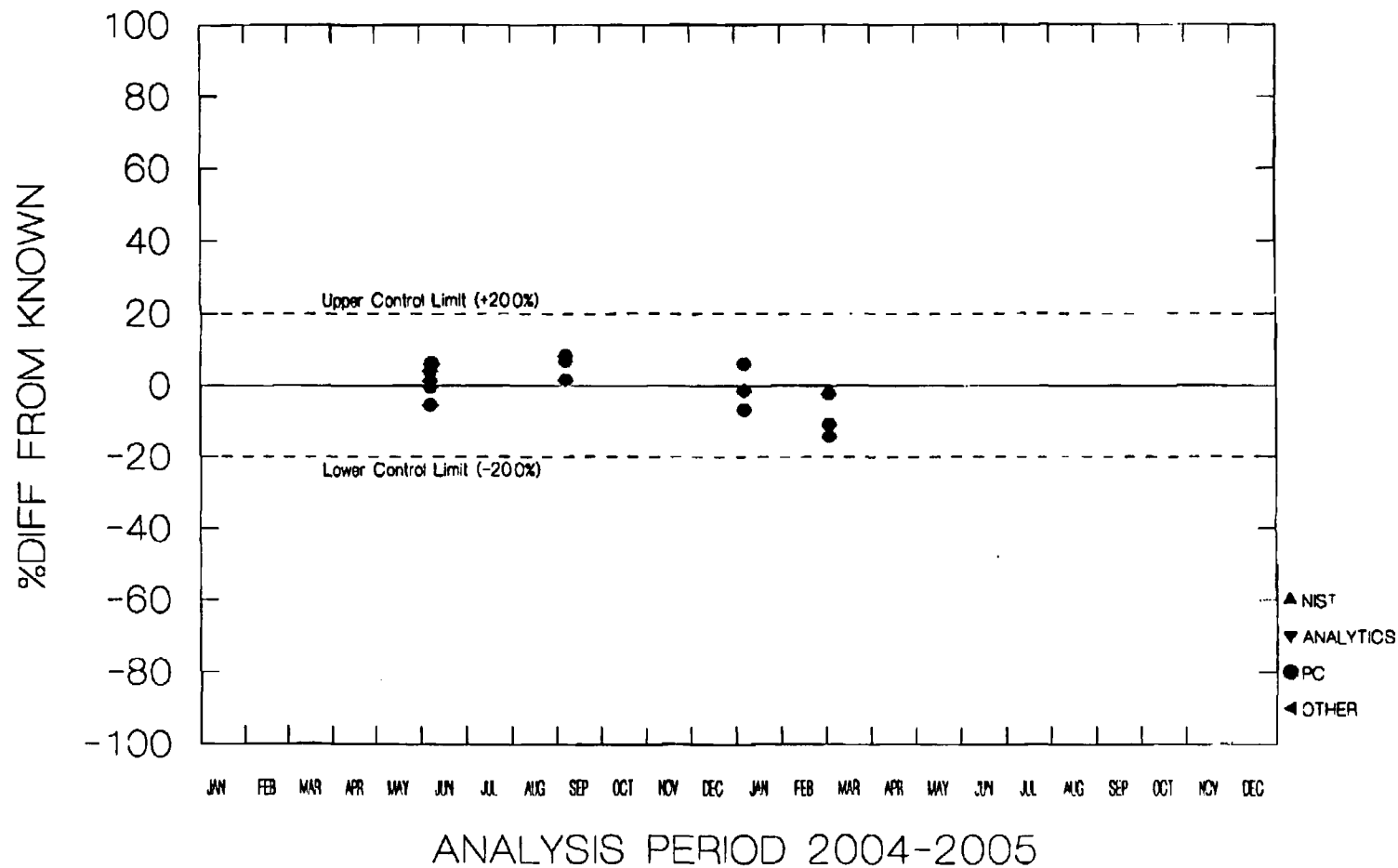
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

PART 50/61 Ni-63 RESULT BIAS



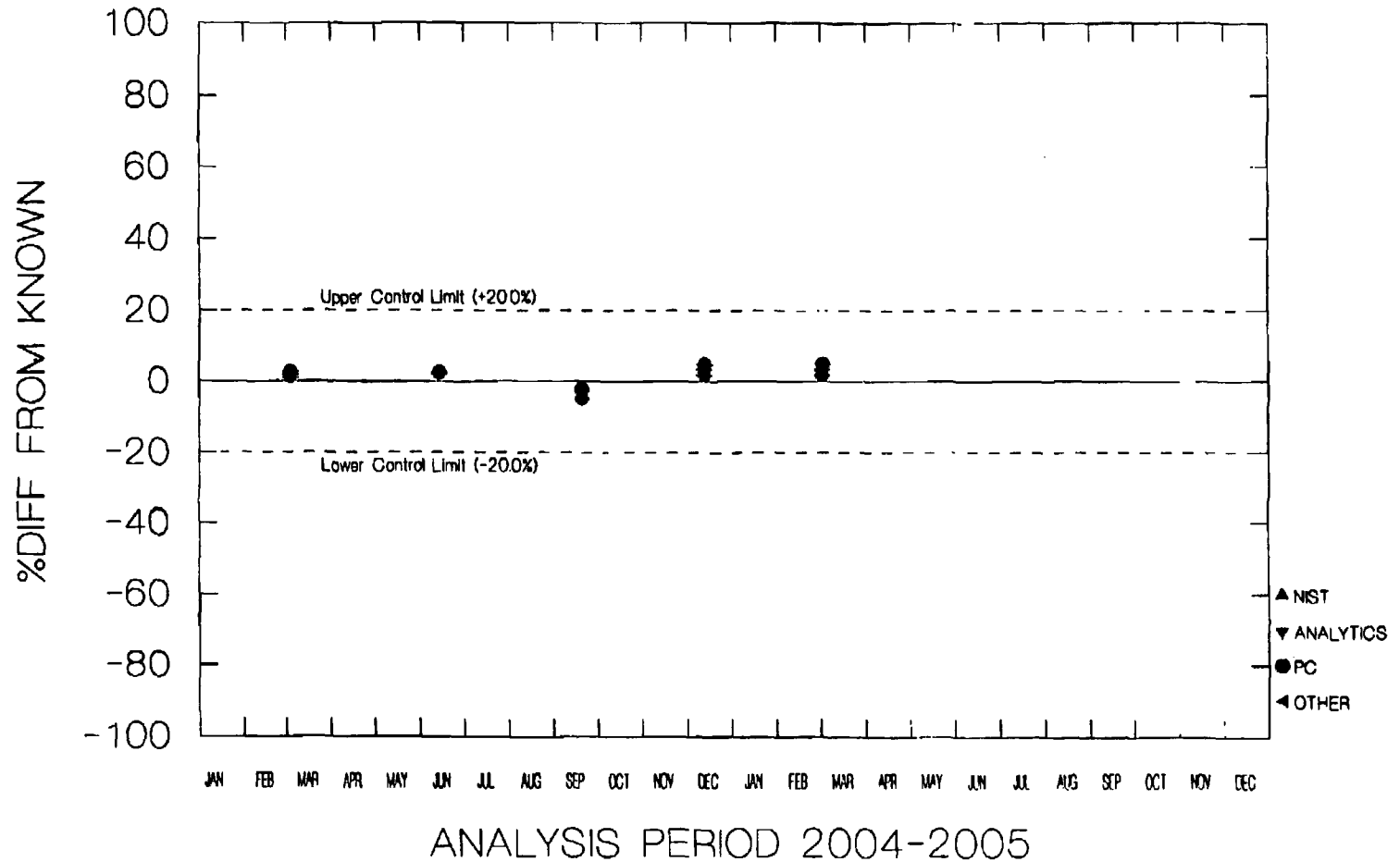
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

PART 50/61 Np-237 RESULT BIAS



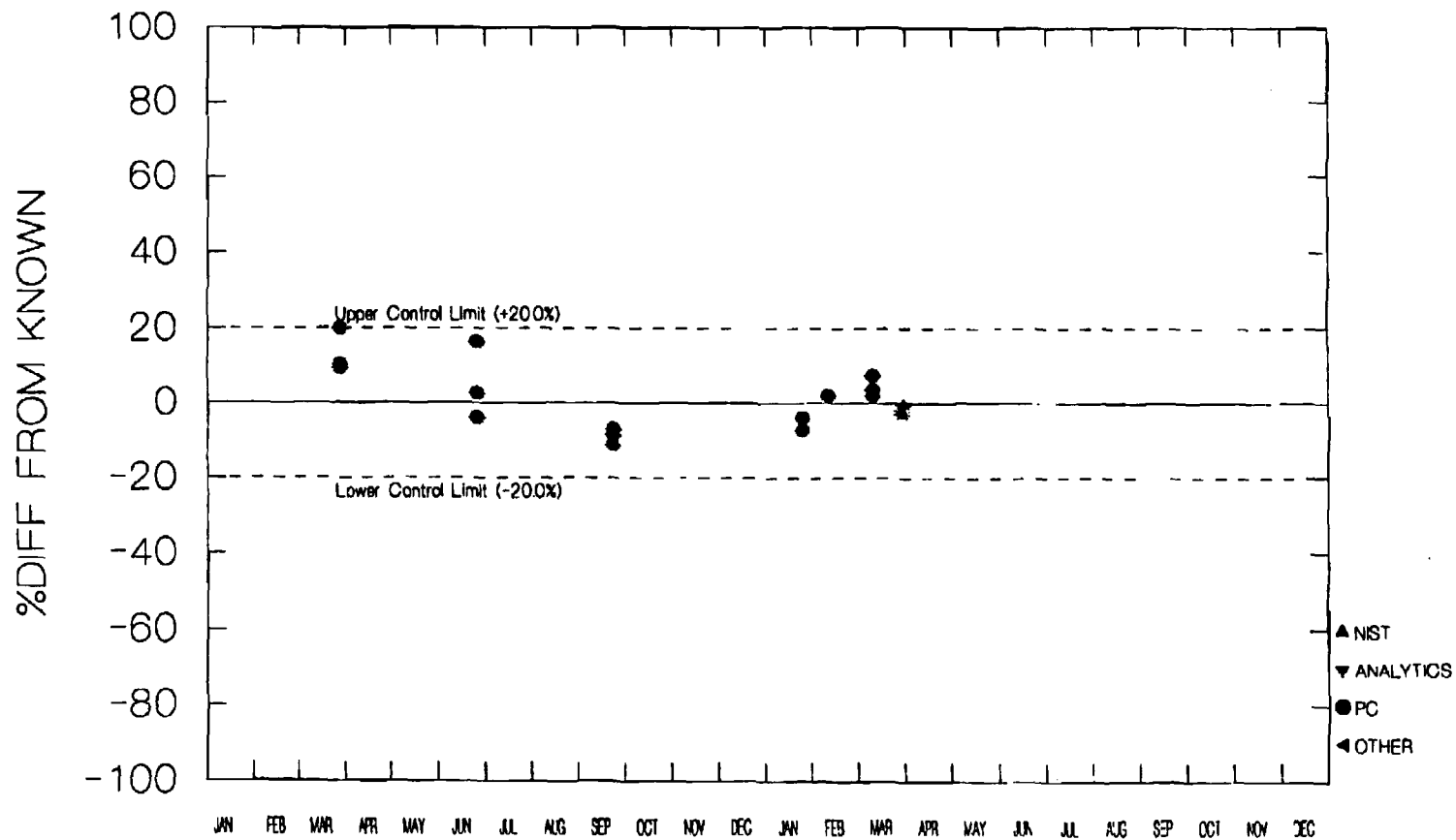
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

PART 50/61 Pu-238 RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

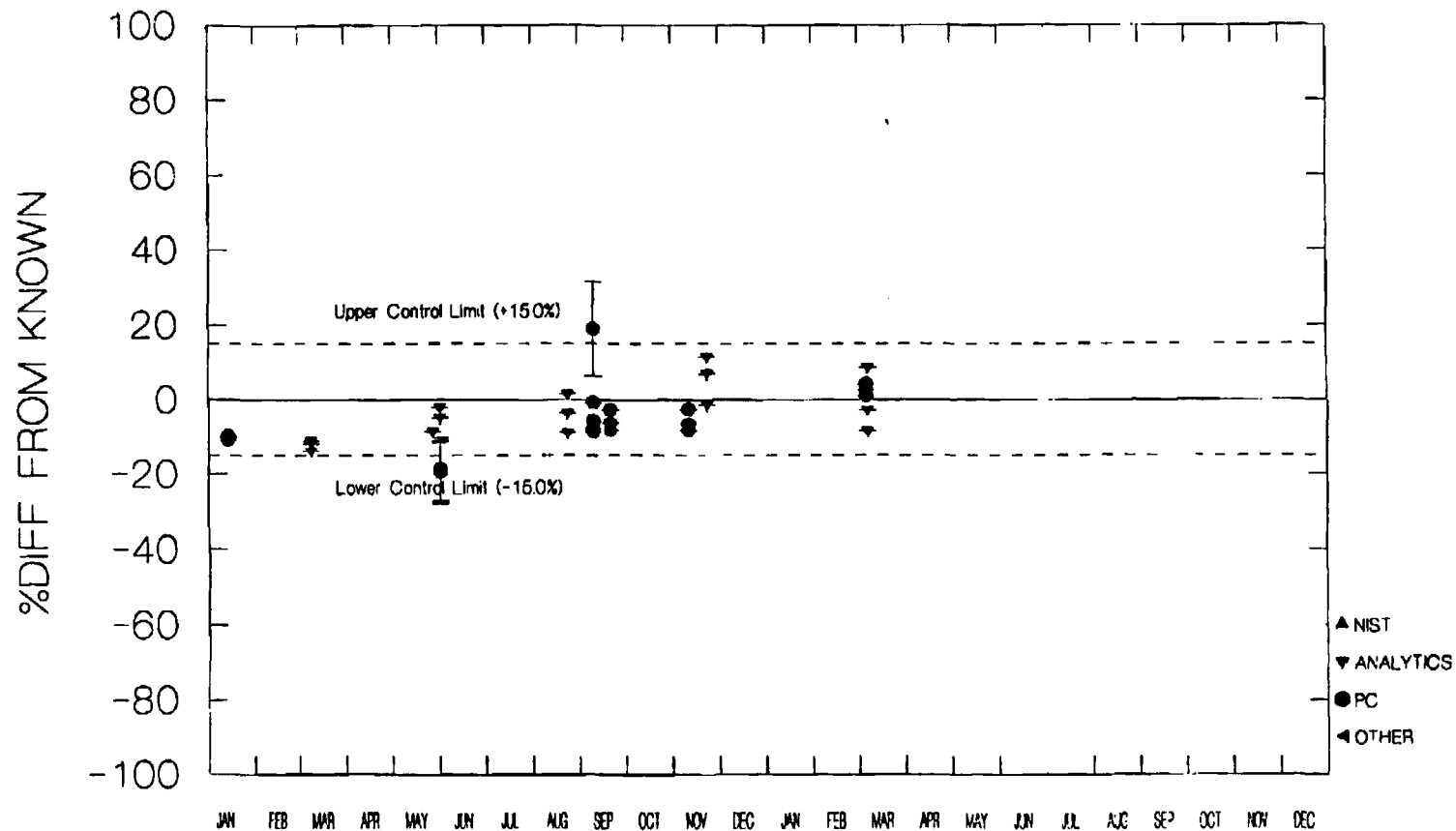
PART 50/61 Pu-241 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

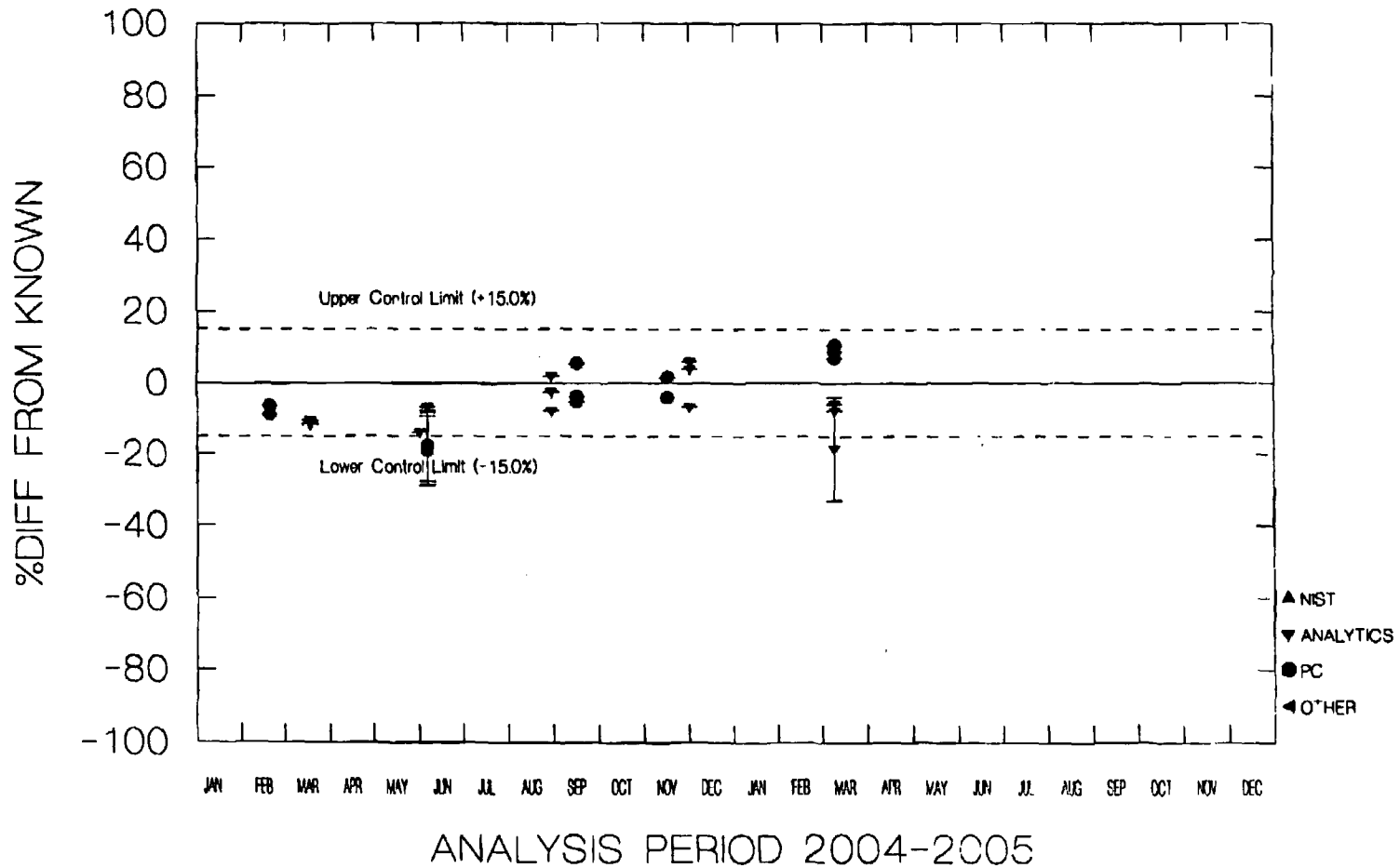
PART 50/61 Sr-89 RESULT BIAS



ANALYSIS PERIOD 2004-2005

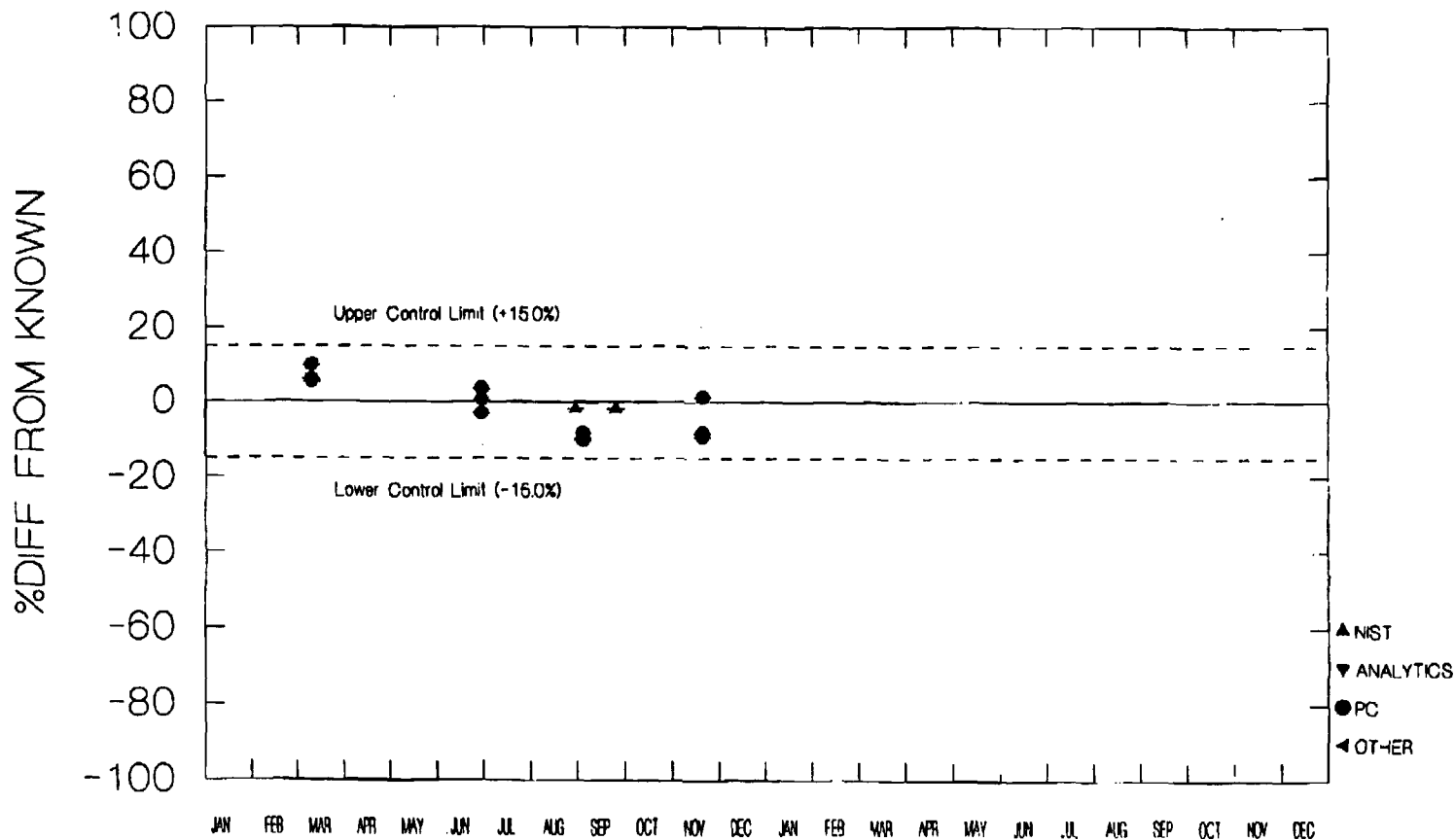
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

PART 50/61 Sr-90 RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

PART 50/61 Tc-99 RESULT BIAS



ANALYSIS PERIOD 2004-2005

APPENDIX C

BIOASSAY QUALITY CONTROL PROGRAM RESULTS

There are no charts for the bioassay quality control program for this semi-annual report period.

ATTACHMENT 1

RESULTS OF THE LABORATORY BLIND DUPLICATE PROGRAM



August 3, 2005
EL 096/05

Distribution

Subject: First Half of 2005, Blind Duplicate Program Results

The Framatome ANP Environmental Laboratory (E-LAB) participates in a Blind Duplicate Program administered by the participating utility companies. For the first half of calendar year 2005, 99.5% of the paired sample measurement results were within the program's criteria for acceptance.

The Blind Duplicate Program began in 1979 as a cooperative effort among the participating companies. Samples are collected and split in the field and submitted to the E-LAB for analysis. The E-LAB Quality Assurance Officer verifies and reports the program results to the participants. The results are evaluated against the E-LAB acceptance criterion established in Reference 1, which states that a paired measurement is in agreement if the individual values are within $\pm 15\%$ of the mean value. If this condition is not met, a two-sigma range is established for each of the results, which are in agreement if the two ranges overlap.

Table 1 summarized the types of media submitted as part of the Blind Duplicate Program by each participant for a total of 11 paired samples.

Table 2 presents the results of the Blind Duplicate Program by analysis type for each participating company. For the first half of 2005 program, 99.5% of the paired measurements met the acceptance criteria as specified in Reference 1. The number of paired measurements falling outside the acceptance criteria is listed before the dash (/) in each company column. For example, the number 1/2 should be interpreted as 1 paired measurements out of 2 falling outside the acceptance criteria. Totals are presented for each participating company as well as for the entire program.

REFERENCES

1. Framatome ANP Environmental Laboratory Manual 100, "Laboratory Quality Assurance Plan," Revision 8, September 10, 2004.

Christopher Shelton
Quality Assurance Officer
Framatome ANP Environmental Laboratory

CAS/cas

Attachment

Distribution:

J. Raimondi
E. Mercer (MY)
D. Montt (YR)

J. Pelczar
D. Perkins (SB 02-12)
E. Moreno

N. Panzarino
M. Strum

EL 096/05
August 3, 2005

Table 1

Summary of Paired Samples Submitted January through June 2005

| Sample Media | Yankee Atomic | Maine Yankee | Seabrook Station | Total |
|---------------------|----------------------|---------------------|-------------------------|--------------|
| Water | 2 | 3 | 4 | 9 |
| Algae | 0 | 0 | 1 | 1 |
| Mussel | 0 | 0 | 1 | 1 |
| Total | 2 | 3 | 6 | 11 |

Table 2

Summary of Paired Measurements Analyzed January through June 2005⁽¹⁾

| Analysis Type | Yankee Atomic | Maine Yankee | Seabrook Station | Total |
|----------------------|----------------------|---------------------|-------------------------|--------------|
| Gamma ⁽²⁾ | 0/52 | 0/52 | 0/104 | 0/208 |
| Gross Beta | 1/2 | 0/0 | 0/0 | 1/2 |
| Tritium | 0/2 | 0/1 | 0/2 | 0/5 |
| Total | 1/56 | 0/53 | 0/106 | 1/215 |

(1) The number of measurements that fail to meet the acceptance criteria is shown before the slash.

(2) The gamma numbers represent the total radionuclide measurements in a gamma isotopic analysis.



February 10, 2006
EL 027/06

TO: Distribution

FROM: J. M. Raimondi

SUBJECT: Framatome ANP Environmental Laboratory
Analytical Service Semi-Annual Quality Assurance Status Report
(July - December 2005)

Attached is the Semi-Annual Status Report covering the Framatome ANP Environmental Laboratory's (E-LAB) Quality Assurance Programs comprising radiological environmental, Part 50/61, and bioassay analytical services for the second half of 2005.

For the Radiological Environmental Monitoring Program (REMP):

- 100% of 520 individual QC analyses evaluated during this semi-annual period met E-LAB acceptance criteria for bias, while
- 100% of 530 QC analyses met the Laboratory QC acceptance criteria for precision.

To provide a perspective of the overall environmental quality program since its inception in 1977:

- 96.8% of the 18,943 environmental QC analyses processed in the past 29 years met acceptance criteria for bias, whereas,
- 99.5% of 16,549 QC samples evaluated for precision met Laboratory criteria for this performance category.

DOE program participation (MAPEP) resulted in 35 of 35 mean results evaluated as in "Agreement" with the acceptance criteria. DOE data is not included in the above values.

The Framatome ANP Environmental Laboratory (ID# 11823) maintained accreditation for six radiological analytes in the Potable water and Non-Potable water categories from the State of New York Department of Health under the National Environmental Laboratory Accreditation Program (NELAP). A total of 9 Proficiency Test results were all rated "Acceptable," this period.

For Part 50/Part 61 processing during the second half of 2005:

- 100% of the 149 Part 50/61 individual analyses evaluated for bias, and
- 100% of the 144 analyses evaluated for precision met E-LAB acceptance criteria.

To provide a perspective of the overall Part 50/61 sample quality program since 1988:

- 94.4% of the 4483 Part 50/61 QC analyses met the acceptance criteria for bias and 99.3% of the 4287 Part 50/61 QC samples met the Laboratory criteria for precision.

A handwritten signature in black ink, appearing to read 'J. M. Raimondi', is written over a horizontal line.

J. M. Raimondi
Manager, Environmental Laboratory

CAS/cas
ATTACHMENTS

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Page 2
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February 10, 2006

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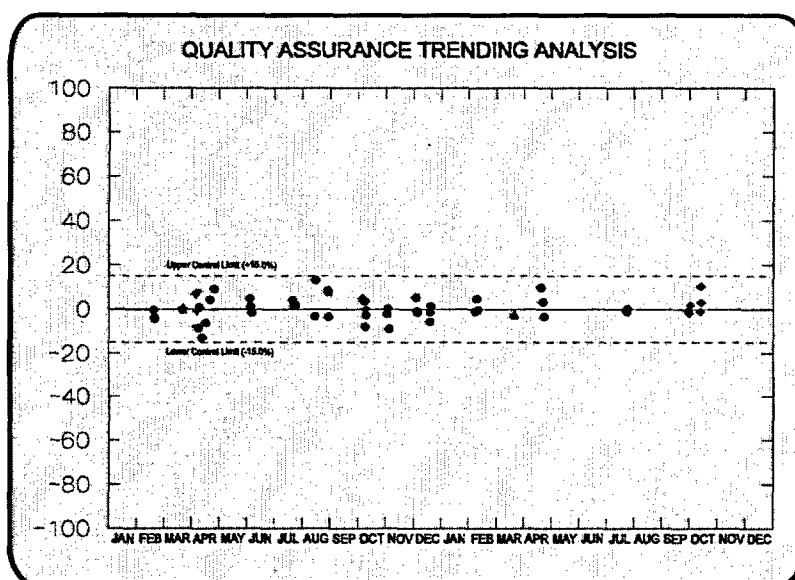
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ANALYTICAL SERVICES

SEMI-ANNUAL QUALITY ASSURANCE STATUS REPORT

July – December 2005




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**FRAMATOME ANP
ENVIRONMENTAL LABORATORY**

**ANALYTICAL SERVICES
SEMI-ANNUAL QUALITY ASSURANCE STATUS REPORT
JULY-DECEMBER 2005**

EL 027/06

Prepared By:  Date: 2/10/2006

Approved By:  Date: 2/15/06

**Framatome ANP
Environmental Laboratory
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APPENDIX B

**EFFLUENT MONITORING AND WASTE CHARACTERIZATION QUALITY
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APPENDIX C

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ATTACHMENT 1

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I. INTRODUCTION

This report covers the Quality Assurance (QA) Program for the Analytical Services function of the Framatome ANP Environmental Laboratory (E-LAB) for the second half (July-December) of 2005. Due to the broad scope of QC inter-comparison programs in which the E-LAB participates, the report consolidates wherever possible, text and results into three service categories: Radiological Environmental Monitoring, Part 50/61, and Bioassay.

This report includes:

- intralaboratory QC results analyzed during the reporting period,
- interlaboratory QC results, analyzed prior to the reporting period, for which "known values" were not previously available, and
- interlaboratory QC results, analyzed during the reporting period, for which "known values" were available.

Any other inter-laboratory QC results will be included in the next semi-annual report.

Manual 100, Revision 9 (Reference 1) became effective on November 16, 2005. The text of this report reflects the latest revision of this manual, as do the trending graphs and any data evaluations performed after the effective date. Any data evaluations performed prior, however, were conducted in accordance with Manual 100, Revision 8.

A. Quality Control Program Scope

1. Inter-laboratory and Third Party

The Framatome ANP Environmental Laboratory QC Program is designed to monitor the quality of analytical processing associated with environmental, bioassay, effluent (10CFR Part 50), and waste (10CFR Part 61) sample analysis.

Inter-laboratory and third party quality control programs for environmental radioanalyses include: the Environmental Crosscheck Program, administered by Analytics, Inc., the National Institute of Standards and Technology (NIST) Measurement Assurance Program (MAP), the Environmental Resource Associates (ERA) Proficiency Test (PT) Program, the Department of Energy (DOE) Mixed Analyte performance Evaluation Program (MAPEP).

The QAP program administered by the (DOE) Environmental Measurements Laboratory (EML) was suspended by the Department of Homeland Security following the results of QAP 60 (contained in the first half 2004 report). The MAPEP program is administered by the Radiological and Environmental Sciences Laboratory (RESL) and consists of four media (water, soil, vegetation, and air filter) submitted twice each year. The MAPEP samples are designed to evaluate the ability and quality of analytical facilities performing sample measurements that contain hazardous and radioactive (mixed) analytes. The ERA PT

program consists of radionuclides in water submitted twice per year. This program is used to maintain certification with the National Environmental Laboratory Accreditation Program (NELAP). The certification is necessary to perform analysis for projects that must meet EPA regulations for the Clean Water Act (CWA), Resource Conservation & Recovery Act (RCRA), or the Safe Drinking Water Act (SDWA).

Inter-laboratory and third party quality control for Part 50/61 radioanalyses, is provided by the Radiochemistry Crosscheck Program, administered by Analytics, Inc. and the NIST MAP.

2. Intra-laboratory

The internal Quality Control program is designed to include QC functions such as instrumentation checks (to insure proper instrument response), blank samples (to which no analyte radioactivity has been added), instrumentation backgrounds, duplicates, as well as overall staff qualification analyses and process controls. Both process control and qualification analyses samples seek to mimic the media type of those samples submitted for analysis by the various laboratory clients. These process controls (or process checks) are either actual samples submitted in duplicate in order to evaluate the precision of laboratory measurements, or blank samples which have been "spiked" with a known quantity of a radioisotope that is of interest to Laboratory clients. These QC samples, which represent either "single" or "double blind" unknowns, are intended to evaluate the entire radiochemical and radiometric process.

To provide a sense of direction and consistency in administering the quality control program, E-LAB has developed and follows an annual quality control and audit assessment schedule (Reference 2). The plan, which is approved on or before January 15th of each year and reviewed for adequacy at monthly LQARC meetings, describes the scheduled frequency and scope of Quality Assurance and Control actions considered necessary for an adequate program. The magnitude of the process control program combines both internal and external sources targeted at 5% of the routine sample analysis load.

B. Quality Assurance Program (Internal and External Audits)

During each semi-annual reporting period at least one internal assessment is conducted in accordance with the pre-established E-LAB Quality Control and Audit Assessment Schedule. In addition, the Laboratory may be audited by prospective customers during a pre-contract audit, and/or by existing clients who wish to conduct periodic audits in accordance with their contractual arrangements. A National Environmental Laboratory Accreditation Program (NELAP) audit is performed every two years as part of maintaining certification to perform EPA-related analyses.

II. PERFORMANCE EVALUATION CRITERIA

A. Acceptance Criteria

The E-LAB has adopted a QC acceptance protocol based upon two performance models:

- For those inter-laboratory programs that already have established performance criteria (i.e., MAPEP and ERA), the Laboratory will utilize the criteria for the specific program.
- For inter-laboratory or third party QC programs that have no preset acceptance criteria (e.g. the Analytics Crosscheck Programs, NIST MAP), results will be evaluated in accordance with E-LAB internal acceptance criteria.

1. Internal Process Control Samples

Internal Process Control (PC) results are evaluated in accordance with two separate E-LAB acceptance criteria. A full discussion of the analytical services acceptance criteria can be found in Reference 1. The first criterion concerns bias, which is defined as the deviation of any one result from the known value. The second criterion concerns precision, which deals with the ability of the measurement to be faithfully replicated by comparison of an individual result with the mean of all results for a given sample set. Quality control deviations falling outside the Laboratory acceptance criteria are discussed in the appendices.

(a) Bias

For each analytical measurement tested, the bias is the percent deviation of the reported result relative to the expected value (value of the spike known by comparison with or derivation from a standard reference material). The percent deviation relative to the known is calculated as follows:

$$\frac{(H'_i - H_i)}{H_i} 100$$

where:

H'_i = the value of the i^{th} measurement in a category being tested

H_i = the actual quantity in the test sample as defined by the spike

The Laboratory internal criterion for bias is that an analysis is considered in agreement if the value is within $\pm 15\%$ of the known value. If this condition is not met, the two-sigma range about the analyzed value is established. If the known value falls within the specified range, the analysis is considered in agreement.

Deviations from this general criterion, for specific radionuclides, are given in Tables 1 and 13 and Reference 1.

E-LAB acceptance criteria are applied when the sample concentration is 10 or more times the method MDC. Otherwise, the "known value" and associated uncertainty are compared to the measured result and uncertainty using a two-tailed standard statistical test at the 95% confidence level.

(b) Precision

For a group of test measurements containing a given spiked level, the precision is the percent deviation of individual results relative to the mean reported measurement. At least two values are required for the determination of precision. The percent deviation relative to the mean reported measurement is calculated as follows:

$$\left(\frac{H'_i - \bar{H}}{\bar{H}} \right) 100$$

where:

H'_i = the reported measurement for the *i*th analytical measurement

\bar{H} = the mean analytical measurement

$$\bar{H} = \sum H'_i \left(\frac{1}{n} \right)$$

n = the number of samples in the test group

The Laboratory criterion for precision is that an analysis is considered in agreement if the individual value is within $\pm 15\%$ of the mean value. If this condition is not met, the two-sigma range about the analyzed value is established. If the mean value falls within the specified range, the analysis is considered in agreement. In the case of duplicate or replicate analyses where there is no "known" value, the two-sigma range is established for each duplicate analysis (three-sigma range for replicates) for each analysis. If the ranges overlap, the analyses are considered in agreement for precision.

Deviations from this general criterion, for specific radionuclides, are given in Tables 1 and 13 and Reference 1.

(c) Mean Bias

For each group of analytical measurements tested, the mean bias is the percent deviation of the mean reported result relative to the expected value. The mean percent deviation relative to the expected value is calculated as follows:

$$\left(\left(\frac{(\bar{H} - H_i)}{H_i} \right) 100 \right)$$

where:

\bar{H} = the mean analytical measurement

H_i = the actual quantity in the test sample as defined by the spike

2. Backgrounds

As discussed in Reference 1, backgrounds represent the ambient signal response, recorded by measuring instruments, which is independent of radioactivity contributed by the radionuclides being measured in the sample. Backgrounds will not normally contain any three-sigma statistically positive activity of the target parameters. The background signal is subtracted from the sample's signal.

3. Blanks

Wherever possible equivalent media for preparing laboratory processing blanks will be used. Synthetic matrices may be used for bioassay if equivalency is proven.

4. NRC Resolution Criteria

Some Laboratory clients use the NRC Resolution Criteria to evaluate double blind Part 50 performance. NRC Resolution Criteria are based on an empirical relationship that combines prior experience and the accuracy needs of the program. As "Resolution" increases, the acceptability of one's measurement becomes more selective. Conversely, as "Resolution" decreases, agreement levels are widened to account for the increase in uncertainty.

5. DOE Evaluation Criteria

- (a) The Environmental Measurements Laboratory (EML) test program (DOEQAP) was cancelled by the Department of Energy in 2004. A future test program may become available if deemed necessary by the Department of Homeland Security.
- (b) The Radiological & Environmental Sciences Laboratory (RESL) inter-comparison program, MAPEP, defines three levels of

performance: Acceptable (flag = "A"), Acceptable with Warning (flag = "W"), and Not Acceptable (flag = "N"). Performance is considered acceptable for a mean with a bias $\leq 20\%$ of the reference value for the analyte. Performance is acceptable with warning for a mean result bias of $>20\%$ but $\leq 30\%$ of the reference value. If the bias is greater than 30% the results are deemed not acceptable.

B. QC Investigation Criteria and Result Reporting

1. QC Investigation Criteria

Summarized below are the investigation criteria applied to QC analyses that failed E-LAB bias criteria. The Condition Report process tracks investigation results.

- (c) No investigation is necessary when an individual QC result falls outside the QC performance criteria for bias.
- (d) Investigations shall be initiated when the mean of a QC process batch or the mean of three consecutive individual QC processes is outside the performance criterion for bias.
- (e) An investigation shall be initiated when the trending of at least 12 consecutive results for a given process indicates that the mean bias from the known is greater than 60% of the bias performance criterion.

2. Reporting of Analytical Results to Laboratory Customers

A similar set of guidelines was developed, applicable to reporting of results. The guidelines are as follows:

If an investigation is required for a process (normally after consecutive QC process check failures), and if the QC results requiring the investigation have a mean bias from the known of greater than \pm (applicable E-LAB bias criterion +5%) for environmental and bioassay processing and \pm (applicable E-LAB bias criterion +10%) for Part 50/61 processing, then the LQARC shall meet to determine the disposition of client results.

3. Self-Assessment Program

In accordance with Reference 1, E-LAB has established a Self-Assessment policy where all Laboratory staff members are strongly encouraged to continually evaluate laboratory activities for quality enhancements, cost savings, and time savings.

III. ANALYTICAL SERVICES QUALITY CONTROL SYNOPSIS

A. Result Summary

Two-year (2004-2005) trending graphs are provided in Appendices A-C of this report to give temporal perspective regarding possible trends or bias. In the event an analysis does not meet E-LAB performance criteria, the individual analysis sheet(s), in addition to a brief explanation, are included to augment the graph. It should be noted that DOE and ERA samples are evaluated against criteria specific to the DOE samples. Therefore, only sample results which fell in the "Warning" or Non-Agreement" categories will be addressed in the Appendices. If any questions arise regarding previous analyses, please refer to the semi-annual status report corresponding to the sample analysis date. In all cases an analysis sheet is available for each individual analysis to back-up the data presented on the graph.

1. Radiological Environmental Services Quality Control

During this semi-annual reporting period, twenty-eight nuclides associated with media types were analyzed by means of the Laboratory's internal process control, DOE, NIST, ERA and Analytics quality control programs. Media types representative of client company analyses performed during this reporting period were selected. Presented below is a synopsis of the media types evaluated.

| | |
|-----------------------|---------------|
| Air Filter | Sediment/soil |
| Charcoal (Air Iodine) | Water |
| Milk | |

(a) Analytics Environmental Cross Check Program

During this semi-annual period the Analytics Cross Check Program provided 158 individual environmental analyses for bias and 157 for precision evaluation (Table 1). Of the 158 analyses evaluated for bias, 100% (158/158) of all results fell within E-LAB acceptance criteria. Of the 157 analyses evaluated for precision, 100% (157/157) came within E-LAB tolerance limits. Appendix A graphically summarizes the results by two-year trending graphs.

Table 2 provides a report of the Laboratory's participation in the Analytics' cross check program for the second and third quarters of 2005. Using the Laboratory's internal acceptance criteria as the basis of evaluation, all 54 of mean results came within agreement criteria.

(b) National Institute of Standards and Technology (NIST) Measurement Assurance Program (MAP)

The E-LAB has been a participant in the Nuclear Energy Institute (NEI)/National Institute of Standards and Technology (NIST) Measurements Assurance Program since June of 1987. Continued participation is documented by dated Reports of

Traceability issued for particular radionuclides, which indicate the deviation of the participant's reported value for a given measurement technique from that measured and certified by the NIST.

During this reporting period there were two NIST MAP samples received. The water sample consisted of 5 radionuclides and 30 measurements performed. The filter sample consisted of 5 radionuclides and 30 measurements performed. Detailed information on Environmental NIST MAP data is provided in Tables 3 and 4. All of the 60 measurements met the E-LAB acceptance criteria and all 20 mean results met the administrative goal of $\pm 5\%$. NIST traceability certificates will be issued for all detector/nuclide combinations.

(c) Summary of Participation in the Department of Energy (DOE) Monitoring Programs

During this semi-annual reporting period, a combination of four different media types and fifteen different radionuclides were analyzed for the semi-annual Mixed Analyte Performance Evaluation Program (MAPEP-05-14, Table 6). All of the 35 mean results were evaluated as "Acceptable." One of the 35 tests was an acceptable false positive test for Pu-238 in vegetation.

(d) Environmental Resource Associates (ERA) Proficiency Test (PT) Program

During this semi-annual period, a total of 9 mean results ($n=3$) were evaluated by ERA. Using the evaluation criteria set by NELAP, 100% (9/9) of the radionuclides were in "Agreement." Appendix A graphically summarized the results by two-year trending graphs. Table 7 provides a report of the Laboratory's participation in the PT program.

The Framatome ANP Environmental Laboratory (Lab ID# 11823) maintained NELAP accreditation from the New York State Department of Health through the Environmental Laboratory Approval Program for the following methods for both potable and non-potable waters:

Gross Alpha, Method EPA 900.0
Gross Beta, Method EPA 900.0
Iodine-131, Method ASTM D4785-88
Photon Emitters, Method EPA 901.1
Radioactive Cesium, Method EPA 901.1
Tritium, Method EPA 906.0

(e) Intra-Laboratory Process Control Program

The Environmental Laboratory internal process control program evaluated 302 individual analyses for bias and 313 analyses for precision. Trending graphs associated with the performance results for this program are given in Appendix A, and the results are summarized in Table 8.

Of the 302 internal process control analyses evaluated for bias, 100% met Laboratory acceptance criteria. Also, 100% of the 313 results for precision were found to be acceptable.

Table 9 lists QC samples used to qualitatively screen calibrated geometry air charcoals for activity above the Minimum Detectable Concentration (MDC). All 66 QC charcoals evaluated during this semi-annual period reported positive activity as expected. All of the QC charcoal measurements had <15% bias when compared to an independent activity verification. The bias data for each individual measurement is presented in Table 9.

(f) Analytical Blanks

During this semi-annual reporting period, two of the 65 environmental analytical blanks analyzed reported positive activity, greater than three (3) times the standard deviation. The two blanks, both gross beta measurements, were just slightly above the limit. All client samples affected were re-processed with an acceptable analytical blank.

(g) Instrumentation Backgrounds

None of the instrumentation backgrounds processed between July-December 2005 reported activity that was above the three standard deviation investigation level.

(h) Blind Duplicate Results

Blind duplicate results for 2005 are presented in Attachment 1. Based upon the summary evaluation, 99.5% of all paired measurements met the acceptance criteria. This data is not included in the summary tables (Tables 10-12). Duplicate analyses were also performed on 29 sets of samples during this period. The sample media consisted of water, milk, soil, vegetation (terrestrial and aquatic), food, fish and other seafoods. All of the results are included in summary tables 10 through 12.

(i) Overall Data Summary for the Reporting Period July-December 2005

The compilation of intra- and inter-laboratory comparison data by analyzed matrix for this reporting period is summarized in Table 10. Table 11 presents the same data grouped according to

analysis type. In either case, the cumulative bias for the three programs evaluated to internal E-LAB performance criteria shows 100% of the 520 individual results were observed to fall within the E-LAB bias acceptance criteria, while 100% of the 530 analyses passed the acceptance criteria for precision.

(j) Summary of Environmental Quality Control Results by Year

The historical summary of the E-LAB process control program performance for the environmental monitoring function is provided in Table 12. For the second half of 2005, 100% of the analyses fell within the E-LAB acceptance criteria for bias as compared to a historical percentage of 96.8. Similarly, 100% of the analyses evaluated for precision met the E-LAB acceptance criteria as compared to 99.5% of analyses for the 28-year operating history.

2. Part 50/61 Quality Control

During this semi-annual reporting period, twenty nuclides were analyzed by means of the Laboratory's internal process control, National Institute for Standards and Technology Measurement Assurance Program (NIST MAP) measurements of Part 50/61 radionuclides, and the Analytics Radiochemistry Crosscheck Program.

(a) Analytics Radiochemistry Cross Check Program

During this semi-annual period the Analytics Cross Check Program provided 30 individual analyses to be evaluated for bias and precision (Table 13). Of the 30 analyses, 100% fell within the E-LAB acceptance criteria for bias and 100% for precision. Appendix B graphically summarizes the results by two-year trending graphs.

Table 14 provides a report of the Laboratory's participation in the Analytics' cross check program for the second half of 2005. Using the Laboratory's internal acceptance criteria as the basis of evaluation, all 10 mean results passed the agreement criteria.

(b) NIST Measurement Assurance Program (MAP)

During this reporting period there were two NIST MAP samples received. The water sample consisted of 5 radionuclides and 30 measurements performed. The filter sample consisted of 5 radionuclides and 30 measurements performed. Detailed information on NIST MAP data is provided in Tables 15 and 16. All of the 60 measurements met the E-LAB acceptance criteria and all 20 mean results met the administrative goal of $\pm 5\%$. NIST traceability certificates will be issued for all detector/nuclide combinations.

(c) Intra-Laboratory Process Check Program

There were 59 internal Laboratory QC process control analyses evaluated for bias and 54 for precision during the second half of 2005 in the Part 50/61 area. Of these, 100% (59/59) met the E-LAB acceptance criteria for bias. A total of 100% (54/54) Part 50/61 process control samples met E-LAB acceptance criteria for precision (Table 17).

(d) Analytical Blanks

During this semi-annual reporting period, one of the 160 Part 50/61 analytical blanks analyzed reported positive activity greater than three (3) times the standard deviation. The single failure was a Ni-63 blank. All affected client samples were re-processed for Ni-63 with a new analytical blank.

(e) Instrumentation Backgrounds

One hundred percent (100%) of the instrumentation backgrounds processed between July-December 2005 reported activity that was below the three standard deviation investigation level.

(f) Overall Data Summary for the Reporting Period July-December 2005

The compilation of intra- and inter-laboratory comparison data by analyzed matrix for this reporting period is summarized in Table 18. The cumulative bias shows 100% (149/149) of the individual results fell within E-LAB acceptance criteria for bias. A total of 100% (144/144) of the results met Laboratory precision criteria.

(g) Summary of Part 50/61 Quality Control Results by Year

The historical E-LAB summary of process control performance for the Part 50/61 monitoring program is provided in Table 19. For the calendar year 2005, 99.3% of the QC analyses fell within E-LAB acceptance criteria for bias as compared to the sixteen year historical percentage of 94.4. For precision, 100% of the results met the precision acceptance criteria as compared to 99.3% historically.

3. Bioassay Quality Control

There were no bioassay QC analyses performed during this semi-annual period as indicated in Table 20.

B. Status of Condition Reports (CR)

Table 21 provides a synopsis of CR activity for sample processing during the second half of 2005. Seven items were closed and eight were opened during this

reporting period. As of December 31, 2005, a total of six CRs remain open, one of which is older than 6 months. This CR (05-10) was written for a QC failure performed quarterly. Three subsequent QC samples have been successfully completed since the failure in late 2004. Closure of the CR is pending response from the QC supplier.

C. Status of Audits/Assessments

1. Internal

Corporate QA Audit 05-37

Framatome ANP Quality Assurance audited the E-LAB during the period December 6-9, 2005. The audit scope included verification of compliance with the applicable quality requirements of the Laboratory QA, Safety, and Condition Report manuals. A total of two findings were issued and are summarized as CRs 05-20 and 05-21 in Table 22.

2. External

There were no external audits conducted during this semi-annual period.

IV. UPDATED PROCEDURES ISSUED DURING JULY-DECEMBER 2005

A list of Analytical Services Section procedures, which were updated during this semi-annual period, is included in Table 22.

V. REFERENCES

- 1. Framatome ANP Environmental Laboratory Manual 100 "Laboratory Quality Assurance Plan", Revision 9, November 16, 2005.**
- 2. Framatome ANP Environmental Laboratory 2005 Quality Control and Audit Assessment Schedule.**

TABLE 1

ANALYTICS ENVIRONMENTAL CROSSCHECK PROGRAM RESULTS BY
 FRAMATOME ANP ENVIRONMENTAL LABORATORY
 ACCEPTANCE CRITERIA, MEDIA, AND MEASUREMENT CATEGORIES
 JULY-DECEMBER 2005

| | Bias Criteria (1) | | | | Precision Criteria (2) | | | |
|---------------------------------------|-------------------|-------------|-------------|------------|------------------------|-------------|------------|------------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Air Particulate | | | | | | | | |
| Alpha | 5 | 1 | 0 | 0 | 6 | 0 | 0 | 0 |
| Beta | 3 | 3 | 0 | 0 | 6 | 0 | 0 | 0 |
| Gamma | 14 | 5 | 8 | 0 | 25 | 1 | 1 | 0 |
| Sr-89 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Sr-90 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 |
| II. Charcoal | | | | | | | | |
| Gamma | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| III. Milk | | | | | | | | |
| Gamma | 36 | 15 | 9 | 0 | 45 | 9 | 6 | 0 |
| Iodine (LL) | 5 | 1 | 0 | 0 | 6 | 0 | 0 | 0 |
| Sr-89 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 0 |
| Sr-90 | 0 | 1 | 2 | 0 | 0 | 1 | 2 | 0 |
| IV. Water | | | | | | | | |
| Alpha | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 |
| Beta | 1 | 2 | 0 | 0 | 3 | 0 | 0 | 0 |
| Gamma | 16 | 11 | 3 | 0 | 26 | 4 | 0 | 0 |
| H-3 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Iodine (LL) | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Sr-89 | | | | | | | | |
| Sr-90 | | | | | | | | |
| Total Number in Range: | 92 | 43 | 23 | 0 | 129 | 18 | 10 | 0 |
| Percentage of Total Processed: | 58.2 | 27.2 | 14.6 | 0.0 | 82.2 | 11.5 | 6.4 | 0.0 |
| Sum of Analyses: | 158 | | | | 157 | | | |

(1) Percent Bias by Deviation Category as noted in Table 1, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 1, Footnote (2)

* Total may not equal 100 due to rounding

TABLE 1

ENVIRONMENTAL PROCESS CONTROL ANALYSIS RESULTS BY
 FRAMATOME ANP ENVIRONMENTAL LABORATORY
 ACCEPTANCE CRITERIA, MEDIA AND MEASUREMENT CATEGORIES
 JULY-DECEMBER 2005
 (Continued)

(1) Percent Bias by Deviation Category

1 = >0 and ≤ 5

2 = >5 and ≤ 10

3 = >10 and ≤ 15 (or within 2 sigma of known, see Reference 1)

For Gross Alpha and Beta
 In water

3 = >10 and ≤ 25 (or within 2 sigma of known)

For Sr-89/90 mixtures

3 = >10 and ≤ 25 (or within 2 sigma of known)

For Alpha Spectrometry*,

3 = >10 and ≤ 20 (or within 2 sigma of known)

For Uranium-Total, Pu-241,
 Zn-65 on an air filter

3 = >10 and ≤ 20 (or within 2 sigma of known)

4 = Outside criteria

(2) Percent Precision by Deviation Category

1 = >0 and ≤ 5

2 = >5 and ≤ 10

3 = >10 and ≤ 15 (or within 2 sigma of mean, see Reference 1). Exceptions as above.

4 = Outside criteria

- * Isotopic Uranium (U-234, 235, 238)
 Isotopic Thorium (Th-230, 232)
 Np-237
 Am-241/Cm-242, 243/244
 Pu-alpha (Pu-238, 239, 240)
 Ra-226

** Total may not equal 100 due to rounding.

TABLE 2

FRAMATOME ANP ENVIRONMENTAL LABORATORY
ANALYTICS ENVIRONMENTAL CROSS CHECK PROGRAM
PERFORMANCE EVALUATION

| Sample Number | Quarter/Year | Sample Media | Nuclide | Units | Reported Value | Known Value | Ratio E-LAB/Analytics | Evaluation |
|---------------|--------------|--------------|-------------|-------|----------------|-------------|-----------------------|------------|
| E4599-162 | 2nd/2005 | Water | H-3 | pCi/L | 9060 | 9100 | 1.00 | Agreement |
| E4600-162 | 2nd/2005 | Filter | Gross Alpha | pCi | 31.9 | 30.9 | 1.03 | Agreement |
| E4600-162 | 2nd/2005 | Filter | Gross Beta | pCi | 125 | 127 | 0.99 | Agreement |
| E4601-162 | 2nd/2005 | Filter | Ce-141 | pCi/L | 59.3 | 58.9 | 1.01 | Agreement |
| E4601-162 | 2nd/2005 | Filter | Cr-51 | pCi/L | 207 | 193 | 1.07 | Agreement |
| E4601-162 | 2nd/2005 | Filter | Cs-134 | pCi/L | 59.1 | 60.6 | 0.98 | Agreement |
| E4601-162 | 2nd/2005 | Filter | Cs-137 | pCi/L | 131 | 120 | 1.09 | Agreement |
| E4601-162 | 2nd/2005 | Filter | Co-58 | pCi/L | 3.55 | 3.4 | 1.04 | Agreement |
| E4601-162 | 2nd/2005 | Filter | Mn-54 | pCi/L | 88.6 | 79.7 | 1.11 | Agreement |
| E4601-162 | 2nd/2005 | Filter | Fe-59 | pCi/L | 40.1 | 40.7 | 0.99 | Agreement |
| E4601-162 | 2nd/2005 | Filter | Zn-65 | pCi/L | 112 | 98.8 | 1.13 | Agreement |
| E4601-162 | 2nd/2005 | Filter | Co-60 | pCi/L | 89.4 | 92.3 | 0.97 | Agreement |
| E4602-162 | 2nd/2005 | Filter | Sr-89 | pCi/L | 90.5 | 97.5 | 0.93 | Agreement |
| E4602-162 | 2nd/2005 | Filter | Sr-90 | pCi/L | 13.0 | 12.6 | 1.03 | Agreement |
| E4603-162 | 2nd/2005 | Milk | I-131LL | pCi/L | 85.7 | 86.9 | 0.99 | Agreement |
| E4603-162 | 2nd/2005 | Milk | I-131 | pCi/L | 86.8 | 86.9 | 1.00 | Agreement |
| E4603-162 | 2nd/2005 | Milk | Ce-141 | pCi/L | 96.3 | 92.4 | 1.04 | Agreement |
| E4603-162 | 2nd/2005 | Milk | Cr-51 | pCi/L | 295 | 303 | 0.98 | Agreement |
| E4603-162 | 2nd/2005 | Milk | Cs-134 | pCi/L | 87.7 | 95 | 0.92 | Agreement |
| E4603-162 | 2nd/2005 | Milk | Cs-137 | pCi/L | 186 | 189 | 0.98 | Agreement |
| E4603-162 | 2nd/2005 | Milk | Co-58 | pCi/L | 5.83 | 5.30 | 1.10 | Agreement |
| E4603-162 | 2nd/2005 | Milk | Mn-54 | pCi/L | 124 | 125 | 0.99 | Agreement |
| E4603-162 | 2nd/2005 | Milk | Fe-59 | pCi/L | 67 | 63.9 | 1.05 | Agreement |
| E4603-162 | 2nd/2005 | Milk | Zn-65 | pCi/L | 149 | 155 | 0.96 | Agreement |
| E4603-162 | 2nd/2005 | Milk | Co-60 | pCi/L | 138 | 145 | 0.96 | Agreement |

TABLE 2
(Continued)
FRAMATOME ANP ENVIRONMENTAL LABORATORY
ANALYTICS RADIOLOGICAL ENVIRONMENTAL CROSS-CHECK
PERFORMANCE EVALUATION

| Sample Number | Quarter/ Year | Sample Media | Nuclide | Units | Reported Value | Known Value | Ratio E-LAB/ Analytics | Evaluation |
|---------------|------------------|--------------|-------------|-------|----------------|-------------|---------------------------|------------|
| E4686-162 | 3rd/2005 | Water | Gross Alpha | pCi/L | 42.3 | 41.6 | 1.02 | Agreement |
| E4686-162 | 3rd/2005 | Water | Gross Beta | pCi/L | 128.5 | 123 | 1.05 | Agreement |
| E4687-162 | 3rd/2005 | Water | I-131LL | pCi/L | 78.3 | 78.2 | 1.00 | Agreement |
| E4687-162 | 3rd/2005 | Water | I-131 | pCi/L | 77.2 | 78.2 | 0.99 | Agreement |
| E4687-162 | 3rd/2005 | Water | Ce-141 | pCi/L | 276.4 | 282 | 0.98 | Agreement |
| E4687-162 | 3rd/2005 | Water | Cr-51 | pCi/L | 353.7 | 408 | 0.87 | Agreement |
| E4687-162 | 3rd/2005 | Water | Cs-134 | pCi/L | 137.3 | 148 | 0.93 | Agreement |
| E4687-162 | 3rd/2005 | Water | Cs-137 | pCi/L | 231.1 | 235 | 0.98 | Agreement |
| E4687-162 | 3rd/2005 | Water | Co-58 | pCi/L | 72.5 | 77.0 | 0.94 | Agreement |
| E4687-162 | 3rd/2005 | Water | Mn-54 | pCi/L | 113.2 | 111 | 1.02 | Agreement |
| E4687-162 | 3rd/2005 | Water | Fe-59 | pCi/L | 74.7 | 74.0 | 1.01 | Agreement |
| E4687-162 | 3rd/2005 | Water | Zn-65 | pCi/L | 152.3 | 149 | 1.02 | Agreement |
| E4687-162 | 3rd/2005 | Water | Co-60 | pCi/L | 192.1 | 202 | 0.95 | Agreement |
| E4688-162 | 3rd/2005 | Charcoal | I-131 | pCi | 61.0 | 62.7 | 0.97 | Agreement |
| E4689-162 | 3rd/2005 | Filter | Gross Alpha | pCi | 39.3 | 38.0 | 1.04 | Agreement |
| E4689-162 | 3rd/2005 | Filter | Gross Beta | pCi | 120.8 | 112 | 1.08 | Agreement |
| E4690-162 | 3rd/2005 | Milk | I-131LL | pCi/L | 99.0 | 94.3 | 1.05 | Agreement |
| E4690-162 | 3rd/2005 | Milk | I-131 | pCi/L | 90.0 | 94.3 | 0.95 | Agreement |
| E4690-162 | 3rd/2005 | Milk | Ce-141 | pCi/L | 228.5 | 233 | 0.98 | Agreement |
| E4690-162 | 3rd/2005 | Milk | Cr-51 | pCi/L | 306.3 | 338 | 0.91 | Agreement |
| E4690-162 | 3rd/2005 | Milk | Cs-134 | pCi/L | 118.3 | 122 | 0.97 | Agreement |
| E4690-162 | 3rd/2005 | Milk | Cs-137 | pCi/L | 196.5 | 195 | 1.01 | Agreement |
| E4690-162 | 3rd/2005 | Milk | Co-58 | pCi/L | 64.0 | 63.4 | 1.01 | Agreement |
| E4690-162 | 3rd/2005 | Milk | Mn-54 | pCi/L | 94.7 | 92.0 | 1.03 | Agreement |
| E4690-162 | 3rd/2005 | Milk | Fe-59 | pCi/L | 63.3 | 61.0 | 1.04 | Agreement |
| E4690-162 | 3rd/2005 | Milk | Zn-65 | pCi/L | 121.7 | 123 | 0.90 | Agreement |
| E4690-162 | 3rd/2005 | Milk | Co-60 | pCi/L | 165.2 | 167 | 0.99 | Agreement |
| E4691-162 | 3rd/2005 | Milk | Sr-89 | pCi/L | 139.6 | 146 | 0.96 | Agreement |
| E4691-162 | 3rd/2005 | Milk | Sr-90 | pCi/L | 10.8 | 11.5 | 0.94 | Agreement |

TABLE 3

**NIST MAP ANALYSIS RESULTS BY
FRAMATOME ANP ENVIRONMENTAL LABORATORY
ACCEPTANCE CRITERIA, MEDIA, AND MEASUREMENT CATEGORIES
JULY-DECEMBER 2005**

| | Bias Criteria (1) | | | | Precision Criteria (2) | | | |
|---------------------------------------|--------------------------|----------|----------|----------|-------------------------------|----------|----------|----------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Water | | | | | | | | |
| Gamma | 30 | 0 | 0 | 0 | 30 | 0 | 0 | 0 |
| II. Filter | | | | | | | | |
| Gamma | 30 | 0 | 0 | 0 | 30 | 0 | 0 | 0 |
| Total Number in Range: | 60 | 0 | 0 | 0 | 60 | 0 | 0 | 0 |
| Percentage of Total Processed: | 100.0 | 0.0 | 0.0 | 0.0 | 100.0 | 0.0 | 0.0 | 0.0 |
| Sum of Analyses: | 60 | | | | 60 | | | |

- (1) Percent Bias by Deviation Category as noted in Table 1, Footnote (1)
- (2) Percent Precision by Deviation Category as noted in Table 1, Footnote (2)
- * Total may not equal 100 due to rounding

TABLE 4

**SUMMARY OF FRAMATOME ANP ENVIRONMENTAL LABORATORY
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)
TRACEABILITY RESULTS
JULY-DECEMBER, 2005**

| NIST Standard Number | Reference Date of Standard | Radionuclide | Matrix | E-LAB Measurement Technique | Mean Percent Deviation From NIST |
|-----------------------------|-----------------------------------|---------------------|---------------|------------------------------------|---|
| 1800-4 | 1-Aug-05 | Fe-59 | Liquid | Gamma Spectroscopy #2 | -0.55 |
| 1800-4 | 1-Aug-05 | Zn-65 | Liquid | Gamma Spectroscopy #2 | -0.55 |
| 1800-4 | 1-Aug-05 | Ba-133 | Liquid | Gamma Spectroscopy #2 | -0.61 |
| 1800-4 | 1-Aug-05 | Cs-134 | Liquid | Gamma Spectroscopy #2 | -3.99 |
| 1800-4 | 1-Aug-05 | Ce-141 | Liquid | Gamma Spectroscopy #2 | -2.69 |
| 1800-4 | 1-Aug-05 | Fe-59 | Liquid | Gamma Spectroscopy #5 | 0.76 |
| 1800-4 | 1-Aug-05 | Zn-65 | Liquid | Gamma Spectroscopy #5 | -0.96 |
| 1800-4 | 1-Aug-05 | Ba-133 | Liquid | Gamma Spectroscopy #5 | 1.96 |
| 1800-4 | 1-Aug-05 | Cs-134 | Liquid | Gamma Spectroscopy #5 | -1.31 |
| 1800-4 | 1-Aug-05 | Ce-141 | Liquid | Gamma Spectroscopy #5 | -2.87 |
| 1801-5 | 1-Aug-05 | Fe-59 | Filter | Gamma Spectroscopy #2 | 1.26 |
| 1801-5 | 1-Aug-05 | Zn-65 | Filter | Gamma Spectroscopy #2 | 1.35 |
| 1801-5 | 1-Aug-05 | Ba-133 | Filter | Gamma Spectroscopy #2 | -0.81 |
| 1801-5 | 1-Aug-05 | Cs-134 | Filter | Gamma Spectroscopy #2 | -2.91 |
| 1801-5 | 1-Aug-05 | Ce-141 | Filter | Gamma Spectroscopy #2 | 2.96 |
| 1801-5 | 1-Aug-05 | Fe-59 | Filter | Gamma Spectroscopy #4 | 1.65 |
| 1801-5 | 1-Aug-05 | Zn-65 | Filter | Gamma Spectroscopy #4 | -0.21 |
| 1801-5 | 1-Aug-05 | Ba-133 | Filter | Gamma Spectroscopy #4 | -0.45 |
| 1801-5 | 1-Aug-05 | Cs-134 | Filter | Gamma Spectroscopy #4 | -3.10 |
| 1801-5 | 1-Aug-05 | Ce-141 | Filter | Gamma Spectroscopy #4 | -0.69 |

Data on NIST MAP program is repeated in Table 16 for Part 50/61 QC data.

TABLE 5

**ENVIRONMENTAL MEASUREMENTS LABORATORY
QUALITY ASSESSMENT PROGRAM**

| MATRIX/ UNITS | RADIO- NUCLIDE | REPORTED MEAN VALUE Bq/Units | REPORTED ERROR | EML VALUE Bq/Units | EML ERROR | REPORTED TO KNOWN RATIO | EVALUATION |
|--------------------------|---------------------------|---|---------------------------|-----------------------------------|----------------------|--|-------------------|
|--------------------------|---------------------------|---|---------------------------|-----------------------------------|----------------------|--|-------------------|

EML has notified the industry that QAP 60 (March 2004) was the final set of samples to be issued. Further information may be found on the EML website, URL <http://www.eml.doe.gov/qap/>

TABLE 6

**DEPARTMENT OF ENERGY MIXED ANALYTE PERFORMANCE EVALUATION
PROGRAM (MAPEP-05-14)**

| MATRIX/ UNITS | REFERENCE DATE | RADIO- NUCLIDE | E-LAB MEAN VALUE | MAPEP VALUE | BIAS % | Evaluation |
|-----------------------|-------------------|-------------------|---------------------|---------------------|-----------|------------|
| Filter (Bq total) | 1-Jul-05 | Am-241 | 0.1359 | 0.158 | -14.0 | Agreement |
| Filter (Bq total) | 1-Jul-05 | Cs-134 | 3.828 | 3.85 | -0.6 | Agreement |
| Filter (Bq total) | 1-Jul-05 | Cs-137 | 3.396 | 3.23 | 5.1 | Agreement |
| Filter (Bq total) | 1-Jul-05 | Co-57 | 6.506 | 6.2 | 4.9 | Agreement |
| Filter (Bq total) | 1-Jul-05 | Co-60 | 2.924 | 2.85 | 2.6 | Agreement |
| Filter (Bq total) | 1-Jul-05 | Mn-54 | 4.55 | 4.37 | 4.1 | Agreement |
| Filter (Bq total) | 1-Jul-05 | Pu-238 | 0.1059 | 0.0969 | 9.3 | Agreement |
| Filter (Bq total) | 1-Jul-05 | Pu-239/240 | 0.096 | 0.0898 | 6.9 | Agreement |
| Filter (Bq total) | 1-Jul-05 | Sr-90 | 2.037 | 2.25 | -9.5 | Agreement |
| Filter (Bq total) | 1-Jul-05 | Zn-65 | 4.81 | 4.33 | 11.1 | Agreement |
| Soil (Bq/kg) | 1-Jul-05 | Cs-134 | 594 | 568 | 4.6 | Agreement |
| Soil (Bq/kg) | 1-Jul-05 | Cs-137 | 468 | 439 | 6.6 | Agreement |
| Soil (Bq/kg) | 1-Jul-05 | Co-57 | 546 | 524 | 4.2 | Agreement |
| Soil (Bq/kg) | 1-Jul-05 | Co-60 | 300 | 287 | 4.4 | Agreement |
| Soil (Bq/kg) | 1-Jul-05 | Mn-54 | 475 | 439 | 8.2 | Agreement |
| Soil (Bq/kg) | 1-Jul-05 | K-40 | 650 | 604 | 7.6 | Agreement |
| Soil (Bq/kg) | 1-Jul-05 | Sr-90 | 663 | 757 | -12.4 | Agreement |
| Soil (Bq/kg) | 1-Jul-05 | Zn-65 | 881 | 823 | 7.0 | Agreement |
| Vegetation (Bq total) | 1-Jul-05 | Am-241 | 0.251 | 0.23 | -10.8 | Agreement |
| Vegetation (Bq total) | 1-Jul-05 | Pu-238 | 0.00111 +/- 0.00054 | False Positive Test | N/A | Agreement |
| Vegetation (Bq total) | 1-Jul-05 | Pu-239/240 | 0.1675 | 0.164 | 2.1 | Agreement |
| Vegetation (Bq total) | 1-Jul-05 | Sr-90 | 2.28 | 2.42 | -5.8 | Agreement |
| Water (Bq/L) | 1-Jul-05 | Am-241 | 1.849 | 2.23 | -17.1 | Agreement |
| Water (Bq/L) | 1-Jul-05 | Cs-134 | 160.7 | 167 | -3.8 | Agreement |
| Water (Bq/L) | 1-Jul-05 | Cs-137 | 306 | 333 | -8.1 | Agreement |
| Water (Bq/L) | 1-Jul-05 | Co-57 | 257 | 272 | -5.6 | Agreement |
| Water (Bq/L) | 1-Jul-05 | Co-60 | 248 | 261 | -4.8 | Agreement |
| Water (Bq/L) | 1-Jul-05 | H-3 | 571 | 527 | 8.3 | Agreement |
| Water (Bq/L) | 1-Jul-05 | Fe-55 | 208 | 196 | 6.0 | Agreement |
| Water (Bq/L) | 1-Jul-05 | Mn-54 | 392 | 418 | -6.3 | Agreement |
| Water (Bq/L) | 1-Jul-05 | Ni-63 | 93.5 | 100 | -6.5 | Agreement |
| Water (Bq/L) | 1-Jul-05 | Pu-238 | 1.659 | 1.91 | -13.1 | Agreement |
| Water (Bq/L) | 1-Jul-05 | Pu-239/240 | 2.305 | 2.75 | -16.2 | Agreement |
| Water (Bq/L) | 1-Jul-05 | Tc-99 | 60.8 | 66.5 | -8.6 | Agreement |
| Water (Bq/L) | 1-Jul-05 | Zn-65 | 326 | 330 | -1.2 | Agreement |

TABLE 7

ENVIRONMENTAL RESOURCE ASSOCIATES PROFICIENCY TEST RESULTS
FRAMATOME ANP ENVIRONMENTAL LABORATORY

| ERA LOT #/ REF. DATE | MATRIX/ UNITS | RADIO- NUCLIDE | REPORTED MEAN VALUE pCi/L | ERA VALUE pCi/L | ERA CONTROL LIMITS | ERA WARNING LIMITS | EVALUATION |
|----------------------------|------------------|-------------------|---------------------------------|-----------------------|--------------------------|--------------------------|------------|
| RAD-63 November 2005 | Water pCi/L | Gross Alpha | 23.3 | 23.3 | 13.2-33.4 | 16.6-30.0 | Agreement |
| RAD-63 November 2005 | Water pCi/L | Gross Beta | 36.6 | 39.1 | 30.4-47.8 | 33.3-44.9 | Agreement |
| RAD-63 November 2005 | Water pCi/L | Tritium | 12200 | 12200 | 10100-14300 | 10800-13600 | Agreement |
| RAD-63 November 2005 | Water pCi/L | Ba-133 | 27.5 | 31.2 | 22.5-39.9 | 25.4-37.0 | Agreement |
| RAD-63 November 2005 | Water pCi/L | Cs-134 | 33.5 | 33.9 | 25.2-42.6 | 28.1-39.7 | Agreement |
| RAD-63 November 2005 | Water pCi/L | Cs-137 | 26.5 | 28.3 | 19.6-37.0 | 22.5-34.1 | Agreement |
| RAD-63 November 2005 | Water pCi/L | Co-60 | 82.5 | 84.1 | 75.4-92.8 | 78.3-89.9 | Agreement |
| RAD-63 November 2005 | Water pCi/L | Zn-65 | 102 | 105 | 86.8-123 | 92.9-117 | Agreement |
| RAD-63 November 2005 | Water pCi/L | I-131 | 17.1 | 17.4 | 12.2-22.6 | 13.9-20.9 | Agreement |

TABLE 8

INTRA-LABORATORY ENVIRONMENTAL PROCESS CONTROL RESULTS BY
FRAMATOME ANP ENVIRONMENTAL LABORATORY
ACCEPTANCE CRITERIA, MEDIA, AND MEASUREMENT CATEGORIES
JULY-DECEMBER 2005

| | Bias Criteria (1) | | | | Precision Criteria (2), (3) | | | |
|---|-------------------|-------------|------------|------------|-----------------------------|------------|-------------|------------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Air Particulate | | | | | | | | |
| Beta | 106 | 19 | 0 | 0 | 0 | 0 | 0 | 0 |
| II. Air Charcoal | | | | | | | | |
| Gamma-Quantitative | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamma - Screening | 43 | 22 | 1 | 0 | 0 | 0 | 0 | 0 |
| III. Milk | | | | | | | | |
| Gamma | 3 | 0 | 0 | 0 | 7 | 2 | 12 | 0 |
| IV. Water | | | | | | | | |
| Am-241 | 2 | 0 | 1 | 0 | 0 | 2 | 0 | 0 |
| Fe-55 | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 0 |
| Gross Alpha | 4 | 1 | 5 | 0 | 2 | 0 | 0 | 0 |
| Gross Beta | 12 | 4 | 1 | 0 | 2 | 0 | 0 | 0 |
| Gamma | 5 | 1 | 0 | 0 | 6 | 0 | 10 | 0 |
| Ni-63 | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 0 |
| Pu-238 | 2 | 0 | 1 | 0 | 2 | 0 | 0 | 0 |
| Sr-90 | 2 | 1 | 0 | 0 | 2 | 0 | 0 | 0 |
| Tritium | 3 | 0 | 0 | 0 | 2 | 0 | 2 | 0 |
| Tc-99 | 1 | 0 | 2 | 0 | 2 | 0 | 0 | 0 |
| V. Soil/Concrete | | | | | | | | |
| Am-241 | 4 | 1 | 5 | 0 | 2 | 0 | 0 | 0 |
| C-14 | 0 | 2 | 4 | 0 | 2 | 0 | 4 | 0 |
| Fe-55 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 |
| Gamma | 10 | 0 | 1 | 0 | 10 | 2 | 22 | 0 |
| Ni-63 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 |
| Pu-238 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 |
| Pu-241 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 |
| Sr-90 | 3 | 4 | 0 | 0 | 0 | 0 | 6 | 0 |
| Tritium | 5 | 3 | 0 | 0 | 4 | 0 | 4 | 0 |
| Tc-99 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 |
| VI. Vegetation/Food | | | | | | | | |
| Gamma | 0 | 0 | 0 | 0 | 118 | 12 | 60 | 0 |
| Total Number In Range: | 209 | 65 | 28 | 0 | 165 | 20 | 128 | 0 |
| Percentage of Total Processed: | 69.2 | 21.5 | 9.3 | 0.0 | 52.7 | 6.4 | 40.9 | 0.0 |
| Sum of Analyses: | 302 | | | | 313 | | | |

(1) Percent Bias by Deviation Category as noted in Table 1, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 1, Footnote (2)

(3) Most Precision data generated from non-positive client samples for specific contractual evaluation

* Total may not equal 100 due to rounding

TABLE 9

QC CHARCOAL ACTIVITY SCREENING RESULTS

| SPIKE NUMBER | LSN | FILTER TYPE | ANALYSIS DATE | ACT. REPORTED | % BIAS |
|--------------|----------|-------------|---------------|---------------|--------|
| 70218162-C | L9329-01 | SAIC-1 | 2-Jun-05 | YES | -3.42 |
| 70218162-D | L9329-03 | SA2C | 2-Jun-05 | YES | -0.74 |
| 70218162-E | L9329-02 | SAIC-2 | 2-Jun-05 | YES | 0.67 |
| 70860162-C | L9478-01 | SAIC-1 | 28-Jun-05 | YES | -0.72 |
| | L9515-01 | SAIC-1 | 6-Jul-05 | YES | 3.95 |
| | L9552-01 | SAIC-1 | 11-Jul-05 | YES | 3.52 |
| | L9584-01 | SAIC-1 | 18-Jul-05 | YES | 0.62 |
| | L9626-01 | SAIC-1 | 24-Aug-05 | YES | 2.77 |
| | L9661-01 | SAIC-1 | 3-Aug-05 | YES | 3.54 |
| | L9696-01 | SAIC-1 | 8-Aug-05 | YES | 4.29 |
| | L9737-01 | SAIC-1 | 15-Aug-05 | YES | 4.07 |
| 7086162-D | L9478-03 | SA2C | 28-Jun-05 | YES | -0.35 |
| | L9515-03 | SA2C | 6-Jul-05 | YES | 0.52 |
| | L9552-03 | SA2C | 11-Jul-05 | YES | -0.43 |
| | L9584-03 | SA2C | 18-Jul-05 | YES | 1.26 |
| | L9626-03 | SA2C | 24-Aug-05 | YES | -4.72 |
| | L9661-03 | SA2C | 3-Aug-05 | YES | -3.73 |
| | L9696-03 | SA2C | 8-Aug-05 | YES | -8.00 |
| | L9737-03 | SA2C | 15-Aug-05 | YES | -6.94 |
| 70860162-E | L9478-02 | SAIC-2 | 28-Jun-05 | YES | 2.28 |
| | L9515-02 | SAIC-2 | 6-Jul-05 | YES | 0.48 |
| | L9552-02 | SAIC-2 | 11-Jul-05 | YES | 2.22 |
| | L9584-02 | SAIC-2 | 18-Jul-05 | YES | -5.30 |
| | L9626-02 | SAIC-2 | 24-Aug-05 | YES | 2.14 |
| | L9661-02 | SAIC-2 | 3-Aug-05 | YES | 3.80 |
| | L9696-02 | SAIC-2 | 8-Aug-05 | YES | 6.17 |
| | L9737-02 | SAIC-2 | 15-Aug-05 | YES | 6.70 |
| 70860162-M | L9771-01 | SAIC-1 | 24-Aug-05 | YES | 3.50 |
| | L9804-01 | SAIC-1 | 30-Aug-05 | YES | 7.18 |
| | L9832-01 | SAIC-1 | 7-Sep-05 | YES | 3.20 |
| 70860162-N | L9771-02 | SAIC-2 | 24-Aug-05 | YES | 2.09 |
| | L9804-02 | SAIC-2 | 30-Aug-05 | YES | 3.17 |
| | L9832-02 | SAIC-2 | 7-Sep-05 | YES | 1.88 |
| 70860162-O | L9771-03 | SA2C | 24-Aug-05 | YES | 3.23 |
| | L9804-03 | SA2C | 30-Aug-05 | YES | 1.38 |
| | L9832-03 | SA2C | 7-Sep-05 | YES | 1.45 |

TABLE 9
(continued)
QC CHARCOAL ACTIVITY SCREENING RESULTS

| SPIKE NUMBER | LSN | FILTER TYPE | ANALYSIS DATE | ACT. REPORTED | % BIAS |
|---------------------|------------|--------------------|----------------------|----------------------|---------------|
| 71346162-G | L10036-01 | SAIC-1 | 19-Oct-05 | YES | 6.86 |
| | L10083-01 | SAIC-1 | 25-Oct-05 | YES | 6.46 |
| | L10118-01 | SAIC-1 | 2-Nov-05 | YES | 0.65 |
| | L10151-01 | SAIC-1 | 8-Nov-05 | YES | 3.56 |
| | L10173-01 | SAIC-1 | 15-Nov-05 | YES | 6.28 |
| | L10200-01 | SAIC-1 | 22-Nov-05 | YES | 5.12 |
| | L10226-01 | SAIC-1 | 30-Nov-05 | YES | 5.11 |
| | L10254-01 | SAIC-1 | 6-Dec-05 | YES | 4.25 |
| 71346162-H | L10036-03 | SA2C | 19-Oct-05 | YES | -0.15 |
| | L10083-03 | SA2C | 25-Oct-05 | YES | 1.54 |
| | L10118-03 | SA2C | 2-Nov-05 | YES | -0.14 |
| | L10151-03 | SA2C | 8-Nov-05 | YES | 0.22 |
| | L10173-03 | SA2C | 15-Nov-05 | YES | 3.45 |
| | L10200-03 | SA2C | 22-Nov-05 | YES | -0.17 |
| | L10226-03 | SA2C | 30-Nov-05 | YES | -5.25 |
| | L10254-03 | SA2C | 6-Dec-05 | YES | 5.69 |
| 71346162-I | L10036-02 | SAIC-2 | 19-Oct-05 | YES | 6.94 |
| | L10083-02 | SAIC-2 | 25-Oct-05 | YES | 7.69 |
| | L10118-02 | SAIC-2 | 2-Nov-05 | YES | 6.69 |
| | L10151-02 | SAIC-2 | 8-Nov-05 | YES | 5.64 |
| | L10173-02 | SAIC-2 | 15-Nov-05 | YES | 7.17 |
| | L10200-02 | SAIC-2 | 22-Nov-05 | YES | 9.48 |
| | L10226-02 | SAIC-2 | 30-Nov-05 | YES | 11.07 |
| | L10254-02 | SAIC-2 | 6-Dec-05 | YES | 5.63 |
| 71909162-B | L10284-01 | SAIC-1 | 16-Dec-05 | YES | 3.59 |
| | L10310-01 | SAIC-1 | 21-Dec-05 | YES | 5.37 |
| 71909162-C | L10284-03 | SA2C | 16-Dec-05 | YES | -4.36 |
| | L10310-03 | SA2C | 21-Dec-05 | YES | -7.51 |
| 71909162-D | L10284-02 | SAIC-2 | 16-Dec-05 | YES | 2.56 |
| | L10310-02 | SAIC-2 | 21-Dec-05 | YES | 4.31 |

TABLE 10

FRAMATOME ANP ENVIRONMENTAL LABORATORY
 ENVIRONMENTAL INTRA-LABORATORY AND INTER-LABORATORY
 DATA SUMMARY BIAS AND PRECISION BY MEDIA
 JUNE-DECEMBER 2005

| | Bias Criteria (1) | | | | Precision Criteria (2), (3) | | | |
|--------------------------------|-------------------|------|-----|-----|-----------------------------|-----|------|-----|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Air Filter | | | | | | | | |
| Gross Alpha | 5 | 1 | 0 | 0 | 6 | 0 | 0 | 0 |
| Gross Beta | 109 | 22 | 0 | 0 | 6 | 0 | 0 | 0 |
| Gamma | 44 | 5 | 8 | 0 | 55 | 1 | 1 | 0 |
| Sr-89 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Sr-90 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 |
| II. Charcoal | | | | | | | | |
| Gamma-Quantitative | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamma-Screening | 43 | 22 | 1 | 0 | 0 | 0 | 0 | 0 |
| III. Milk | | | | | | | | |
| Gamma | 39 | 15 | 9 | 0 | 52 | 11 | 18 | 0 |
| Iodine (LL) | 5 | 1 | 0 | 0 | 6 | 0 | 0 | 0 |
| Sr-89 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 0 |
| Sr-90 | 0 | 1 | 2 | 0 | 0 | 1 | 2 | 0 |
| IV. Soil/Concrete | | | | | | | | |
| Am-241 | 4 | 1 | 5 | 0 | 2 | 0 | 0 | 0 |
| C-14 | 0 | 2 | 4 | 0 | 2 | 0 | 4 | 0 |
| Fe-55 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 |
| Gamma | 10 | 0 | 1 | 0 | 10 | 2 | 22 | 0 |
| Ni-63 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 |
| Pu-238 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 |
| Pu-241 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 |
| Sr-90 | 3 | 4 | 0 | 0 | 0 | 0 | 6 | 0 |
| Tritium | 5 | 3 | 0 | 0 | 4 | 0 | 4 | 0 |
| Tc-99 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 |
| V. Water | | | | | | | | |
| Am-241 | 2 | 0 | 1 | 0 | 0 | 2 | 0 | 0 |
| Fe-55 | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 0 |
| Gross Alpha | 6 | 2 | 5 | 0 | 5 | 0 | 0 | 0 |
| Gross Beta | 13 | 6 | 1 | 0 | 5 | 0 | 0 | 0 |
| Gamma | 51 | 12 | 3 | 0 | 62 | 4 | 10 | 0 |
| Iodine (LL) | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Ni-63 | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 0 |
| Pu-238 | 2 | 0 | 1 | 0 | 2 | 0 | 0 | 0 |
| Sr-90 | 2 | 1 | 0 | 0 | 2 | 0 | 0 | 0 |
| Tritium | 6 | 0 | 0 | 0 | 5 | 0 | 2 | 0 |
| Tc-99 | 1 | 0 | 2 | 0 | 2 | 0 | 0 | 0 |
| VI. Vegetation/Food | | | | | | | | |
| Gamma | 0 | 0 | 0 | 0 | 118 | 12 | 60 | 0 |
| Total Number in Range: | 361 | 108 | 51 | 0 | 354 | 38 | 138 | 0 |
| Percentage of Total Processed: | 69.4 | 20.8 | 9.8 | 0.0 | 66.8 | 7.2 | 26.0 | 0.0 |
| Sum of Analyses: | 520 | | | | 530 | | | |

(1) Percent Bias by Deviation Category as noted in Table 1, Footnote (1)
 (2) Percent Precision by Deviation Category as noted in Table 1, Footnote (2)
 (3) Most Precision data generated from non-positive client samples for specific contractual evaluation
 * Total may not equal 100 due to rounding.
 ** Totals summarize Internal PCs, NIST MAP, and Analytics Cross Check programs

TABLE 11

**FRAMATOME ANP ENVIRONMENTAL LABORATORY
ENVIRONMENTAL INTRA-LABORATORY AND INTER-LABORATORY
DATA SUMMARY BIAS AND PRECISION BY ANALYSIS TYPE
JULY-DECEMBER 2005**

| | Bias Criteria (1) | | | | Precision Criteria (2), (3) | | | |
|-------------------------------|-------------------|-------------|------------|------------|-----------------------------|------------|-------------|------------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Gross Alpha | | | | | | | | |
| Air Filter | 5 | 1 | 0 | 0 | 6 | 0 | 0 | 0 |
| Water | 6 | 2 | 5 | 0 | 5 | 0 | 0 | 0 |
| II. Am-241 | | | | | | | | |
| Soil/Concrete | 4 | 1 | 5 | 0 | 2 | 0 | 0 | 0 |
| Water | 2 | 0 | 1 | 0 | 0 | 2 | 0 | 0 |
| III. C-14 | | | | | | | | |
| Soil/Concrete | 0 | 2 | 4 | 0 | 2 | 0 | 4 | 0 |
| IV. Fe-55 | | | | | | | | |
| Soil/Concrete | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 |
| Water | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 0 |
| V. Gross Beta | | | | | | | | |
| Air Filter | 109 | 22 | 0 | 0 | 6 | 0 | 0 | 0 |
| Water | 13 | 6 | 1 | 0 | 5 | 0 | 0 | 0 |
| VI. Gamma | | | | | | | | |
| Air Filter | 44 | 5 | 8 | 0 | 55 | 1 | 1 | 0 |
| Charcoal-Quantitative | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Charcoal-Screening | 43 | 22 | 1 | 0 | 0 | 0 | 0 | 0 |
| Milk | 39 | 15 | 9 | 0 | 52 | 11 | 18 | 0 |
| Soil/Concrete | 10 | 0 | 1 | 0 | 10 | 2 | 22 | 0 |
| Vegetation/Food | 0 | 0 | 0 | 0 | 118 | 12 | 60 | 0 |
| Water | 51 | 12 | 3 | 0 | 62 | 4 | 10 | 0 |
| VII. Iodine (LL) | | | | | | | | |
| Milk | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Water | 5 | 1 | 0 | 0 | 6 | 0 | 0 | 0 |
| VIII. Ni-63 | | | | | | | | |
| Soil/Concrete | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 |
| Water | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 0 |
| IX. Pu-238 | | | | | | | | |
| Soil/Concrete | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 |
| Water | 2 | 0 | 1 | 0 | 2 | 0 | 0 | 0 |
| X. Pu-241 | | | | | | | | |
| Soil/Concrete | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 |
| XI. Sr-89 | | | | | | | | |
| Air Filter | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Milk | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 0 |
| XII. Sr-90 | | | | | | | | |
| Air Filter | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 |
| Milk | 0 | 1 | 2 | 0 | 0 | 1 | 2 | 0 |
| Soil/Concrete | 3 | 4 | 0 | 0 | 0 | 0 | 6 | 0 |
| Water | 2 | 1 | 0 | 0 | 2 | 0 | 0 | 0 |
| XIII. Tritium | | | | | | | | |
| Soil/Concrete | 5 | 3 | 0 | 0 | 4 | 0 | 4 | 0 |
| Water | 6 | 0 | 0 | 0 | 5 | 0 | 2 | 0 |
| XIV. Tc-99 | | | | | | | | |
| Soil/Concrete | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 |
| Water | 1 | 0 | 2 | 0 | 2 | 0 | 0 | 0 |
| Total Number in Range: | 361 | 108 | 51 | 0 | 354 | 38 | 138 | 0 |
| % of Total Processed: | 69.4 | 20.8 | 9.8 | 0.0 | 66.8 | 7.2 | 26.0 | 0.0 |
| Sum of Analyses: | 520 | | | | 530 | | | |

(1) Percent Bias by Deviation Category as noted in Table 1, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 1, Footnote (2)

(3) Most Precision data generated from non-positive client samples for specific contractual evaluation

* Total may not equal 100 due to rounding.

** Totals summarize Internal PCs, NIST MAP, and Analytics Cross Check programs

TABLE 12

ENVIRONMENTAL BIAS AND PRECISION BY YEAR

| Year | Percent Bias Deviation from Known | | | | | Percent Precision Deviation from Mean | | | | |
|--|--------------------------------------|--------------|--------------|--------------------------|----------------------|--|--------------|--------------|--------------------------|----------------------|
| | Bias Criteria* (1) | | | | | Precision Criteria* (2) | | | | |
| | 1 | 2 | 3 | Outside Criteria 4 | % Within Criteria | 1 | 2 | 3 | Outside Criteria 4 | % Within Criteria |
| 2005 | 710 | 242 | 117 | 3 | 99.7 | 594 | 51 | 202 | 0 | 100.0 |
| 2004 | 849 | 273 | 172 | 10 | 99.2 | 439 | 60 | 362 | 2 | 99.8 |
| 2003 | 572 | 182 | 74 | 13 | 98.5 | 354 | 55 | 106 | 1 | 99.8 |
| 2002 | 619 | 170 | 74 | 7 | 99.2 | 411 | 44 | 16 | 3 | 99.4 |
| 2001 | 383 | 115 | 80 | 22 | 96.3 | 330 | 45 | 19 | 2 | 99.5 |
| 2000 | 368 | 143 | 63 | 18 | 97.0 | 342 | 70 | 36 | 1 | 99.8 |
| 1999 | 323 | 100 | 44 | 13 | 97.3 | 301 | 46 | 10 | 2 | 99.4 |
| 1998 | 375 | 100 | 21 | 7 | 98.6 | 355 | 56 | 21 | 4 | 99.1 |
| 1997 | 351 | 118 | 46 | 11 | 97.9 | 306 | 46 | 11 | 0 | 100.0 |
| 1996 | 616 | 187 | 104 | 24 | 97.4 | 696 | 71 | 33 | 3 | 99.6 |
| 1995 | 291 | 75 | 37 | 12 | 97.1 | 200 | 43 | 24 | 0 | 100.0 |
| 1994 | 359 | 116 | 54 | 14 | 97.4 | 265 | 61 | 10 | 1 | 99.7 |
| 1993 | 262 | 121 | 60 | 29 | 93.9 | 227 | 59 | 26 | 1 | 99.7 |
| 1992 | 438 | 206 | 84 | 21 | 97.2 | 656 | 112 | 29 | 1 | 99.9 |
| 1991 | 504 | 174 | 92 | 19 | 97.6 | 710 | 82 | 30 | 4 | 99.5 |
| 1990 | 519 | 153 | 56 | 34 | 95.5 | 644 | 97 | 20 | 2 | 99.7 |
| 1989 | 448 | 171 | 70 | 28 | 96.1 | 599 | 76 | 35 | 4 | 99.4 |
| 1988 | 425 | 141 | 66 | 22 | 96.6 | 536 | 76 | 20 | 1 | 99.8 |
| 1987 | 450 | 187 | 65 | 27 | 96.3 | 623 | 80 | 15 | 3 | 99.6 |
| 1986 | 558 | 185 | 70 | 27 | 96.8 | 700 | 82 | 33 | 0 | 100.0 |
| 1985 | 449 | 177 | 92 | 25 | 96.6 | 561 | 93 | 28 | 0 | 100.0 |
| 1984 | 479 | 254 | 104 | 31 | 96.4 | 699 | 127 | 24 | 0 | 100.0 |
| 1983 | 475 | 211 | 108 | 36 | 95.7 | 639 | 113 | 46 | 4 | 99.5 |
| 1982 | 341 | 109 | 135 | 30 | 95.1 | 496 | 112 | 135 | 12 | 98.4 |
| 1981 | 175 | 116 | 152 | 29 | 93.9 | 286 | 72 | 46 | 1 | 99.8 |
| 1980 | 160 | 115 | 167 | 37 | 92.3 | 335 | 96 | 59 | 1 | 99.8 |
| 1979 | 80 | 51 | 68 | 20 | 90.9 | 230 | 73 | 51 | 16 | 95.7 |
| 1978 | 112 | 90 | 40 | 20 | 92.4 | 259 | 73 | 29 | 14 | 96.3 |
| 1977 | 28 | 18 | 12 | 8 | 87.9 | 75 | 39 | 5 | 7 | 94.4 |
| Total # in Range: | 11,719 | 4,300 | 2,327 | 597 | 96.8 | 12,868 | 2,110 | 1,481 | 90 | 99.5 |
| % of all Analyses in Range* | 61.9 | 22.7 | 12.3 | 3.2 | | 77.8 | 12.8 | 8.9 | 0.5 | |
| Total Number | 18,943 | | | | | 16,549 | | | | |

* Total may not equal 100 due to rounding.

(1) Deviation Categories 1-3 as noted in Table 1, Footnote (1)

(2) Deviation Categories 1-3 as noted in Table 1, Footnote (2)

TABLE 13

**ANALYTICS RADIOCHEMISTRY CROSSCHECK PROGRAM RESULTS BY
FRAMATOME ANP ENVIRONMENTAL LABORATORY
ACCEPTANCE CRITERIA, MEDIA, AND MEASUREMENT CATEGORIES
JULY-DECEMBER 2005**

| | Bias Criteria (1) | | | | Precision Criteria (2) | | | |
|---------------------------------------|-------------------|-------------|-------------|------------|------------------------|-------------|------------|------------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Water | | | | | | | | |
| Fe-55 | 2 | 6 | 4 | 0 | 7 | 4 | 1 | 0 |
| Sr-89 | 6 | 2 | 1 | 0 | 7 | 2 | 0 | 0 |
| Sr-90 | 5 | 2 | 2 | 0 | 6 | 3 | 0 | 0 |
| Total Number in Range: | 13 | 10 | 7 | 0 | 20 | 9 | 1 | 0 |
| Percentage of Total Processed: | 43.3 | 33.3 | 23.3 | 0.0 | 66.7 | 30.0 | 3.3 | 0.0 |
| Sum of Analyses: | 30 | | | | 30 | | | |

(1) Percent Bias by Deviation Category as noted in Table 12, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 12, Footnote (2)

* Total may not equal 100 due to rounding

TABLE 13

PART 50/61 PROCESS CONTROL ANALYSIS RESULTS BY
FRAMATOME ANP ENVIRONMENTAL LABORATORY
ACCEPTANCE CRITERIA, MEDIA AND MEASUREMENT CATEGORIES
JULY-DECEMBER 2005
(Continued)

(1) Percent Bias by Deviation Category

1 = >0 and ≤ 5

2 = >5 and ≤ 10

3 = >10 and ≤ 15 (or within 2 sigma of known, see Reference 1)

For Gross Alpha and Beta
In water,

3 = >10 and ≤ 25 (or within 2 sigma of known)

For Alpha Spectrometry*,

3 = >10 and ≤ 20 (or within 2 sigma of known)

For Uranium-Total, Pu-241,
Zn-65 on an air filter, C-14,

3 = >10 and ≤ 20 (or within 2 sigma of known)

4 = Outside criteria

(2) Percent Precision by Deviation Category

1 = >0 and ≤ 5

2 = >5 and ≤ 10

3 = >10 and ≤ 15 (or within 2 sigma of mean, see Reference 1)

4 = Outside criteria

* Isotopic Uranium (U-234, 235, 238)
Isotopic Thorium (Th-230, 232)
Np-237
Am-241/Cm-242, 243/244
Pu-alpha (Pu-238, 239, 240)
Ra-226

** Total may not equal 100 due to rounding.

TABLE 14

FRAMATOME ANP ENVIRONMENTAL LABORATORY
ANALYTICS RADIOCHEMISTRY CROSS-CHECK
PERFORMANCE EVALUATION

| Sample Number | Quarter/Year | Sample Media | Nuclide | Units | Mean | | Ratio | Evaluation |
|---------------|--------------|--------------|---------|--------|----------------|-------------|---------------------|-------------|
| | | | | | Reported Value | Known Value | E-LAB/ Analytics | |
| A19215-162 | 2nd/2005 | Liquid | Fe-55 | uCi/cc | 1.38E-03 | 1.34E-03 | 1.03 | Agreement |
| A19216-162 | 2nd/2005 | Liquid | Sr-89 | uCi/cc | 1.04E-03 | 1.08E-03 | 0.96 | Agreement |
| A19216-162 | 2nd/2005 | Liquid | Sr-90 | uCi/cc | 9.14E-05 | 9.63E-05 | 0.95 | Agreement |
| A19666-162 | 2nd/2005 | Liquid | Fe-55 | uCi/cc | 2.44E-04 | 2.34E-04 | 1.04 | Agreement * |
| A19539-162 | 3rd/2005 | Liquid | Fe-55 | uCi/cc | 1.23E-04 | 1.17E-04 | 1.05 | Agreement |
| A19540-162 | 3rd/2005 | Liquid | Sr-89 | uCi/cc | 3.62E-03 | 3.71E-03 | 0.98 | Agreement |
| A19540-162 | 3rd/2005 | Liquid | Sr-90 | uCi/cc | 1.99E-04 | 2.01E-04 | 0.99 | Agreement |
| A19843-162 | 4th/2005 | Liquid | Fe-55 | uCi/cc | 1.30E-04 | 1.16E-04 | 1.12 | Agreement |
| A19844-162 | 4th/2005 | Liquid | Sr-89 | uCi/cc | 3.38E-03 | 3.69E-03 | 0.92 | Agreement |
| A19844-162 | 4th/2005 | Liquid | Sr-90 | uCi/cc | 1.88E-04 | 2.06E-04 | 0.91 | Agreement |

* - Special Fe-55 sample for CR 05-16 investigation

TABLE 15

NIST MAP ANALYSIS RESULTS BREAKDOWN BY
 FRAMATOME ANP ENVIRONMENTAL LABORATORY
 ACCEPTANCE CRITERIA, MEDIA AND MEASUREMENT CATEGORIES
 JULY-DECEMBER 2005

| | Bias Criteria (1) | | | | Precision Criteria (2) | | | |
|---------------------------------------|-------------------|-----|-----|-----|------------------------|-----|-----|-----|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Water | | | | | | | | |
| Gamma | 30 | 0 | 0 | 0 | 30 | 0 | 0 | 0 |
| II. Filter | | | | | | | | |
| Gamma | 30 | 0 | 0 | 0 | 30 | 0 | 0 | 0 |
| Total Number in Range: | 60 | 0 | 0 | 0 | 60 | 0 | 0 | 0 |
| Percentage of Total Processed: | 100.0 | 0.0 | 0.0 | 0.0 | 100.0 | 0.0 | 0.0 | 0.0 |
| Sum of Analyses: | 60 | | | | 60 | | | |

(1) Percent Bias by Deviation Category as noted in Table 1, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 1, Footnote (2)

* Total may not equal 100 due to rounding

TABLE 16

SUMMARY OF FRAMATOME ANP ENVIRONMENTAL LABORATORY
 NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)
 TRACEABILITY RESULTS
 JULY-DECEMBER, 2005

| NIST Standard Number | Reference Date of Standard | Radionuclide | Matrix | E-LAB Measurement Technique | Mean Percent Deviation From NIST |
|----------------------|----------------------------|--------------|--------|-----------------------------|----------------------------------|
| 1800-4 | 1-Aug-05 | Fe-59 | Liquid | Gamma Spectroscopy #2 | -0.55 |
| 1800-4 | 1-Aug-05 | Zn-65 | Liquid | Gamma Spectroscopy #2 | -0.55 |
| 1800-4 | 1-Aug-05 | Ba-133 | Liquid | Gamma Spectroscopy #2 | -0.61 |
| 1800-4 | 1-Aug-05 | Cs-134 | Liquid | Gamma Spectroscopy #2 | -3.99 |
| 1800-4 | 1-Aug-05 | Ce-141 | Liquid | Gamma Spectroscopy #2 | -2.69 |
| 1800-4 | 1-Aug-05 | Fe-59 | Liquid | Gamma Spectroscopy #5 | 0.76 |
| 1800-4 | 1-Aug-05 | Zn-65 | Liquid | Gamma Spectroscopy #5 | -0.96 |
| 1800-4 | 1-Aug-05 | Ba-133 | Liquid | Gamma Spectroscopy #5 | 1.96 |
| 1800-4 | 1-Aug-05 | Cs-134 | Liquid | Gamma Spectroscopy #5 | -1.31 |
| 1800-4 | 1-Aug-05 | Ce-141 | Liquid | Gamma Spectroscopy #5 | -2.87 |
| 1801-5 | 1-Aug-05 | Fe-59 | Filter | Gamma Spectroscopy #2 | 1.26 |
| 1801-5 | 1-Aug-05 | Zn-65 | Filter | Gamma Spectroscopy #2 | 1.35 |
| 1801-5 | 1-Aug-05 | Ba-133 | Filter | Gamma Spectroscopy #2 | -0.81 |
| 1801-5 | 1-Aug-05 | Cs-134 | Filter | Gamma Spectroscopy #2 | -2.91 |
| 1801-5 | 1-Aug-05 | Ce-141 | Filter | Gamma Spectroscopy #2 | 2.96 |
| 1801-5 | 1-Aug-05 | Fe-59 | Filter | Gamma Spectroscopy #4 | 1.65 |
| 1801-5 | 1-Aug-05 | Zn-65 | Filter | Gamma Spectroscopy #4 | -0.21 |
| 1801-5 | 1-Aug-05 | Ba-133 | Filter | Gamma Spectroscopy #4 | -0.45 |
| 1801-5 | 1-Aug-05 | Cs-134 | Filter | Gamma Spectroscopy #4 | -3.10 |
| 1801-5 | 1-Aug-05 | Ce-141 | Filter | Gamma Spectroscopy #4 | -0.69 |

Data on NIST MAP program is repeated in Table 4 for Environmental QC data.

TABLE 17

INTRA-LABORATORY PART 50/61 PROCESS CONTROL RESULTS BREAKDOWN BY
 FRAMATOME ANP ENVIRONMENTAL LABORATORY
 ACCEPTANCE CRITERIA, MEDIA AND MEASUREMENT CATEGORIES
 JULY-DECEMBER 2005

| | Bias Criteria (1) | | | | Precision Criteria (2) | | | |
|---|-------------------|-------------|-------------|------------|------------------------|------------|------------|------------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Solid | | | | | | | | |
| C-14 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| H-3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| II. Liquid | | | | | | | | |
| Alpha | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Am-241 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 |
| Beta | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C-14 | 0 | 1 | 5 | 0 | 6 | 0 | 0 | 0 |
| Cm-243/4 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 |
| Fe-55 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 |
| Gamma | 5 | 1 | 0 | 0 | 6 | 0 | 0 | 0 |
| H-3 | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| I-129 | 5 | 0 | 1 | 0 | 4 | 2 | 0 | 0 |
| Ni-63 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Np-237 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pu-238 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Pu-241 | 2 | 1 | 0 | 0 | 1 | 2 | 0 | 0 |
| Sr-89 | 1 | 2 | 0 | 0 | 3 | 0 | 0 | 0 |
| Sr-90 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 |
| Tc-99 | 2 | 2 | 2 | 0 | 6 | 0 | 0 | 0 |
| Total Number in Range: | 29 | 16 | 14 | 0 | 50 | 4 | 0 | 0 |
| Percentage of Total Processed: | 49.2 | 27.1 | 23.7 | 0.0 | 92.6 | 7.4 | 0.0 | 0.0 |
| Sum of Analyses: | 59 | | | | 54 | | | |

(1) Percent Bias by Deviation Category as noted in Table 13, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 13, Footnote (2)

* Total may not equal 100 due to rounding.

TABLE 18

PART 50/61 ANALYSIS RESULTS BREAKDOWN BY
 FRAMATOME ANP ENVIRONMENTAL LABORATORY
 ACCEPTANCE CRITERIA, MEDIA AND MEASUREMENT CATEGORIES
 JULY-DECEMBER 2005

| | Bias Criteria (1) | | | | Precision Criteria (2) | | | |
|---------------------------------------|-------------------|-------------|-------------|------------|------------------------|------------|------------|------------|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Filter | | | | | | | | |
| Gamma | 30 | 0 | 0 | 0 | 30 | 0 | 0 | 0 |
| II. Soil/Concrete | | | | | | | | |
| C-14 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| H-3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| II. Liquid | | | | | | | | |
| Alpha | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Am-241 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 |
| Beta | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| C-14 | 0 | 1 | 5 | 0 | 6 | 0 | 0 | 0 |
| Cm-243/4 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 |
| Fe-55 | 2 | 7 | 6 | 0 | 10 | 4 | 1 | 0 |
| Gamma | 35 | 1 | 0 | 0 | 36 | 0 | 0 | 0 |
| H-3 | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| I-129 | 5 | 0 | 1 | 0 | 4 | 2 | 0 | 0 |
| Ni-63 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Np-237 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pu-238 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 |
| Pu-241 | 2 | 1 | 0 | 0 | 1 | 2 | 0 | 0 |
| Sr-89 | 7 | 4 | 1 | 0 | 10 | 2 | 0 | 0 |
| Sr-90 | 5 | 4 | 3 | 0 | 9 | 3 | 0 | 0 |
| Tc-99 | 2 | 2 | 2 | 0 | 6 | 0 | 0 | 0 |
| Total Number in Range: | 102 | 26 | 21 | 0 | 130 | 13 | 1 | 0 |
| Percentage of Total Processed: | 68.5 | 17.4 | 14.1 | 0.0 | 90.3 | 9.0 | 0.7 | 0.0 |
| Sum of Analyses: | 149 | | | | 144 | | | |

(1) Percent Bias by Deviation Category as noted in Table 13, Footnote (1)

(2) Percent Precision by Deviation Category as noted in Table 13, Footnote (2)

* Total may not equal 100 due to rounding.

** Totals summarize Internal PCs, NIST MAP, and Analytics Cross Check programs

TABLE 19

PART 50/61 BIAS AND PRECISION BY YEAR (1)

| Year | Percent Bias Deviation from Known | | | | | Percent Precision Deviation from Mean | | | | |
|--|--------------------------------------|--------------|-------------|--------------------------|----------------------|--|-------------|------------|--------------------------|----------------------|
| | Bias Criteria (2) | | | | | Precision Criteria (2) | | | | |
| | 1 | 2 | 3 | Outside Criteria 4 | % Within Criteria | 1 | 2 | 3 | Outside Criteria 4 | % Within Criteria |
| 2005 | 173 | 68 | 45 | 2 | 99.3 | 224 | 27 | 4 | 0 | 100.0 |
| 2004 | 157 | 110 | 54 | 17 | 95.0 | 286 | 23 | 4 | 0 | 100.0 |
| 2003 | 144 | 91 | 51 | 9 | 96.9 | 249 | 18 | 2 | 0 | 100.0 |
| 2002 | 215 | 94 | 49 | 8 | 97.8 | 300 | 24 | 5 | 2 | 99.4 |
| 2001 | 159 | 90 | 46 | 24 | 92.5 | 238 | 46 | 6 | 0 | 100.0 |
| 2000 | 151 | 72 | 28 | 23 | 91.6 | 220 | 38 | 16 | 4 | 98.6 |
| 1999 | 111 | 59 | 14 | 7 | 96.3 | 168 | 13 | 5 | 2 | 98.9 |
| 1998 | 90 | 68 | 24 | 7 | 96.3 | 160 | 22 | 7 | 0 | 100.0 |
| 1997 | 99 | 43 | 33 | 8 | 95.6 | 168 | 13 | 2 | 0 | 100.0 |
| 1996 | 194 | 80 | 33 | 17 | 94.8 | 285 | 31 | 8 | 0 | 100.0 |
| 1995 | 112 | 47 | 35 | 7 | 96.5 | 173 | 15 | 4 | 0 | 100.0 |
| 1994 | 125 | 39 | 25 | 5 | 97.4 | 158 | 22 | 5 | 1 | 99.5 |
| 1993 | 154 | 51 | 32 | 17 | 93.3 | 208 | 34 | 7 | 0 | 100.0 |
| 1992 | 116 | 86 | 38 | 7 | 97.2 | 207 | 27 | 5 | 0 | 100.0 |
| 1991 | 126 | 77 | 53 | 35 | 88.0 | 223 | 28 | 10 | 5 | 98.1 |
| 1990 | 116 | 65 | 31 | 21 | 91.0 | 199 | 35 | 6 | 0 | 100.0 |
| 1989 | 73 | 71 | 51 | 26 | 88.2 | 152 | 40 | 24 | 8 | 96.4 |
| 1988 | 30 | 19 | 13 | 13 | 82.7 | 43 | 13 | 6 | 9 | 87.3 |
| Total # in Range: | 2,345 | 1,230 | 655 | 253 | 94.4 | 3,661 | 469 | 126 | 31 | 99.3 |
| % of all Analyses in Range* | 52.3 | 27.4 | 14.6 | 5.6 | | 85.4 | 10.9 | 2.9 | 0.7 | |
| Sum of Analyses | 4,483 | | | | | 4,287 | | | | |

* Total may not equal 100 due to rounding.

(1) This breakdown excludes the 71 verification analyses associated with the startup of this area of the Laboratory during 1988-89.

(2) Deviation Categories 1-4 as noted in Table 13, Footnote (1)

TABLE 20

BIOASSAY ANALYSIS RESULTS BREAKDOWN BY
 FRAMATOME ANP ENVIRONMENTAL LABORATORY
 ACCEPTANCE CRITERIA, MEDIA AND MEASUREMENT CATEGORIES
 JULY - DECEMBER 2005

| | Bias Criteria (1) | | | | Precision Criteria (2) | | | |
|--|-------------------|-----|-----|-----|------------------------|-----|-----|-----|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| I. Urine (3) | | | | | | | | |
| Gamma | | | | | | | | |
| H-3 | | | | | | | | |
| Total Number In Range: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Percentage of Total Processed*: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Sum of Analyses: | 0 | | | | 0 | | | |

- (1) Percent Bias by Deviation Category as noted in Table 13, Footnote (1)
- (2) Percent Precision by Deviation Category as noted in Table 13, Footnote (2)
- (3) There were no internal or external bioassay QC samples analyzed during this period.
- * Total may not equal 100 due to rounding

TABLE 21

**CONDITION REPORT (CR) STATUS
(JULY - DECEMBER 2005)**

| CR # | (OPEN) INITIATION DATE | (CLOSED) CLOSE-OUT DATE | DESCRIPTION | STATUS AS OF 12/31/05 |
|----------|------------------------------|-------------------------------|--|--|
| CR 04-18 | 30-Nov-04 | 29-Sep-05 | Internal process checks for I-129 for the first and second quarters of 2004 had positive biases greater than the acceptance limit. | Testing indicated that a bias exists with the gamma spectroscopy detector calibration. A new NIST source, backordered, was received on 6/20/05. Recalibration of the gamma spectroscopy detector completed on 9/29/05. Efficiency change appears to correct the historical positive trend. |
| CR 05-06 | 15-Feb-05 | 28-Jul-05 | Fe-55 Part 50/61 QC sample failed with negative bias. | The ICP and chemists were tested successfully on iron recovery analysis techniques. A new Fe-55 calibration for the liquid scintillation counter was put in place using a new primary NIST traceable standard. |
| CR 05-10 | 30-Mar-05 | | Analytics 4th quarter 2004 air particulate gross alpha QC failure. | Bias of -15.5% with limit of 15%. Sample recounted with no change. 1st quarter 2005 AP counted by GPC (20.8 pCi, -5.0% bias), gamma spectroscopy (24.3 pCi, +11% bias), and known (21.9 pCi). Contacting Analytics on AP prep details to determine cause of bias shift from one quarter to the next. |
| CR 05-13 | 24-May-05 | 28-Sep-05 | MAPEP Am-241 in vegetation Warning. | MAPEP prepared vegetation is a fine, dry powdery material, unlike true environmental vegetation samples. Some losses were experienced during transfer for gamma counting. Handling precautions are being added to worksheet templates for MAPEP vegetation samples. |
| CR 05-14 | 24-May-05 | 28-Jul-05 | MAPEP Ni-63 in water False Negative. | No apparent cause identified for false negative result. Four samples of lower activities were analyzed concurrently and all passed the acceptance criteria. |
| CR 05-15 | 22-Aug-05 | 22-Dec-05 | Cabbage sample listed on chain-of-custody form could not be located. | Staff training was conducted for chain-of-custody, sample receipt, sample handling, sample storage, and sample disposal. Potential problems that may have caused "loss" of cabbage sample were included in the training. |

TABLE 21
(continued)
CONDITION REPORT (CR) STATUS
(JULY - DECEMBER 2005)

| CR # | (OPEN) INITIATION DATE | (CLOSED) CLOSE-OUT DATE | DESCRIPTION | STATUS AS OF 12/31/05 |
|----------|------------------------------|-------------------------------|---|---|
| CR 05-16 | 22-Aug-05 | 28-Sep-05 | Analytics Part 50 Fe-55 2nd quarter spike failed acceptance criteria. | Analytics identified a previously unknown Fe-55 contaminant in one of the radionuclides used to create the Part 50 QC sample. New samples were submitted and successfully analyzed. |
| CR 05-17 | 31-Aug-05 | 2-Nov-05 | Part 61 filter sample mistaken for Part 50 filter - preparation caused loss of alkaline fraction (H-3, C-14, Tc-99, I-129). | Sample was stored in a non-standard location and processing chemist failed to fully verify the required analyses. Personnel involved were counseled concerning verification of processing protocol and review of sample worksheets prior to performing sample preparation. |
| CR 05-18 | 23-Nov-05 | | Analytics charcoal QC samples not processed expeditiously. | Sample submission form contained incorrect analysis code (gamma vice charcoal gamma) causing delay in processing. Personnel have been retrained on completing documentation and questioning unusual submittals. The status review report has been updated to ensure weekly review of all sample status. |
| CR 05-19 | 23-Nov-05 | | Part 50 Sr-89/90 QC failed due to incorrect sample volume entered into spreadsheet. | Sample volumes have been corrected and QC results passes acceptance criteria. Use of personal notebooks has been eliminated. All documentation is recorded directly on controlled worksheets. Procedures are being revised to include this precaution. Chemist's notebook has been reviewed for similar problems. |
| CR 05-20 | 12-Dec-05 | | Pipet daily QC logs list incorrect acceptance limits. | Limits were listed in rounded form, causing potential unidentified failures. The maximum error was identified as <1%. QC logs have been updated and chemists have been retrained on correct format of QC limits values. |
| CR 05-21 | 12-Dec-05 | | Procedure Read & Sign training not completed for 2 chemists. | Procedure training has been completed. Individuals had documented qualifications for the 2 procedures identified. Closure pending verification of probable cause investigation. |
| CR 05-22 | 22-Dec-05 | | Several radiation protection records were unable to be located during annual audit. | Departure of Radiation Safety Officer (RSO) prior to audit caused inability of new RSO to locate several records. Search of files for these records is in process. |

TABLE 22

UPDATED INSTRUMENTATION/ANALYTICAL PROCEDURES
ISSUED DURING JULY-DECEMBER 2005

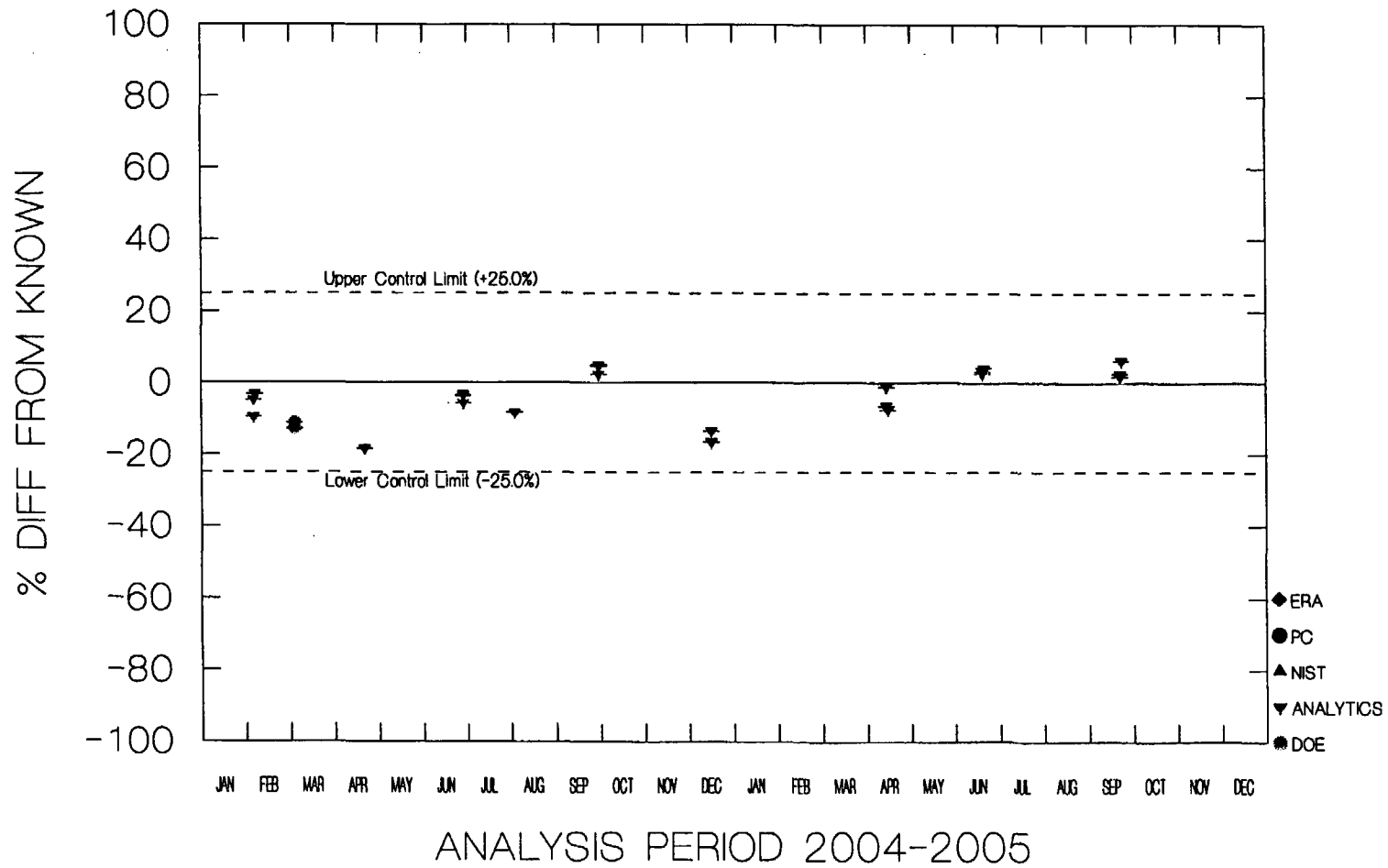
| PROCEDURE NUMBER | TITLE | REVISION NUMBER | EFFECTIVE DATE |
|------------------|--|-----------------|----------------|
| 110 | Suggested Sample Collection Procedures for Environmental Media | 15 | 11/18/05 |
| 340 | The Determination of Iodine-131 in Environmental Media Using Anion Exchange Chromatography | 26 | 08/03/05 |
| 373 | The Determination of Tritium in Environmental, Bioassay, and Plant Effluent Samples Using the Micro Distillation Apparatus | 3 | 09/13/05 |
| 400 | Operation of the Ortec Maestro Multichannel Analyzer (MCA) Emulation Software System | 2 | 08/22/05 |
| 520 | Operation of the Portable Gamma Spectrometry System for Emergency Response | 14 | 07/15/05 |
| 730 | Standardization and Verification of Carriers | 17 | 11/23/05 |
| 750 | Laboratory Training and Qualification Guideline | 13 | 09/13/05 |

APPENDIX A

**INTER/INTRA-LABORATORY,
ENVIRONMENTAL MONITORING
ANALYTICS, DOE, ERA AND NIST
QUALITY CONTROL PROGRAM RESULTS**

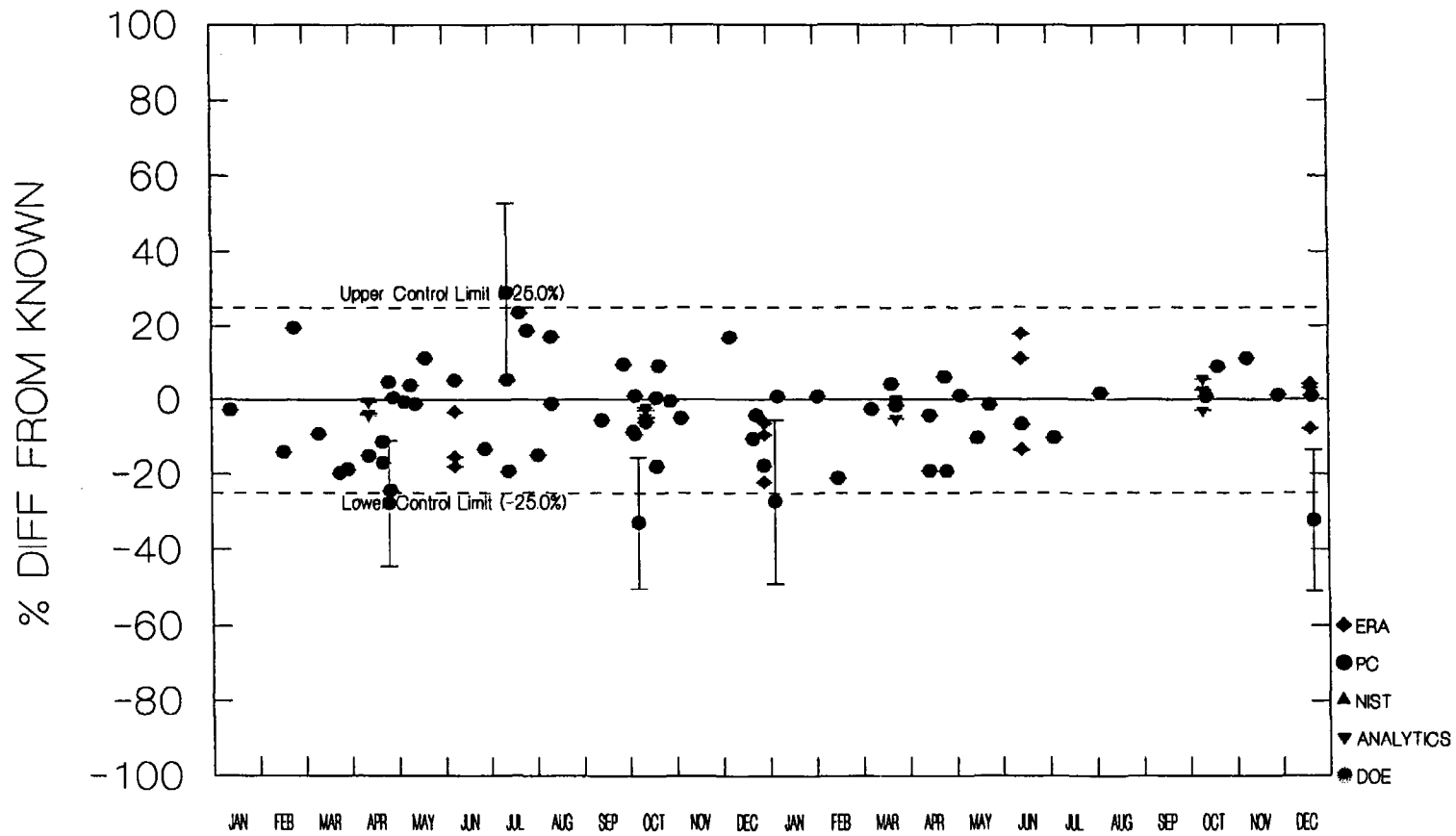
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP GROSS ALPHA AIR PARTICULATE RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP GROSS ALPHA WATER RESULT BIAS



ANALYSIS PERIOD 2004-2005

YR BATCH 28 QC CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: WATER

ISSUANCE DATE: 01/30/2006

REF. DATE: 03/29/2005

LAB SAMPLE NO: 1020902 ANAL DATE: 12/21/2005

UNITS: pCi/L

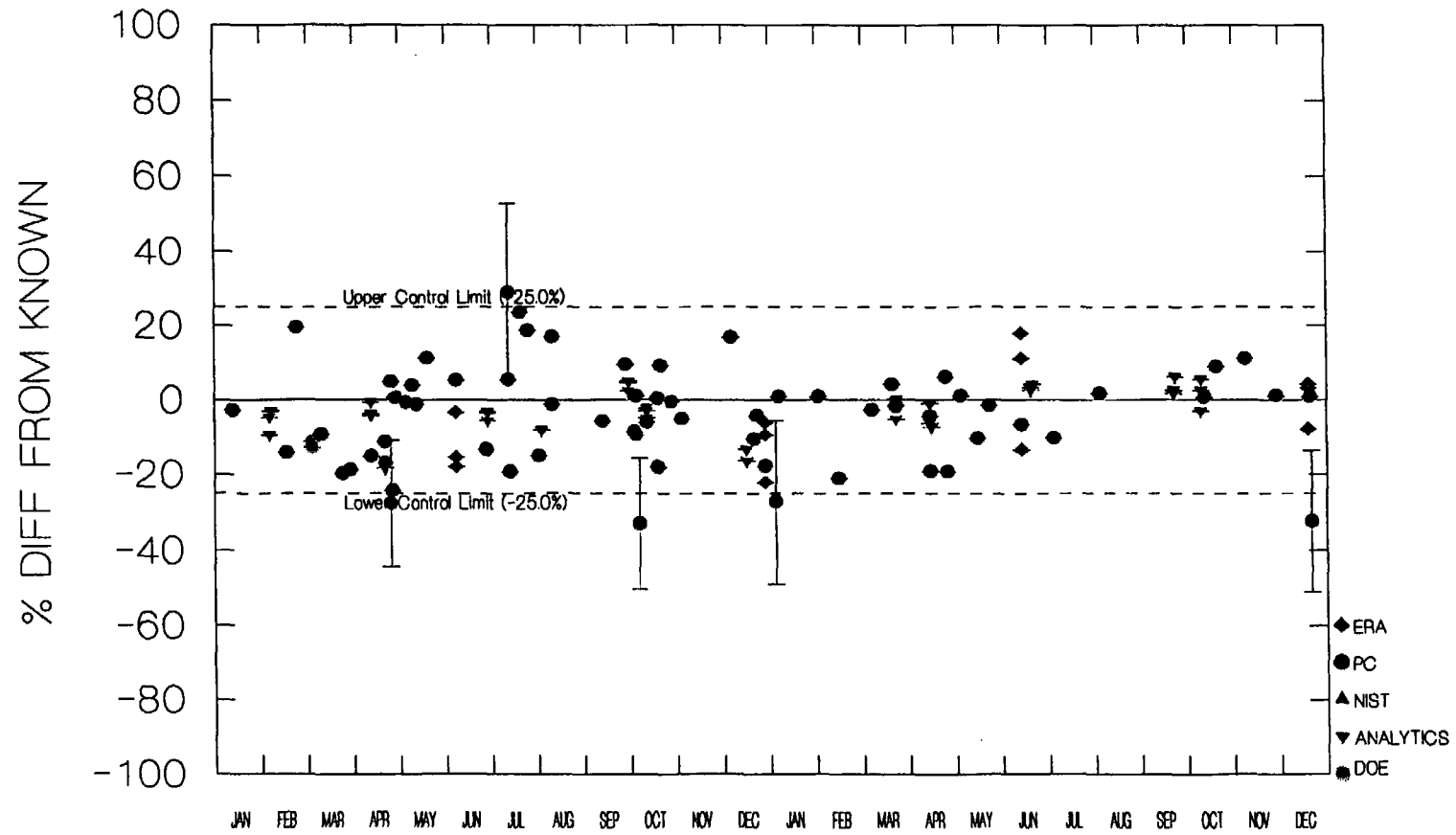
| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|-----------------|----------|----------|------|-------------|----------|----------|----------|
| Alpha | (333 ± 46)E-01 | | | | 49.20E 00 | -32.30 | | |
| Beta | (584 ± 41)E-01 | | | | 59.80E 00 | -2.30 | | |

Internal spike for Gross Alpha in water was analyzed according to specific client protocol. The known value was less than 10 times the method MDC. The result met the client's QC acceptance criteria.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

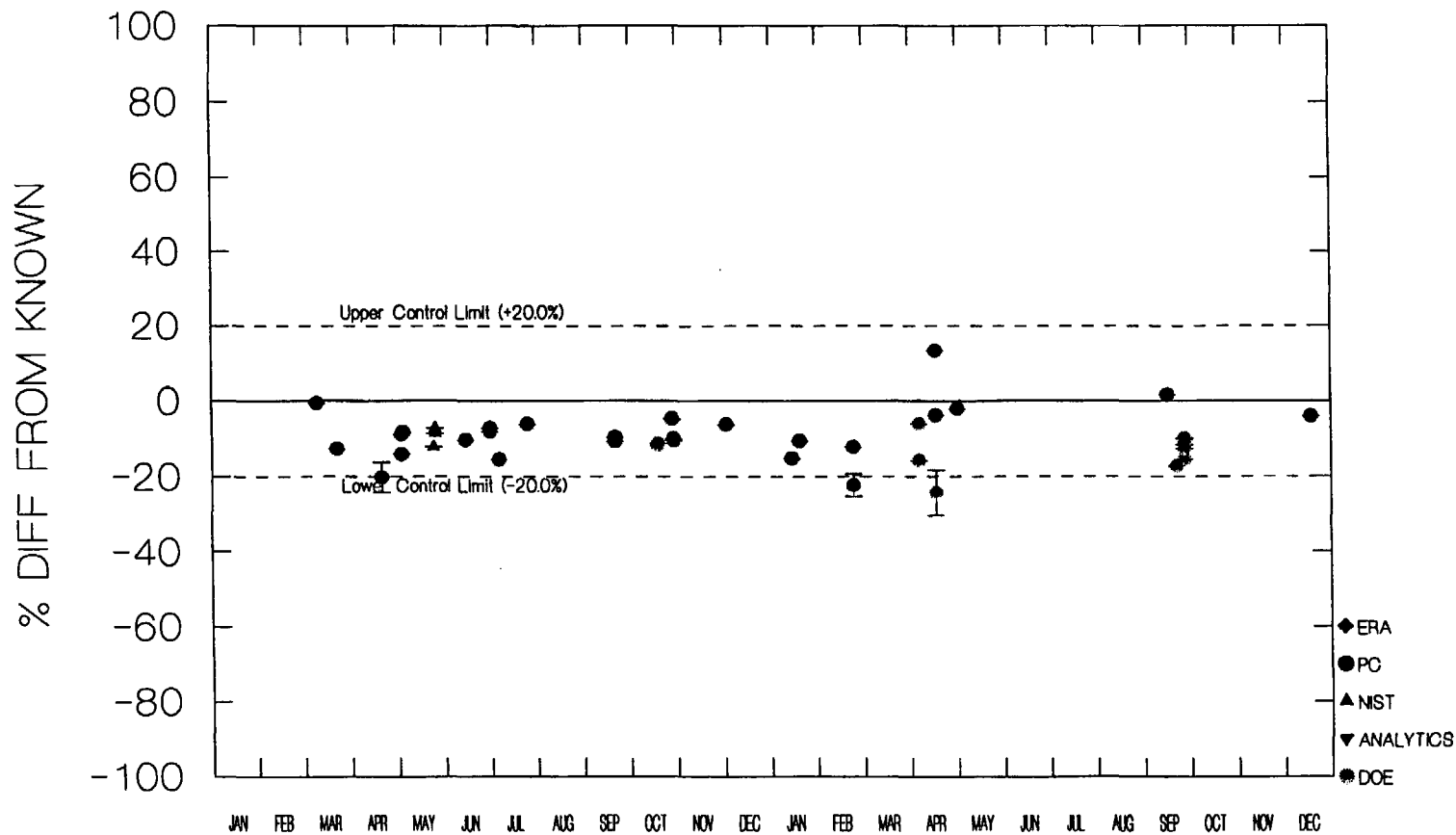
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP GROSS ALPHA RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

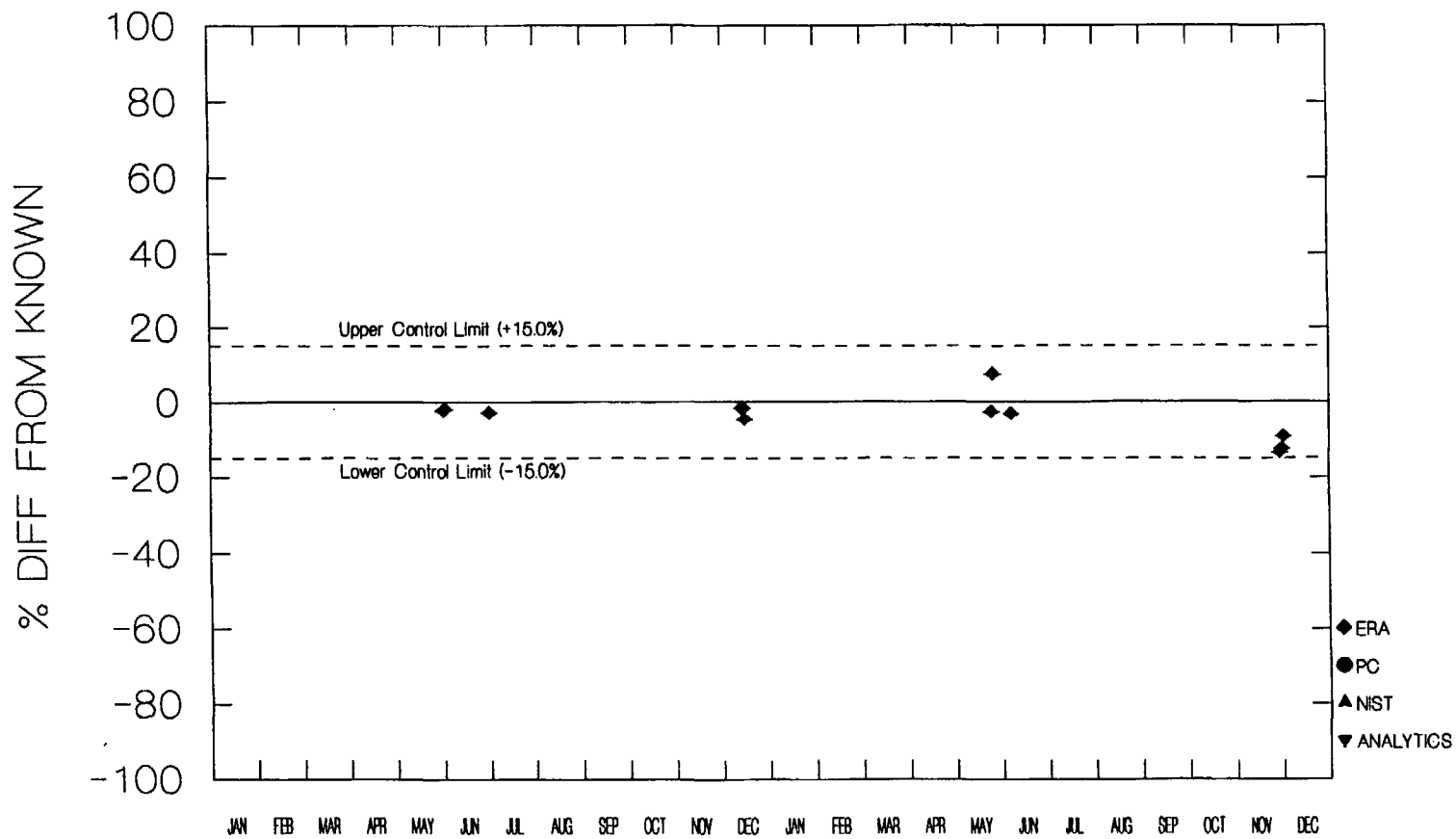
REMP Am-241 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

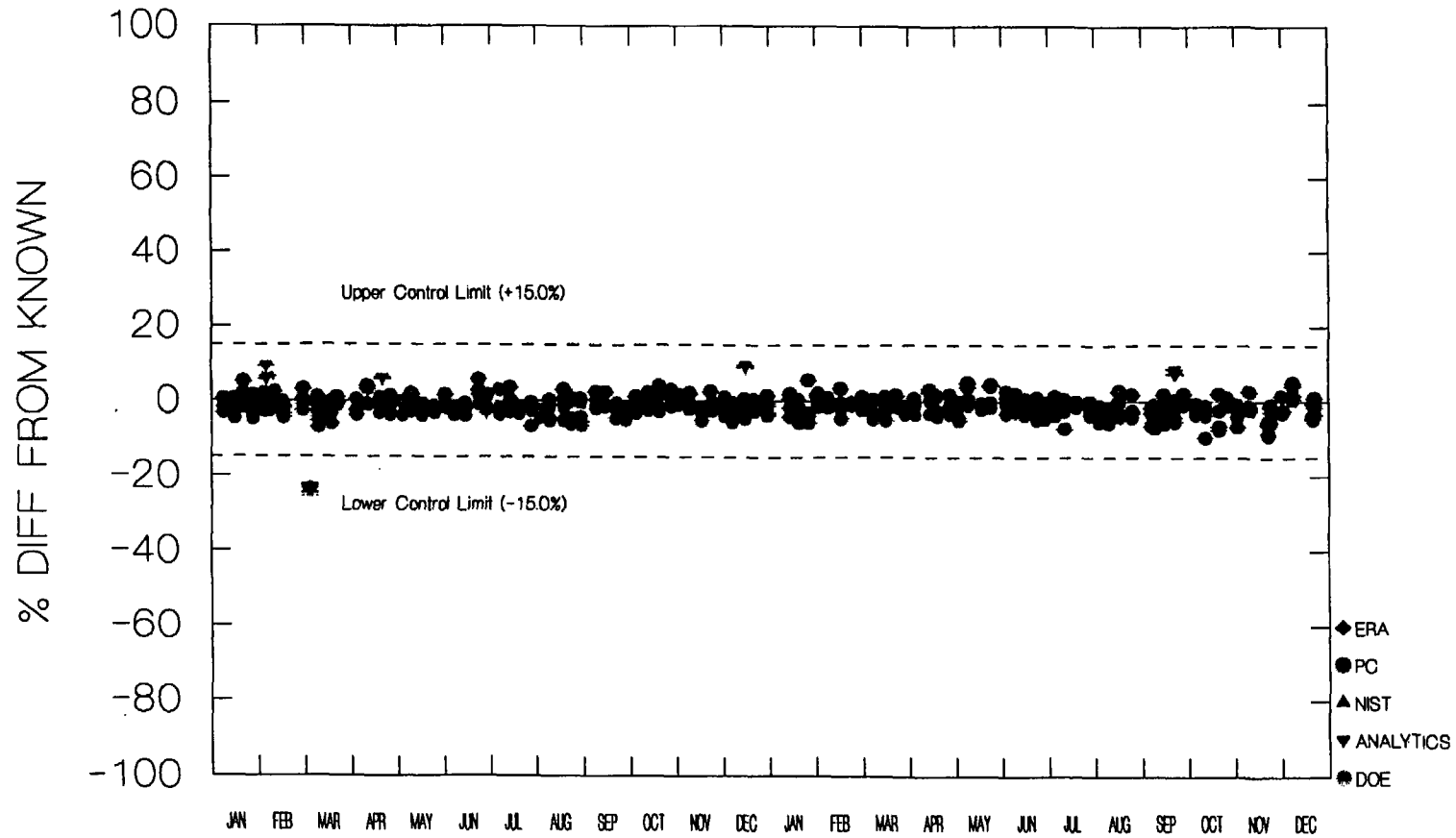
REMP Ba-133 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

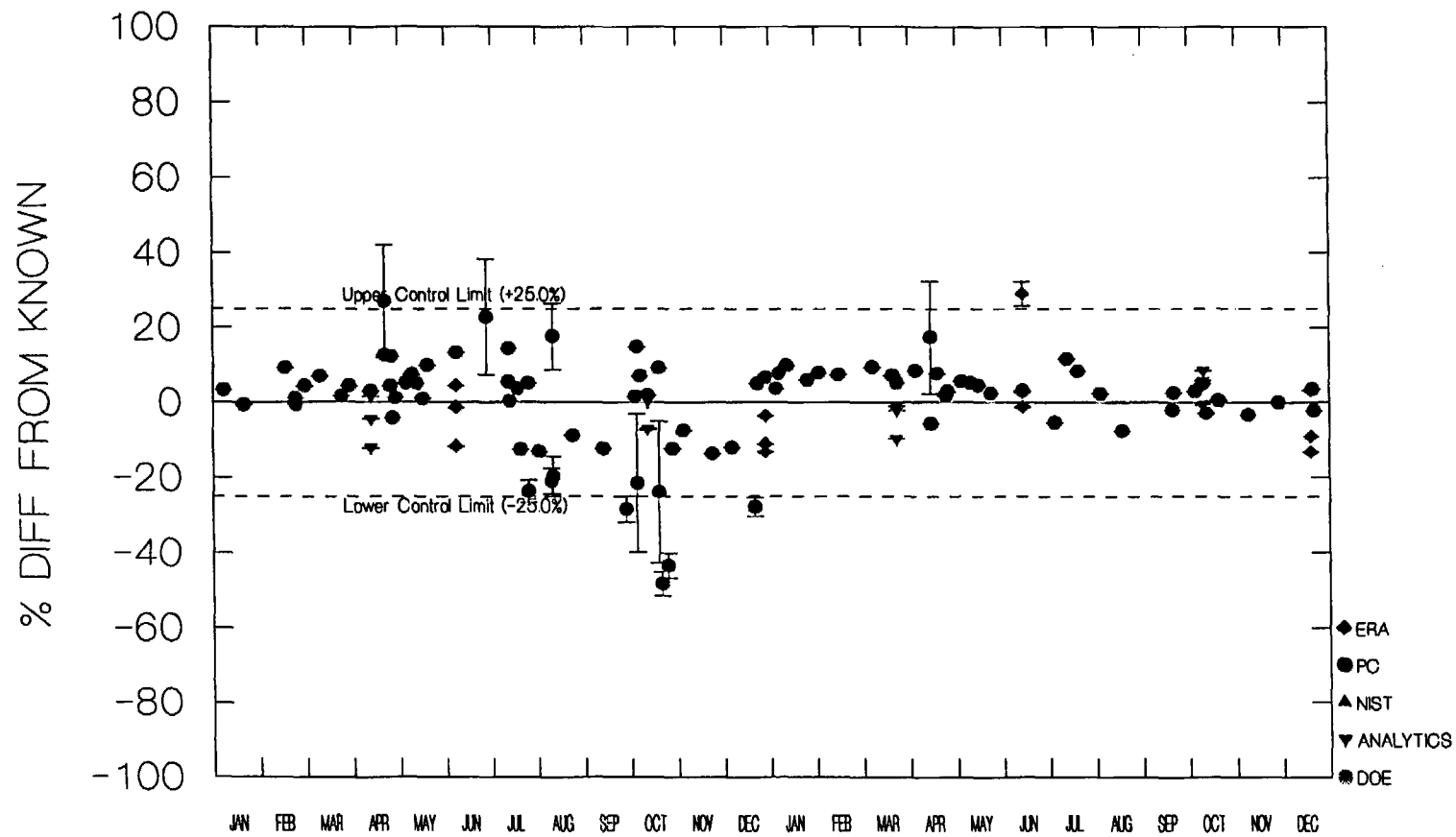
REMP AIR PARTICULATE GROSS BETA RESULT BIAS



ANALYSIS PERIOD 2004-2005

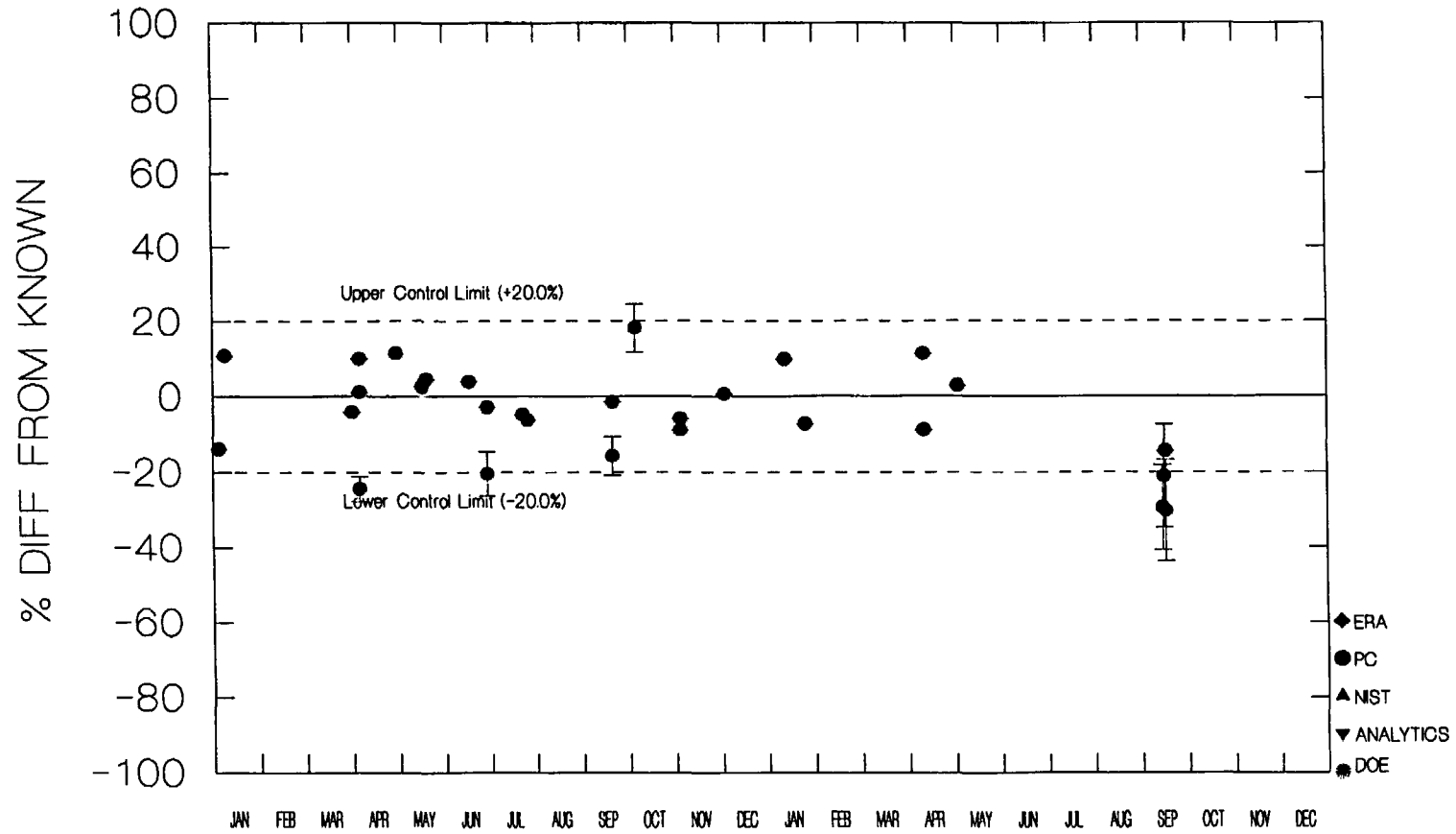
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP BETA (NON-AP) RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP C-14 RESULT BIAS



ANALYSIS PERIOD 2004-2005

YR QC BATCH 1 CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: CONCRETE

ISSUANCE DATE: 09/19/2005

REF. DATE: 09/08/2005

LAB SAMPLE NO: X23959 ANAL DATE: 09/14/2005

UNITS: uCi/g

| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|-----------------|----------|----------|------|-------------|----------|----------|----------|
| C-14 | (459 ± 37)E-08 | | | | 65.00E-07 | -29.40 | | |

Matrix spike for C-14 in concrete was analyzed according to specific client protocol. The result met the client's QC acceptance criteria.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

YR QC BATCH 2 CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: CONCRETE

ISSUANCE DATE: 09/19/2005

REF. DATE: 09/08/2005

LAB SAMPLE NO: X23995

ANAL DATE: 09/15/2005

UNITS: uCi/g

| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|-----------------|----------|----------|------|-------------|----------|----------|----------|
| C-14 | (442 ± 38)E-08 | | | | 56.00E-07 | -21.10 | | |

Matrix spike for C-14 in concrete was analyzed according to specific client protocol. The result met the client's QC acceptance criteria.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

YR QC BATCH 3 CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: CONCRETE

ISSUANCE DATE: 09/20/2005

REF. DATE: 09/08/2005

LAB SAMPLE NO: X23999

ANAL DATE: 09/16/2005

UNITS: uCi/g

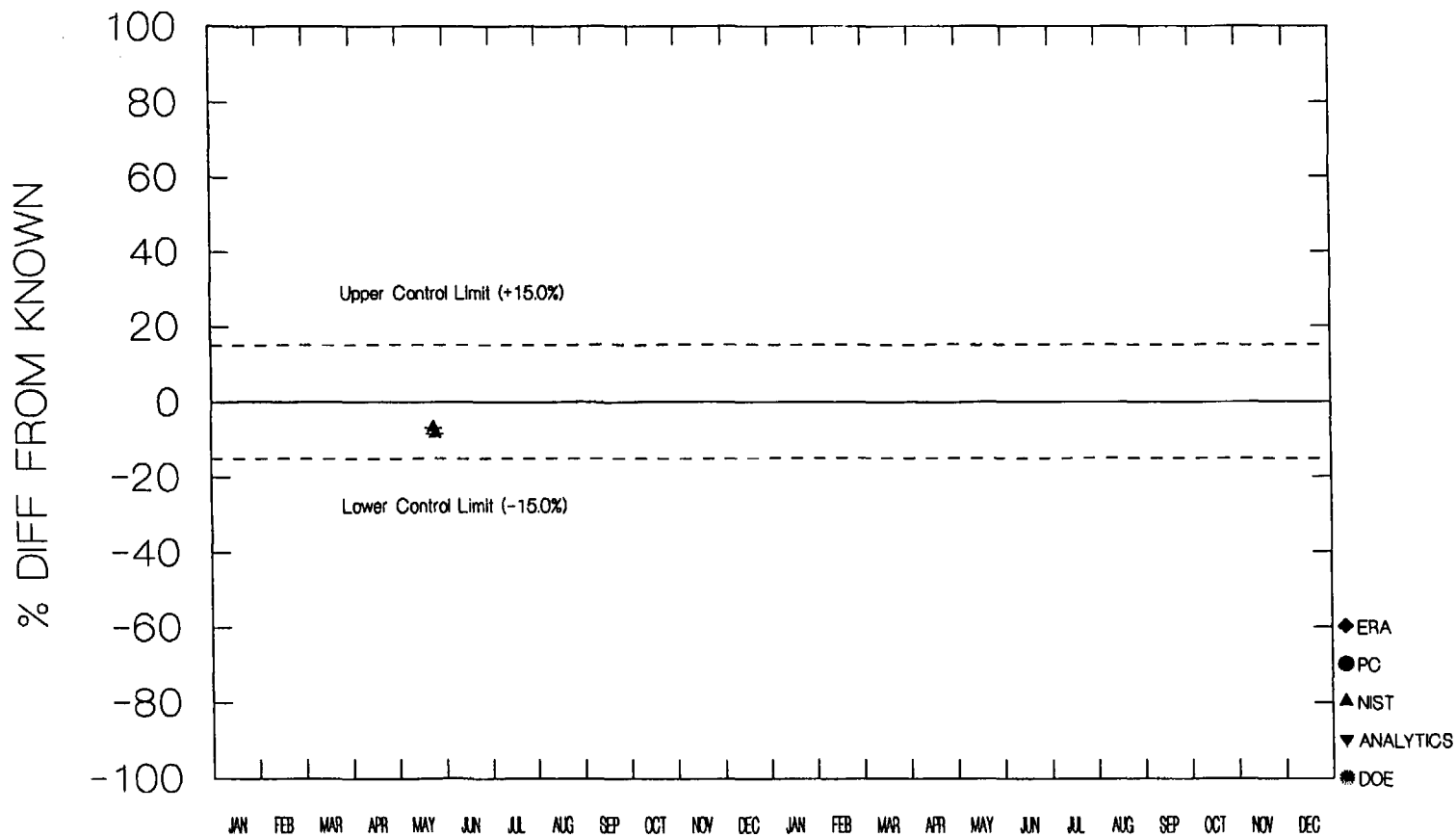
| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|-----------------|----------|----------|------|----------------|-------------|-------------|-------------|
| C-14 | (495 ± 48)E-08 | | | | 71.00E-07 | -30.30 | | |

Matrix spike for C-14 in concrete was analyzed according to specific client protocol. The result met the client's QC acceptance criteria.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

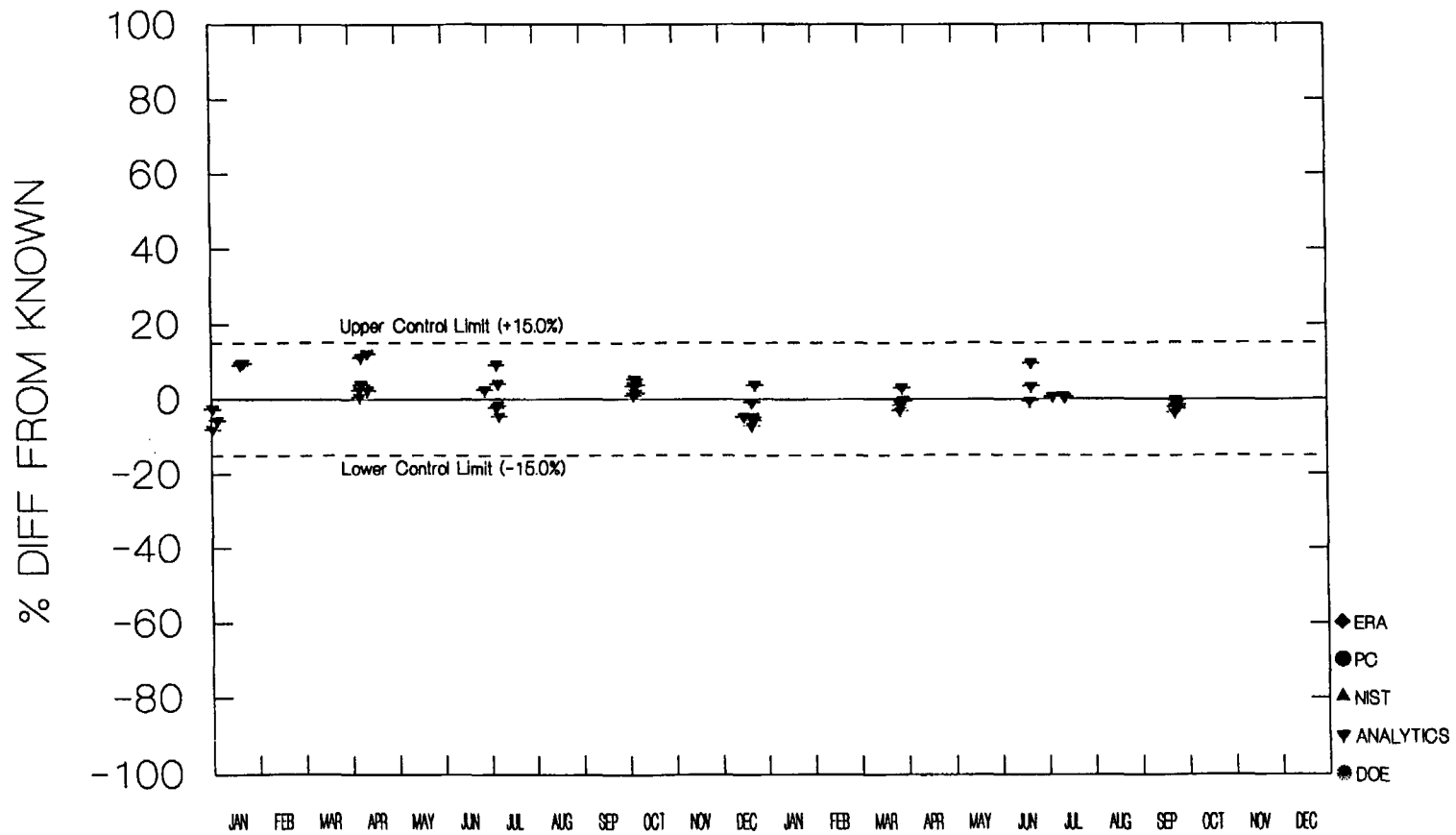
REMP Cd-109 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

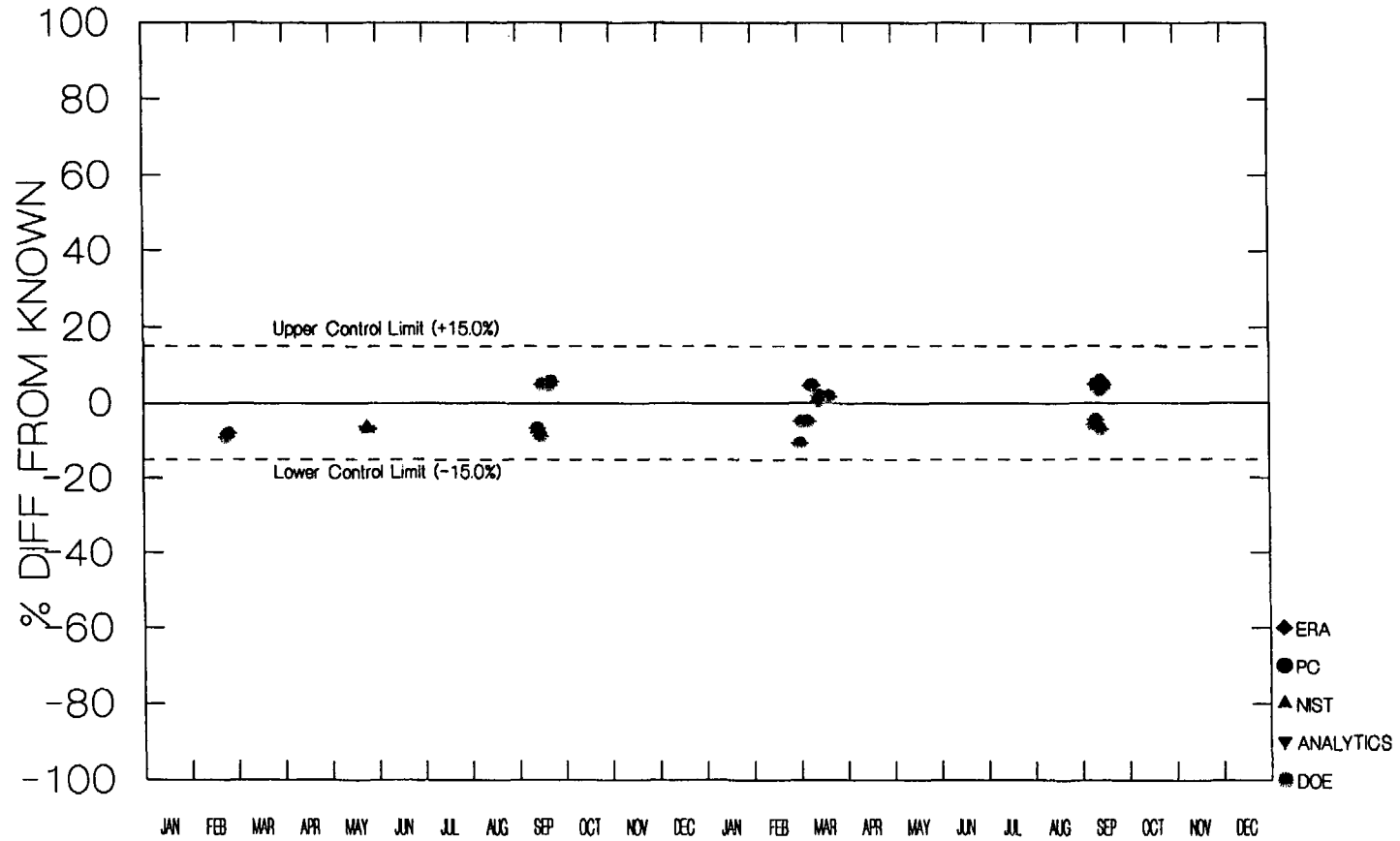
REMP Ce-141 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

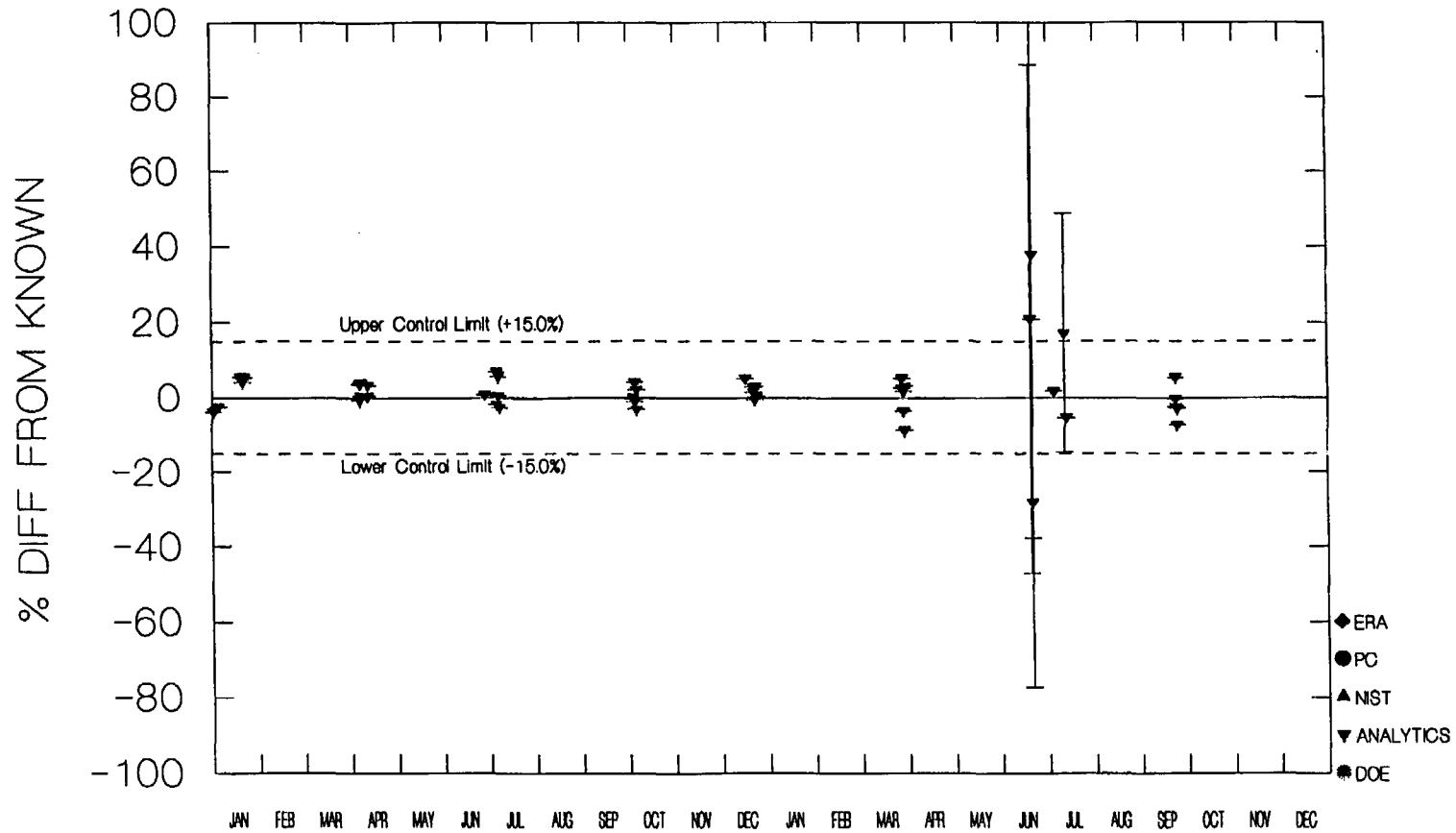
REMP Co-57 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Co-58 RESULT BIAS



ANALYSIS PERIOD 2004-2005

INTRALABORATORY CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: MILK

ISSUANCE DATE: 10/11/2005

REF. DATE: 06/09/2005

LAB SAMPLE NO: 941001 ANAL DATE: 06/20/2005
 LAB SAMPLE NO: 941002 ANAL DATE: 06/21/2005
 LAB SAMPLE NO: 941003 ANAL DATE: 06/21/2005

UNITS: pCi/L

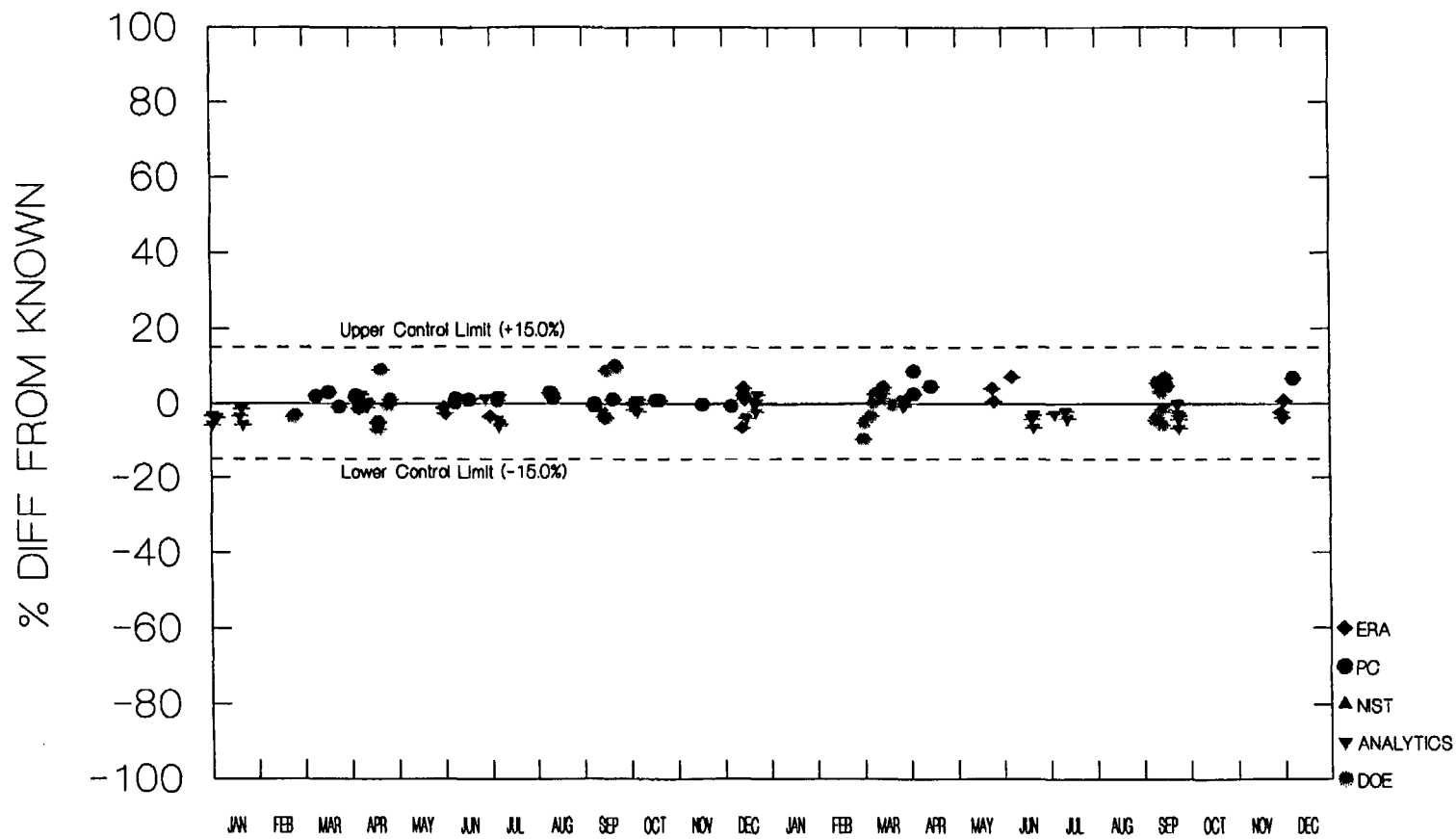
| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|----------------|----------------|-------------------|-----------|-------------|----------|----------|----------|
| Co-58 | (64 ± 18)E-01 | (38 ± 13)E-01 | (73 ± 20)E-01 | | 53.00E-01 | 20.80 | -28.30 | 37.70 |
| | | | % DIFF FROM MEAN: | 58.33E-01 | | 9.70 | -34.90 | 25.10 |

All three measurements of Analytics spike for Co-58 in milk exceeded the 15% bias limit, however, the mean of the three measurements was +10.1% and each analysis result the 2-sigma uncertainty range overlapped the known. The spike level of the sample was well below 10 times the method MDC.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Co-60 RESULT BIAS



ANALYSIS PERIOD 2004-2005

INTRALABORATORY CROSS-CHECK ANALYSIS SHEET

SAMPLE TYPE: MILK

ISSUANCE DATE: 02/08/2006

REF. DATE: 09/15/2005

LAB-SAMPLE NO: 988901 ANAL DATE: 09/23/2005
 LAB-SAMPLE NO: 988902 ANAL DATE: 09/23/2005
 LAB-SAMPLE NO: 988903 ANAL DATE: 09/23/2005

UNITS: pCi/L

| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|------------------|------------------|-------------------|-----------|-------------|----------|----------|----------|
| Ce-141 | (2246 ± 36)E-01 | (2325 ± 36)E-01 | (2284 ± 39)E-01 | 22.85E 01 | 23.30E 01 | -3.60 | -0.20 | -2.00 |
| | | | % DIFF FROM MEAN: | | | -1.70 | 1.80 | 0.00 |
| Co-58 | (669 ± 22)E-01 | (618 ± 27)E-01 | (632 ± 25)E-01 | 63.97E 00 | 63.40E 00 | 5.50 | -2.50 | -0.30 |
| | | | % DIFF FROM MEAN: | | | 4.60 | -3.40 | -1.20 |
| Co-60 | (1625 ± 26)E-01 | (1668 ± 30)E-01 | (1662 ± 30)E-01 | 16.52E 01 | 16.70E 01 | -2.70 | -0.10 | -0.50 |
| | | | % DIFF FROM MEAN: | | | -1.60 | 1.00 | 0.60 |
| Cr-51 | (273 ± 18)E 00 | (312 ± 18)E 00 | (334 ± 19)E 00 | 30.63E 01 | 33.80E 01 | -19.20* | -7.70 | -1.20 |
| | | | % DIFF FROM MEAN: | | | -10.90 | 1.80 | 9.00 |

Analytics spike for Cr-51 in milk exceeded the 15% bias limit and the 2-sigma range; however, the mean bias of the three measurements was -9.4%. The known value was less than 10 times the method MDC.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

INTRALABORATORY CROSS CHECK ANALYSIS SHEET

SAMPLE TYPE: WATER

ISSUANCE DATE: 02/08/2006

REF. DATE: 09/15/2005

LAB SAMPLE NO: 988801 ANAL DATE: 09/24/2005
 LAB SAMPLE NO: 988802 ANAL DATE: 09/24/2005
 LAB SAMPLE NO: 988803 ANAL DATE: 09/24/2005

UNITS: pCi/L

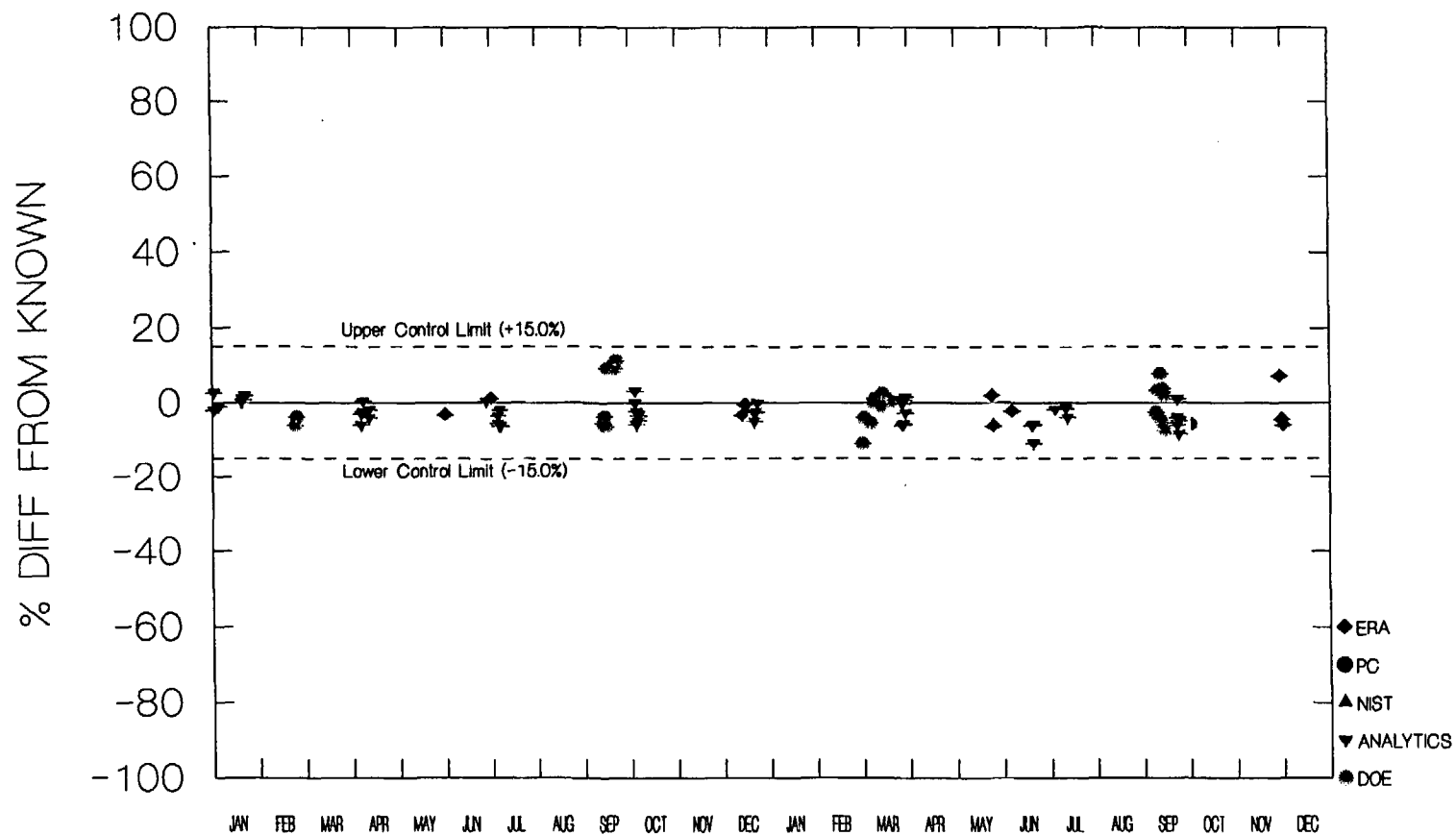
| NUCLIDE | RESULT 1 | RESULT 2 | RESULT 3 | MEAN | KNOWN VALUE | % DIFF.1 | % DIFF.2 | % DIFF.3 |
|---------|------------------|------------------|---------------------------------------|-----------|-------------|----------------|------------------|-----------------|
| Ce-141 | (2762 ± 38)E-01 | (2750 ± 39)E-01 | (2780 ± 41)E-01 % DIFF FROM MEAN: | 27.64E 01 | 28.20E 01 | -2.10 -0.10 | -2.50 -0.50 | -1.40 0.60 |
| Co-58 | (748 ± 23)E-01 | (713 ± 28)E-01 | (713 ± 26)E-01 % DIFF FROM MEAN: | 72.47E 00 | 77.00E 00 | -2.90 3.20 | -7.40 -1.60 | -7.40 -1.60 |
| Co-60 | (1932 ± 27)E-01 | (1883 ± 30)E-01 | (1949 ± 31)E-01 % DIFF FROM MEAN: | 19.21E 01 | 20.20E 01 | -4.40 0.60 | -6.80 -2.00 | -3.50 1.40 |
| Cr-51 | (367 ± 18)E 00 | (345 ± 18)E 00 | (349 ± 19)E 00 % DIFF FROM MEAN: | 35.37E 01 | 40.80E 01 | -10.00 3.80 | -15.40* -2.50 | -14.50 -1.30 |
| Cs-134 | (1354 ± 30)E-01 | (1409 ± 34)E-01 | (1356 ± 35)E-01 % DIFF FROM MEAN: | 13.73E 01 | 14.80E 01 | -8.50 -1.40 | -4.80 2.60 | -8.40 -1.20 |

Analytcs spike for Cr-51 in water exceeded the 15% bias limit and the 2-sigma range, however, the mean bias of the three measurements was -13.3%. The known value was less than 10 times the method MDC.

ALL RESULTS PASSED QA PERFORMANCE CRITERIA EXCEPT THOSE NOTED WITH AN ASTERISK

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

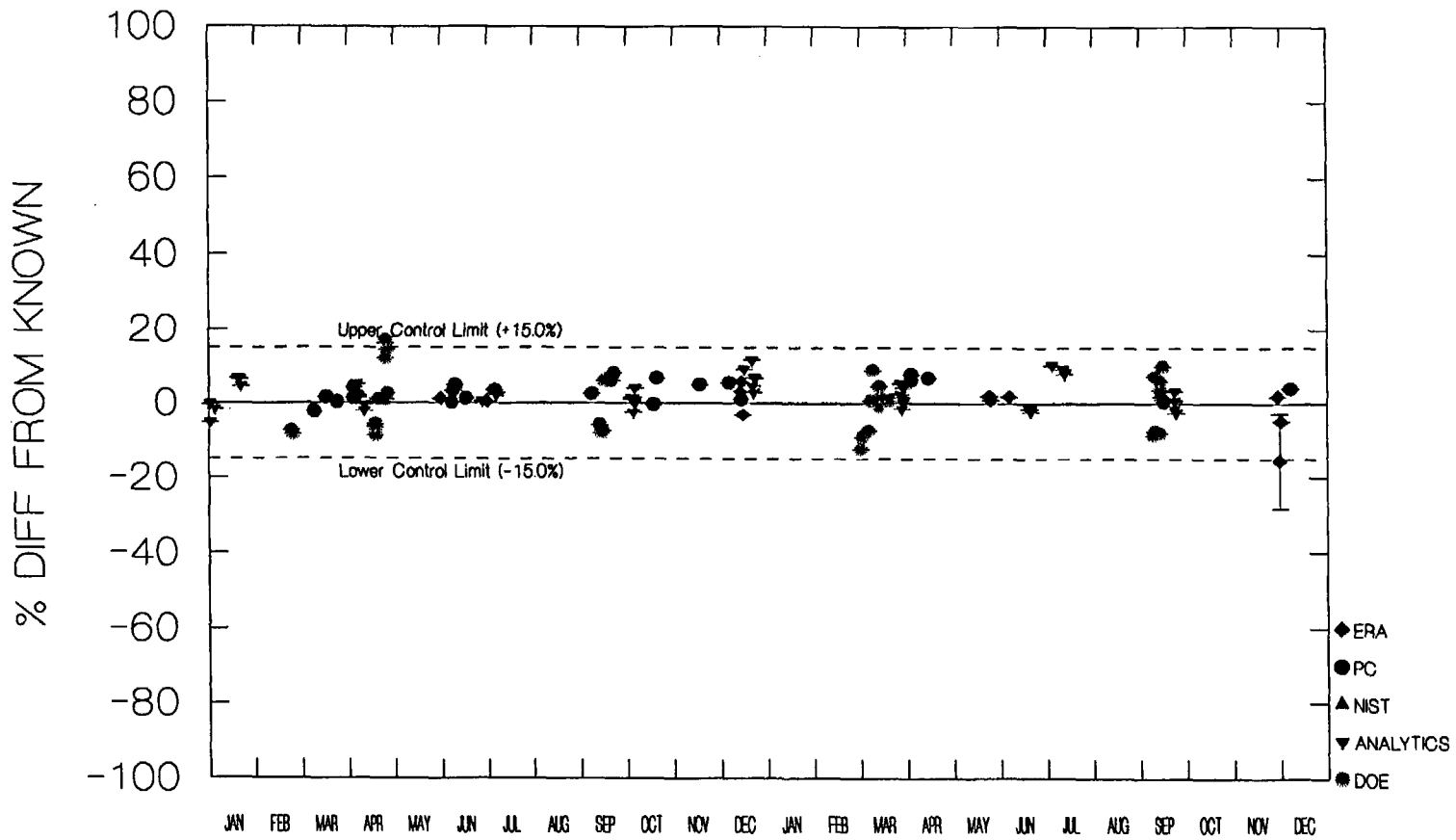
REMP Cs-134 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

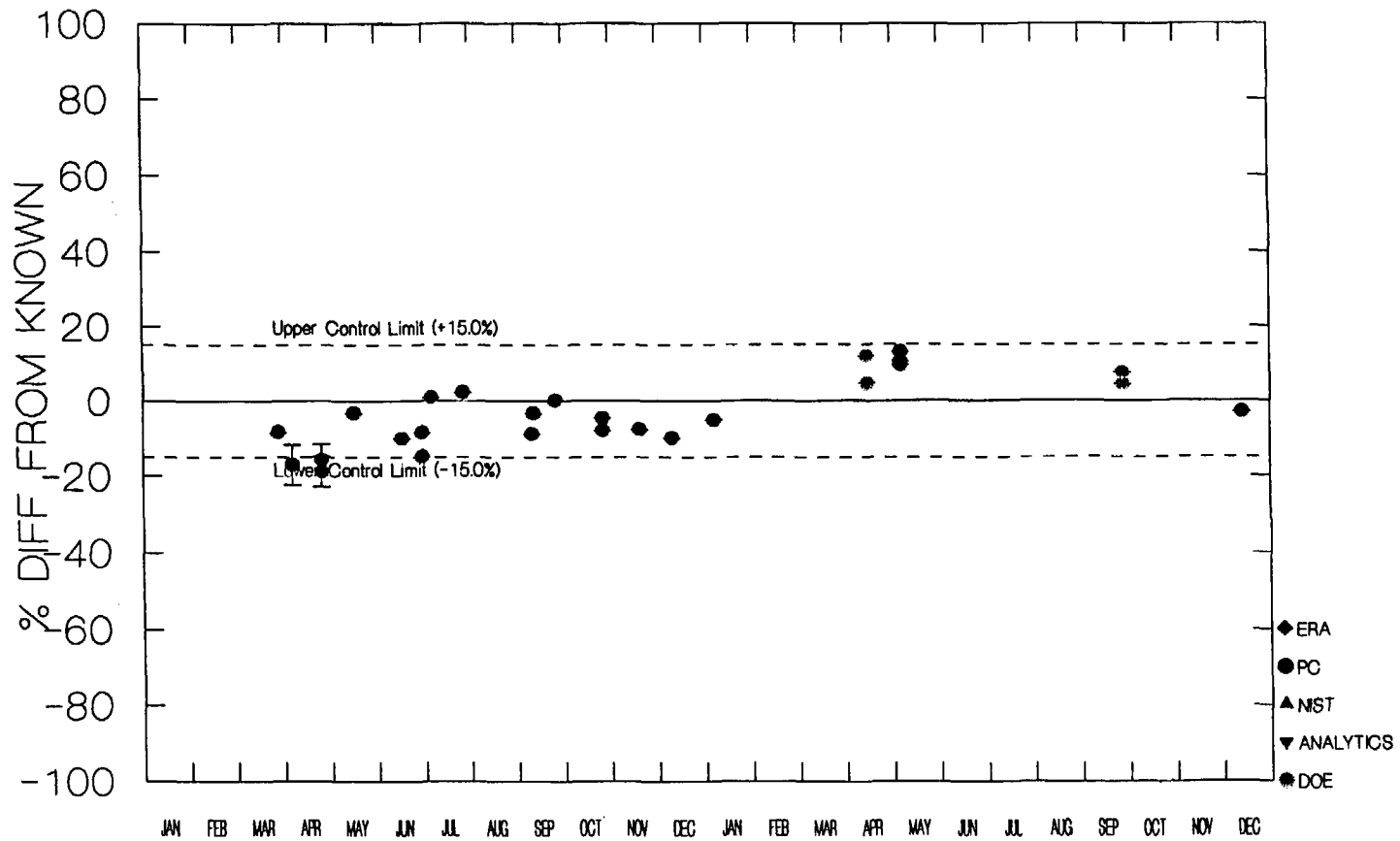
REMP Cs-137 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

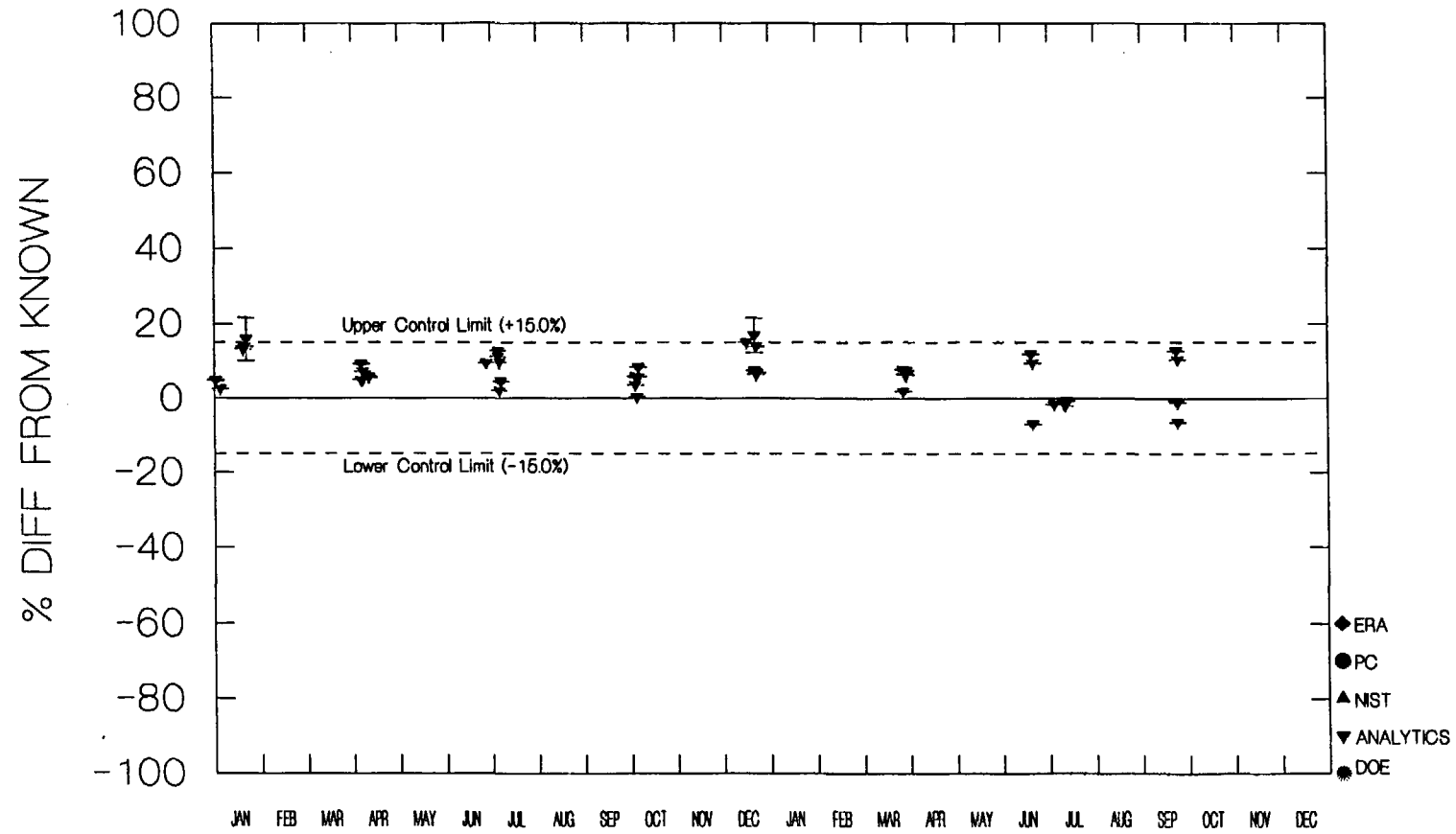
REMP Fe-55 RESULT BIAS



ANALYSIS PERIOD 2004-2005

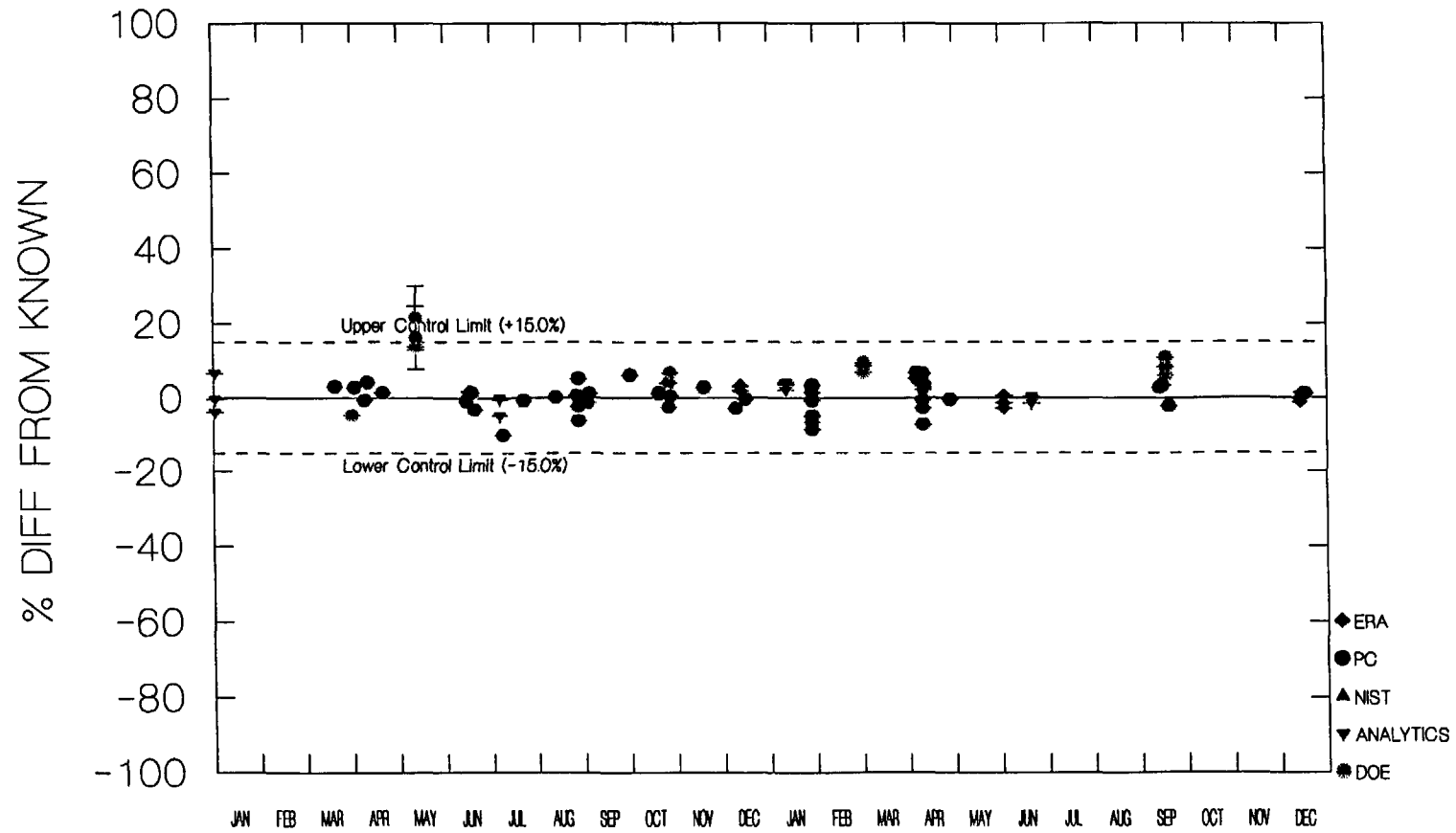
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Fe-59 RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

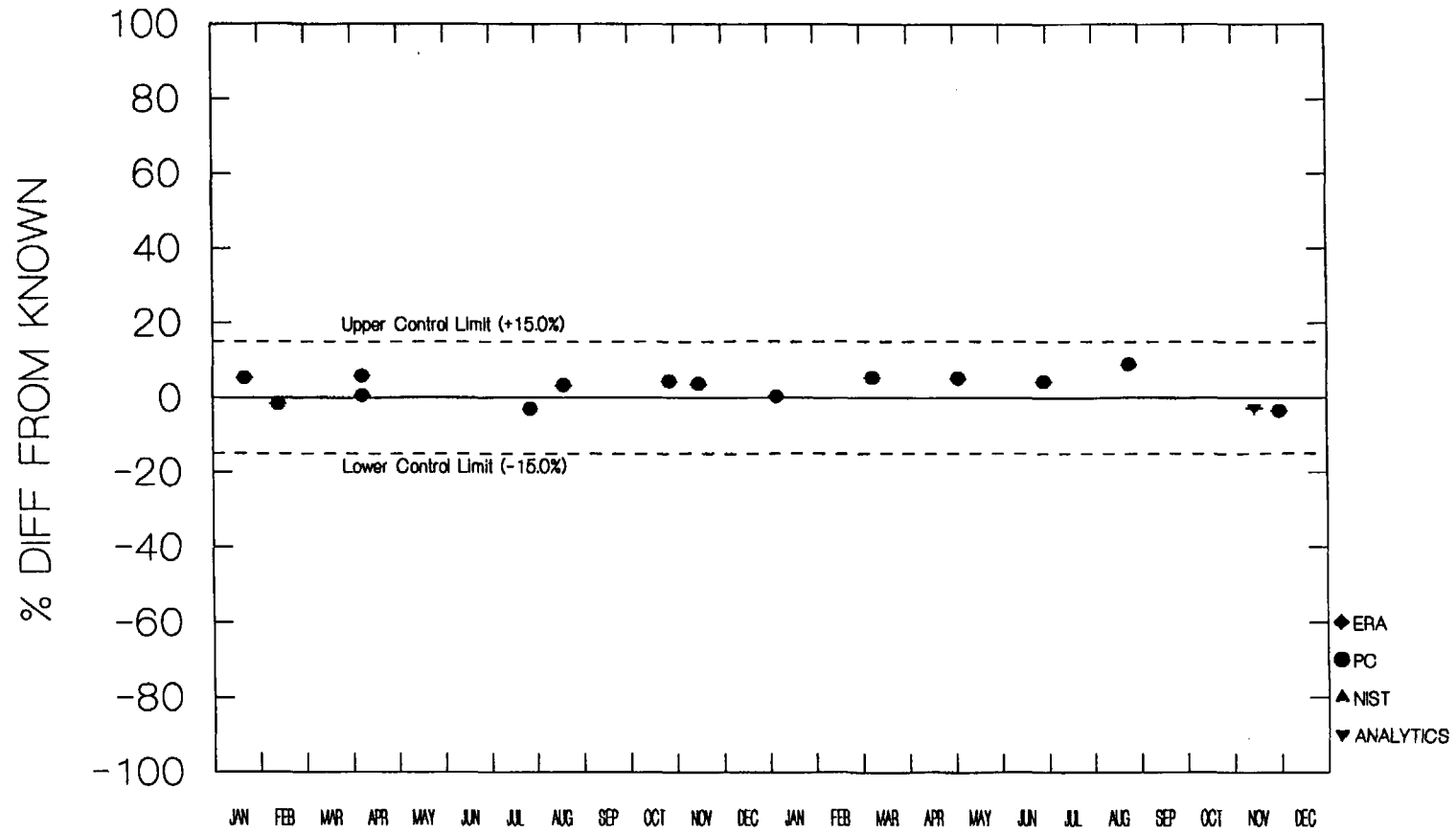
REMP H-3 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

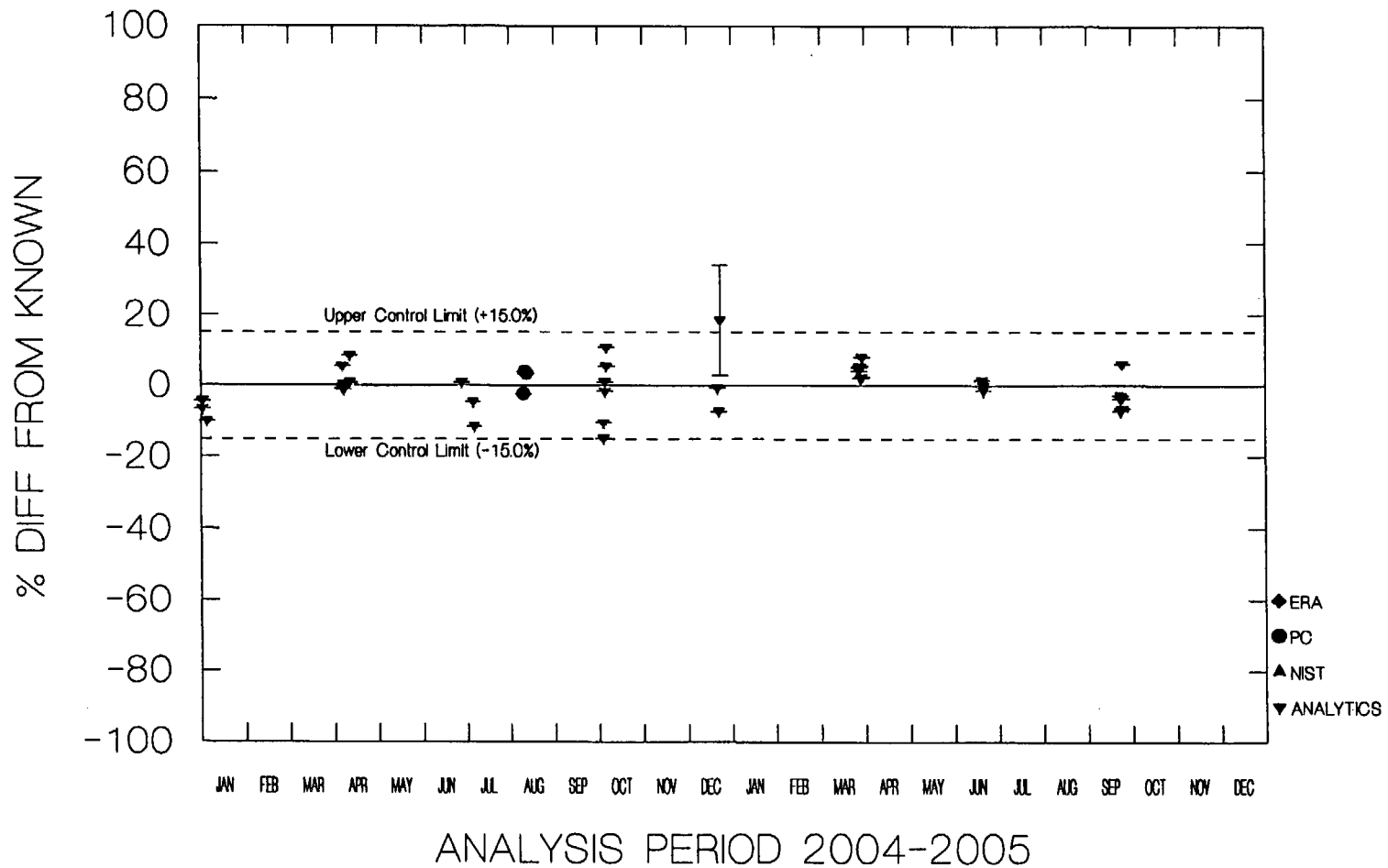
REMP CHARCOAL RESULT BIAS



ANALYSIS PERIOD 2004-2005

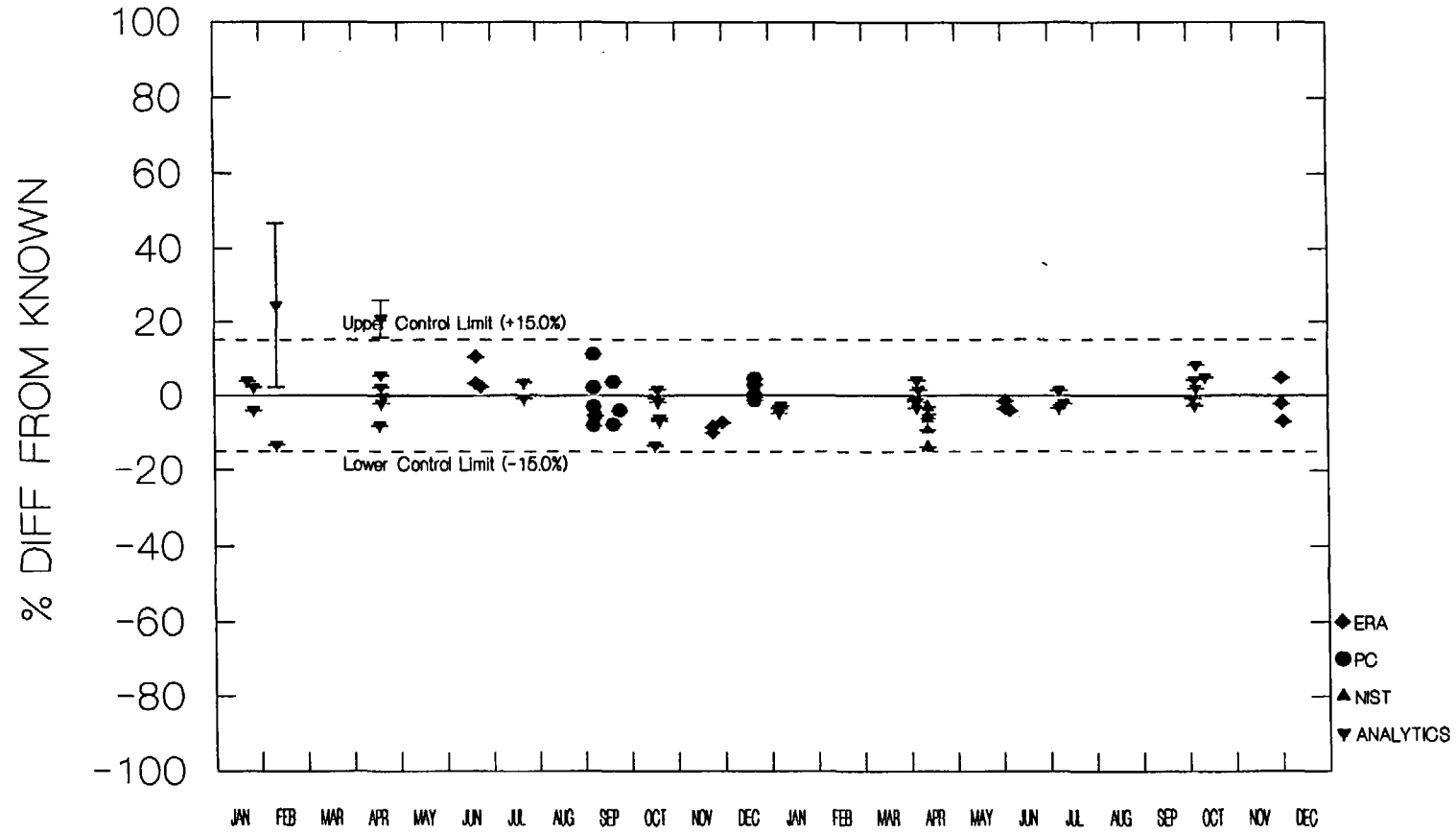
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP I-131 (Gamma) RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

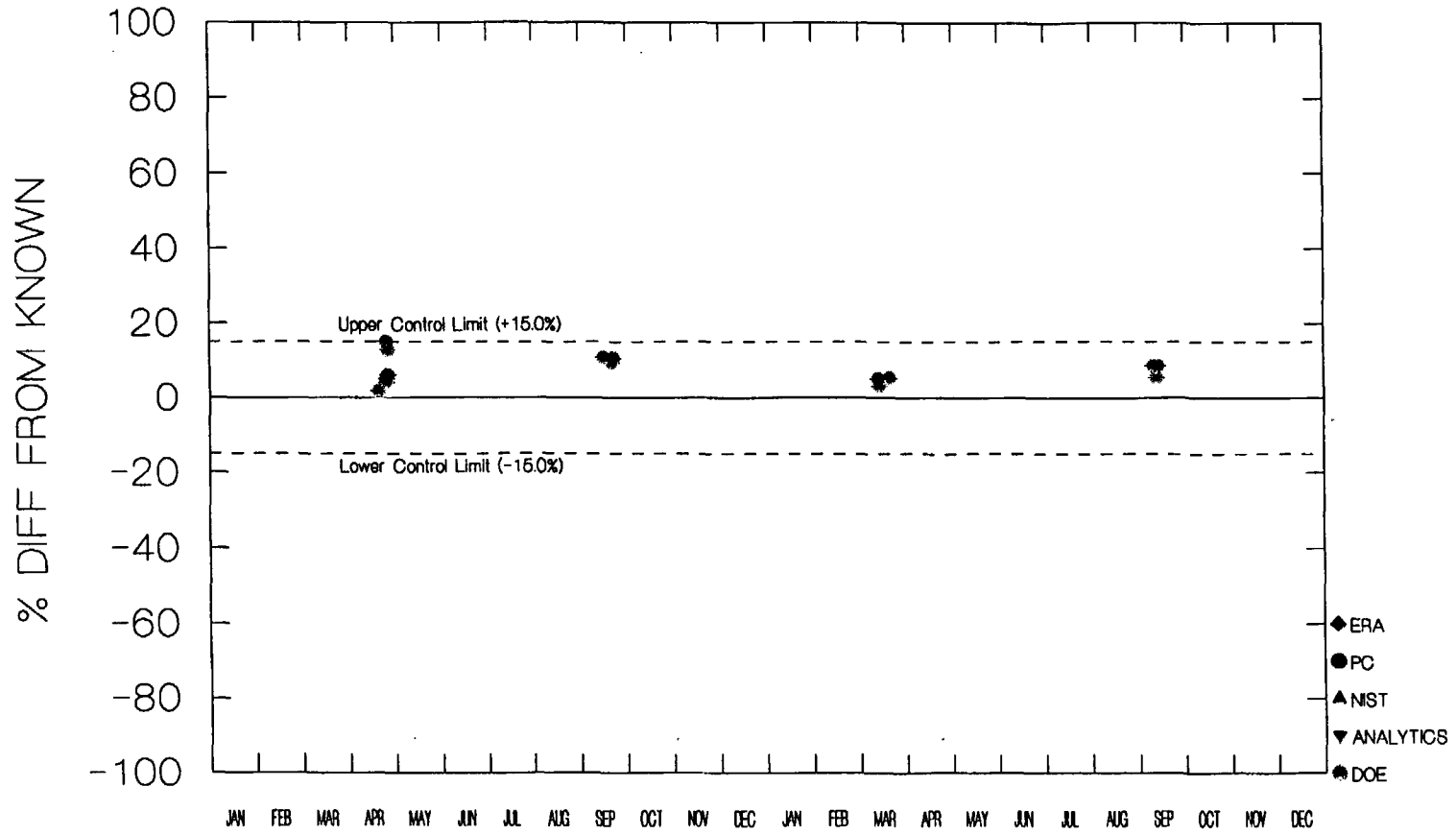
REMP I-131 LOW LEVEL RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

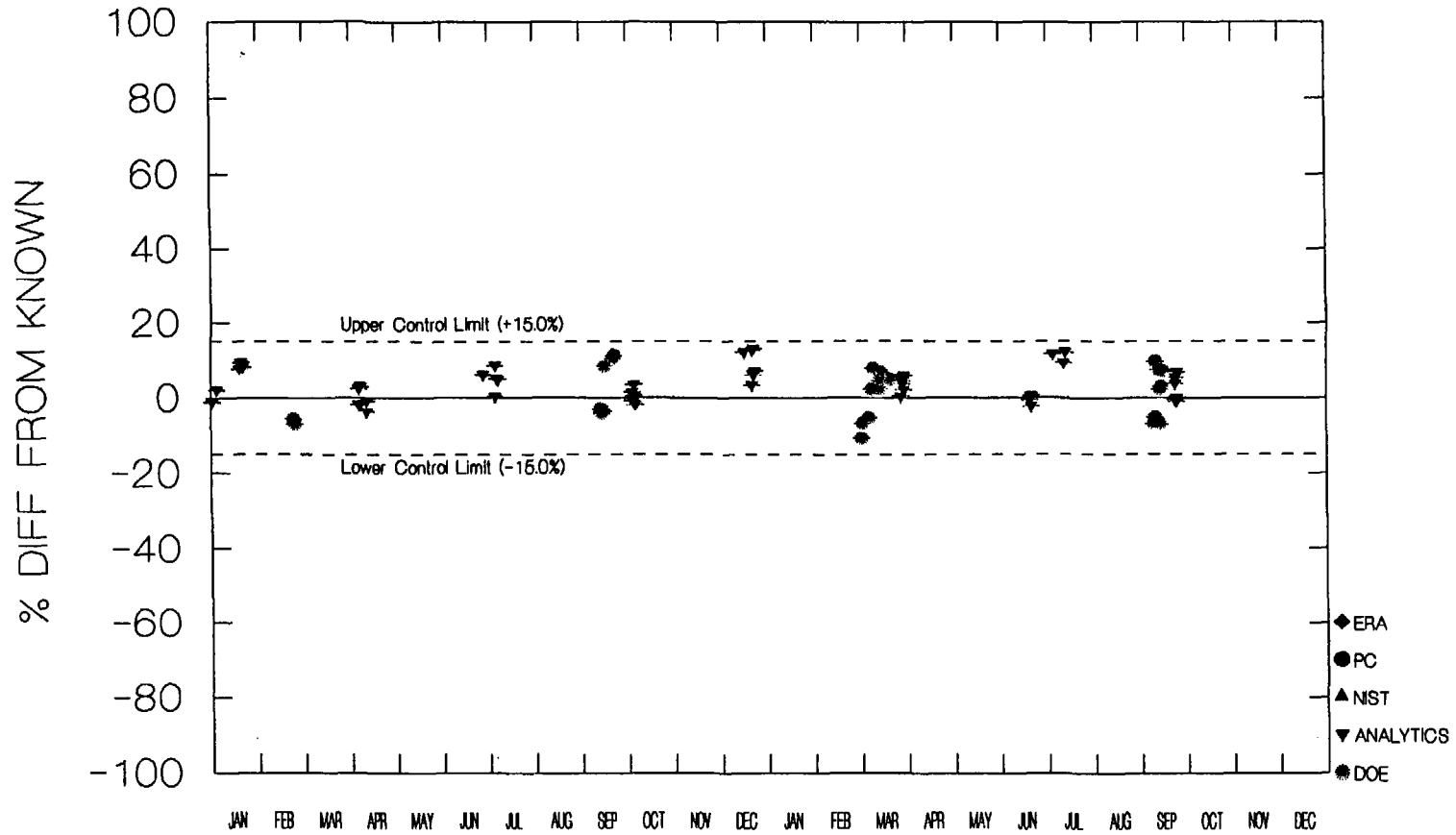
REMP K-40 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

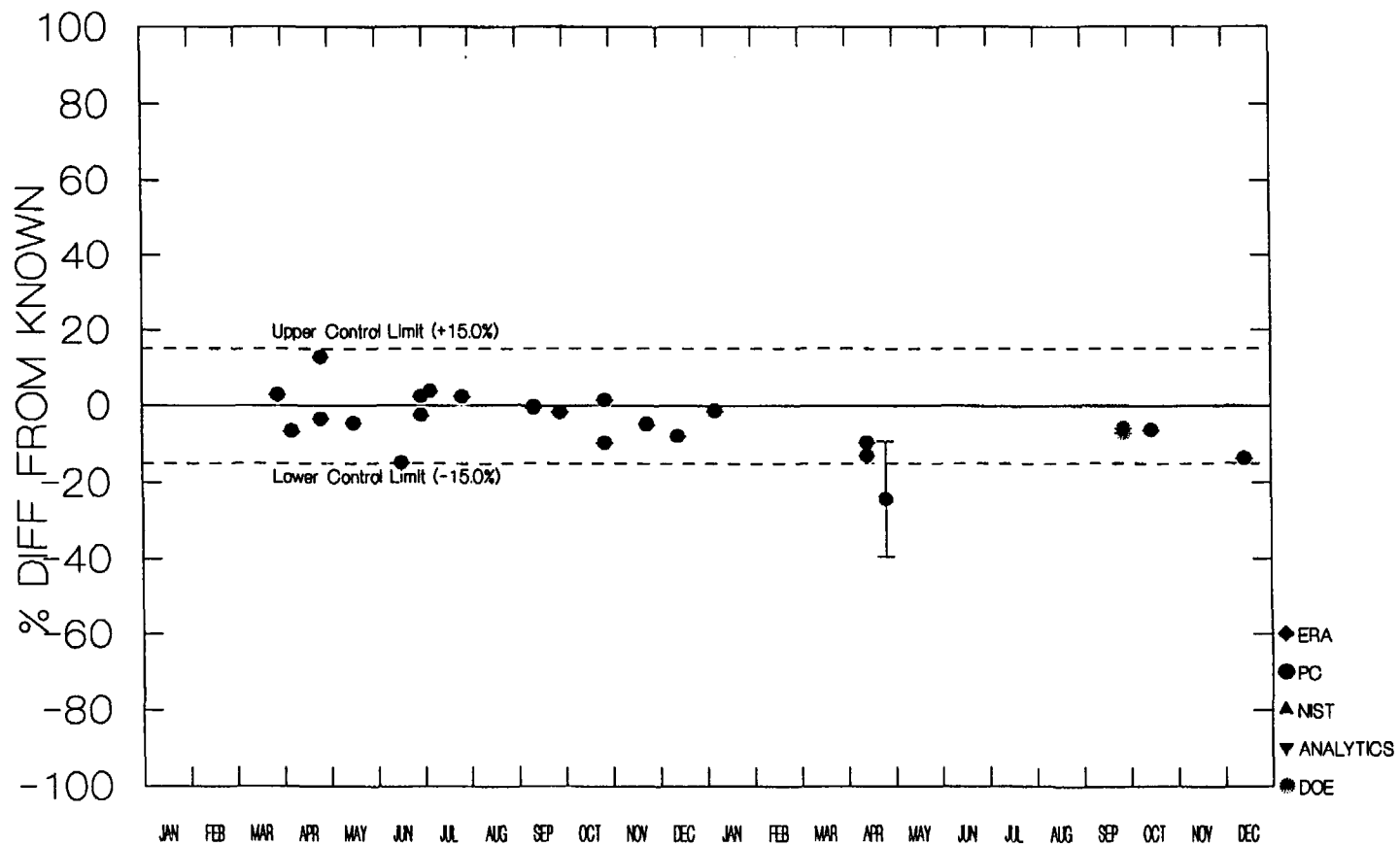
REMP Mn-54 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

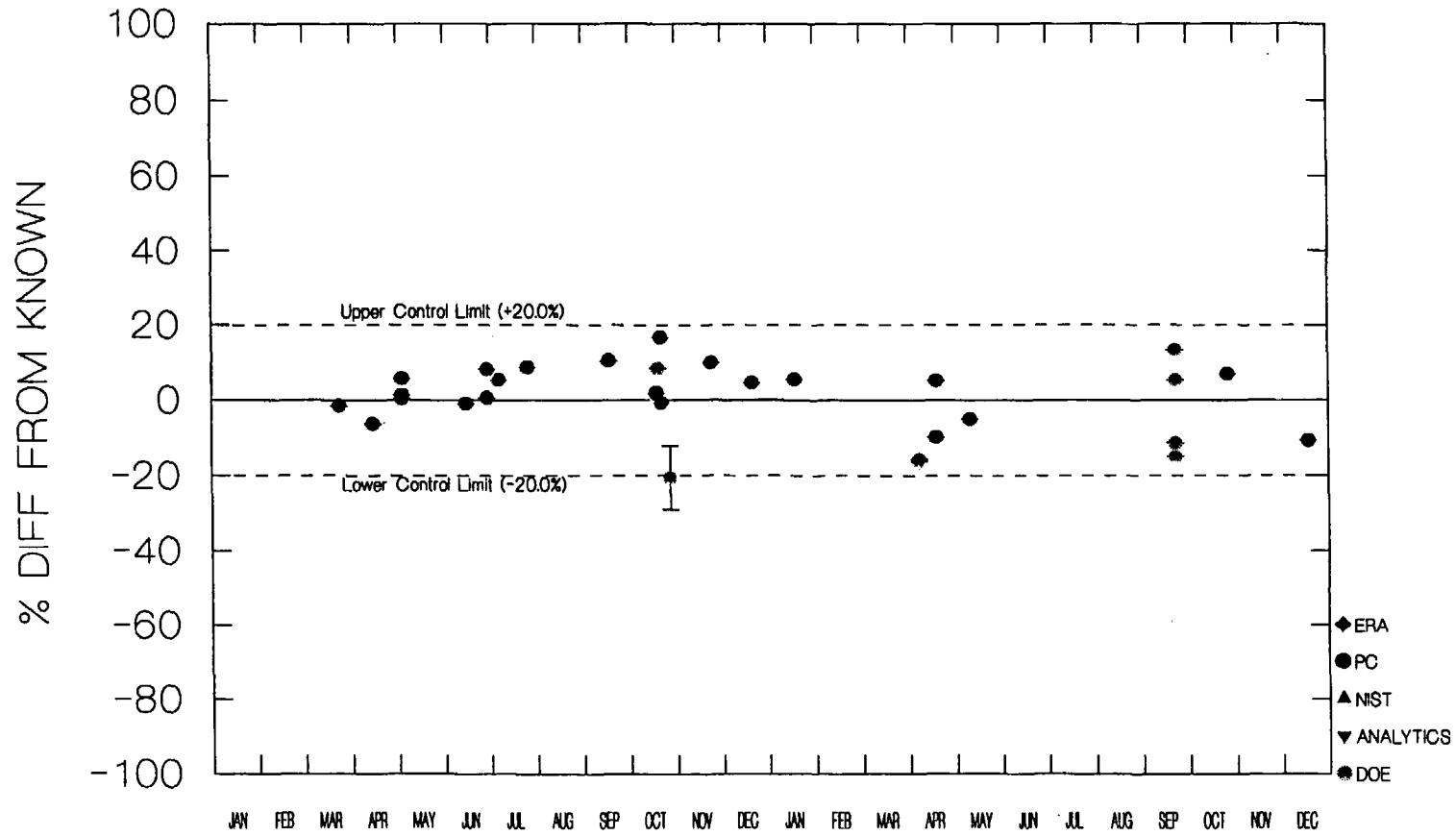
REMP Ni-63 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

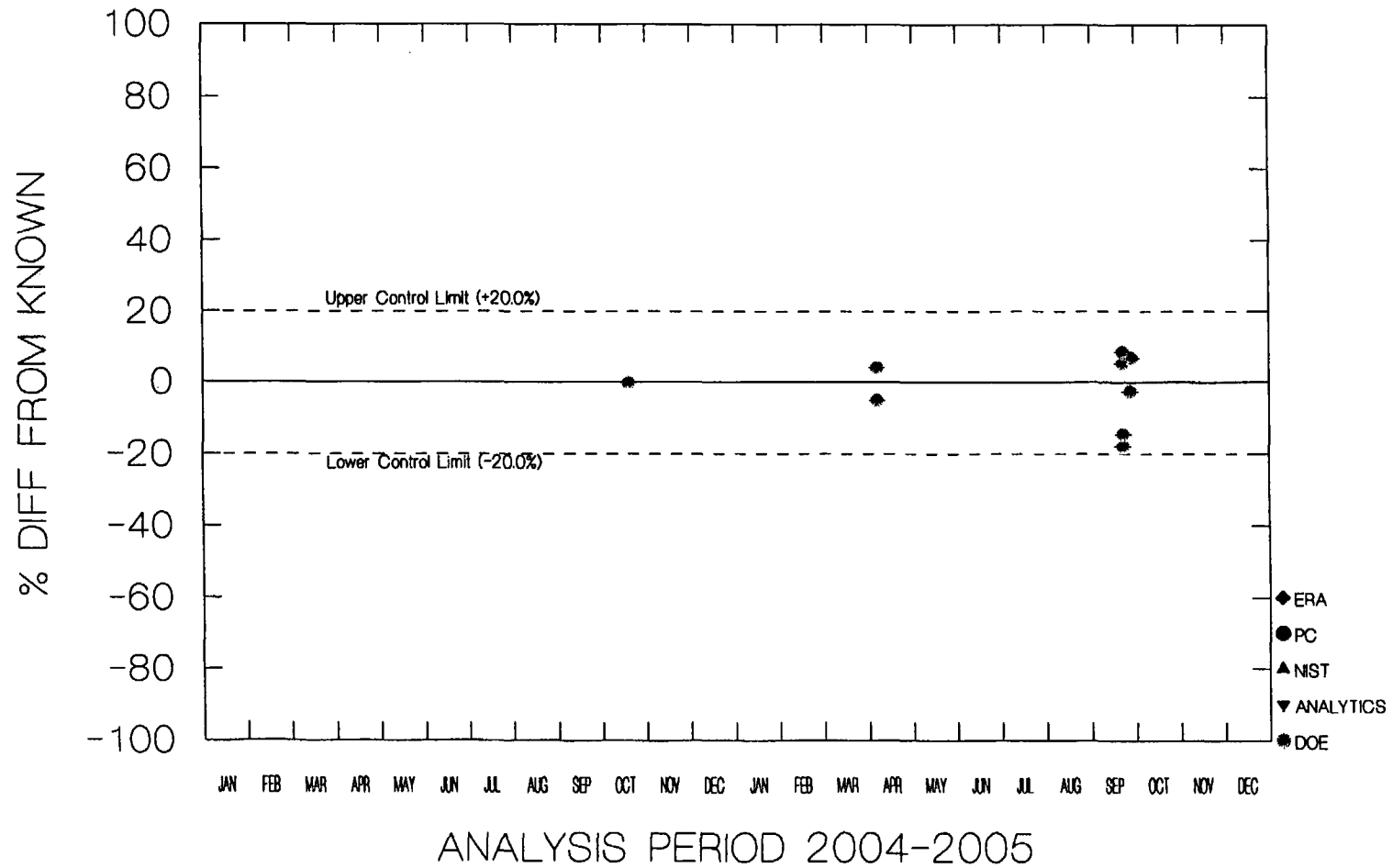
REMP Pu-238 RESULT BIAS



ANALYSIS PERIOD 2004-2005

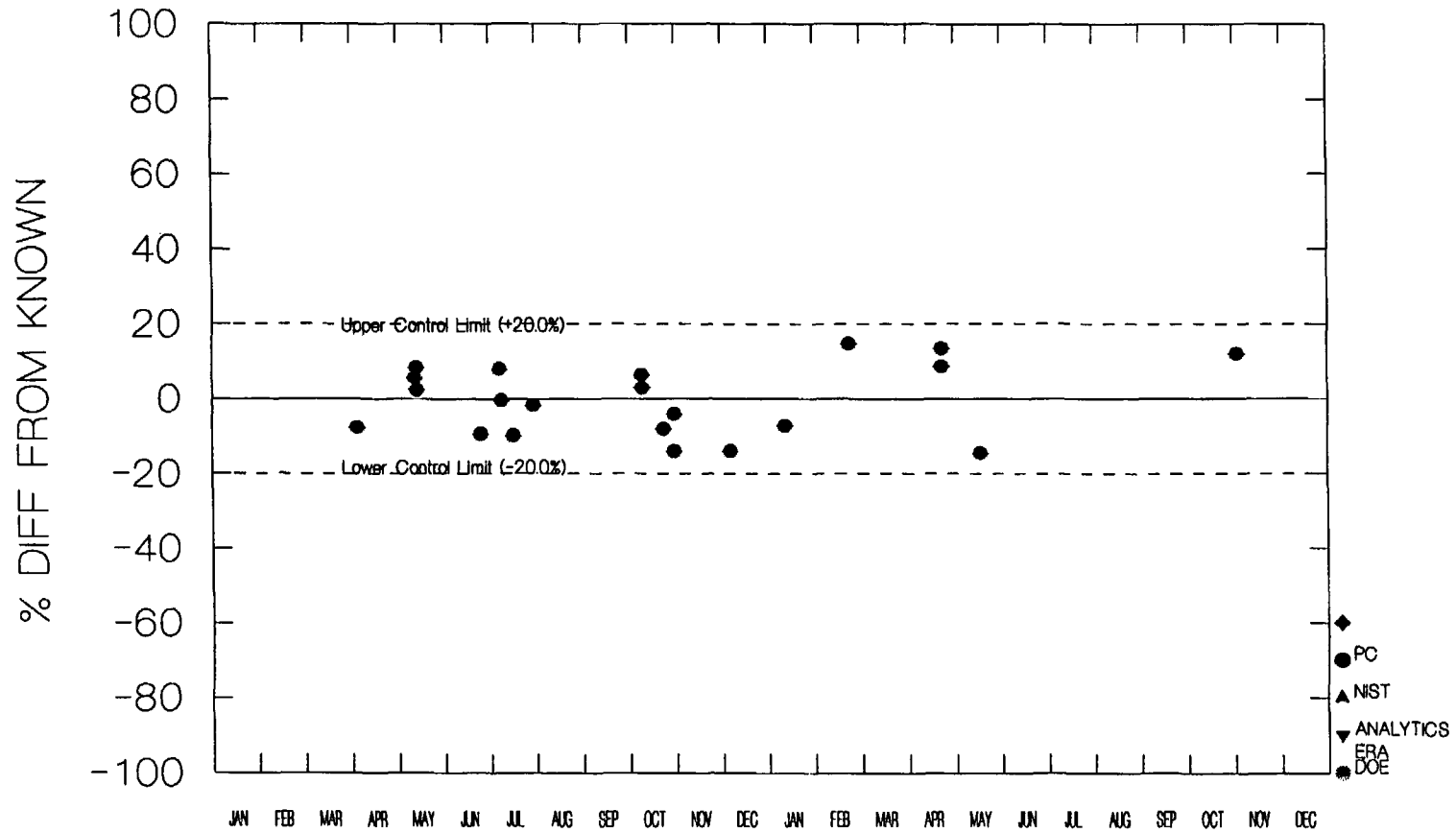
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Pu-239 RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

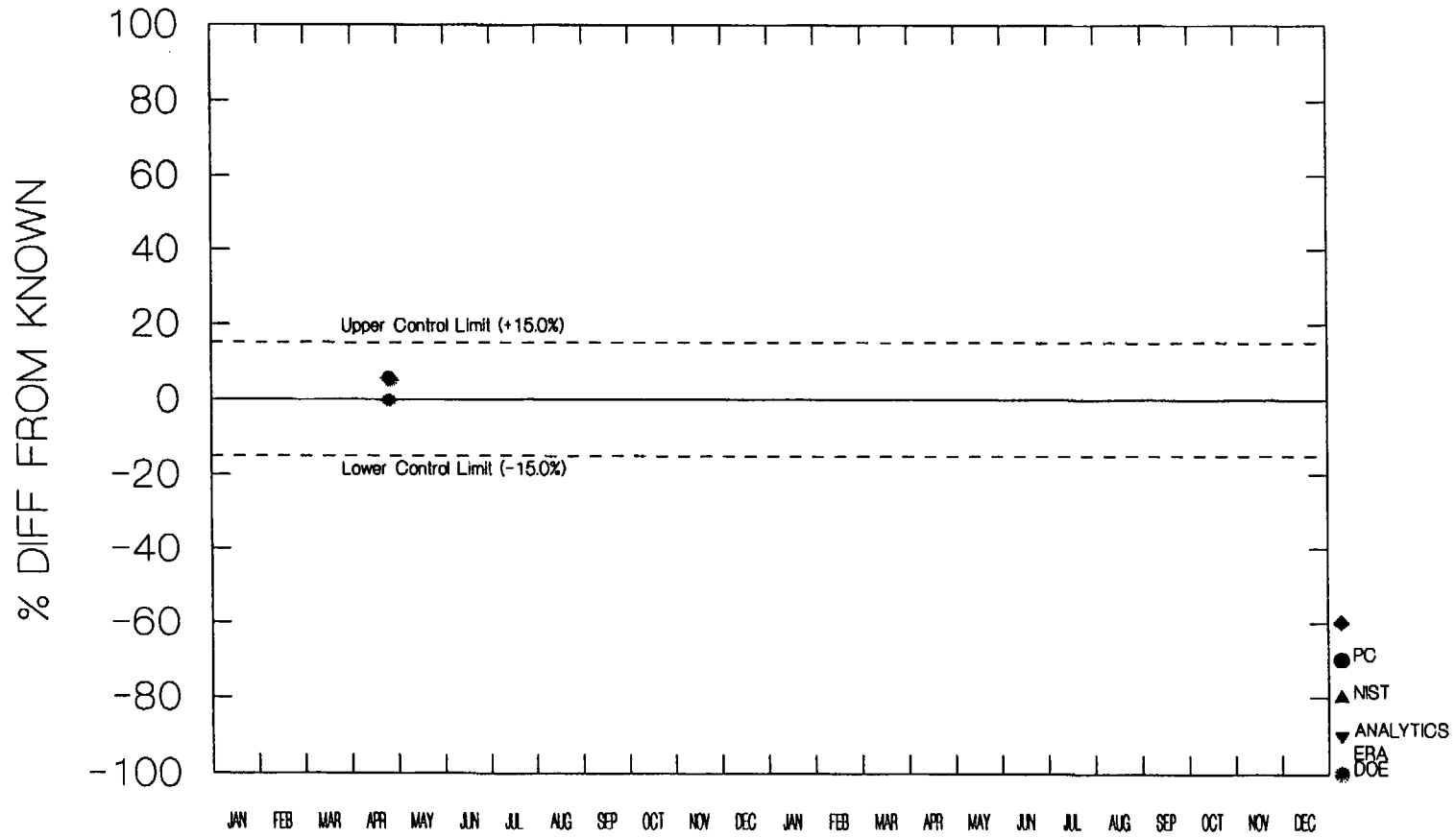
REMP Pu-241 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

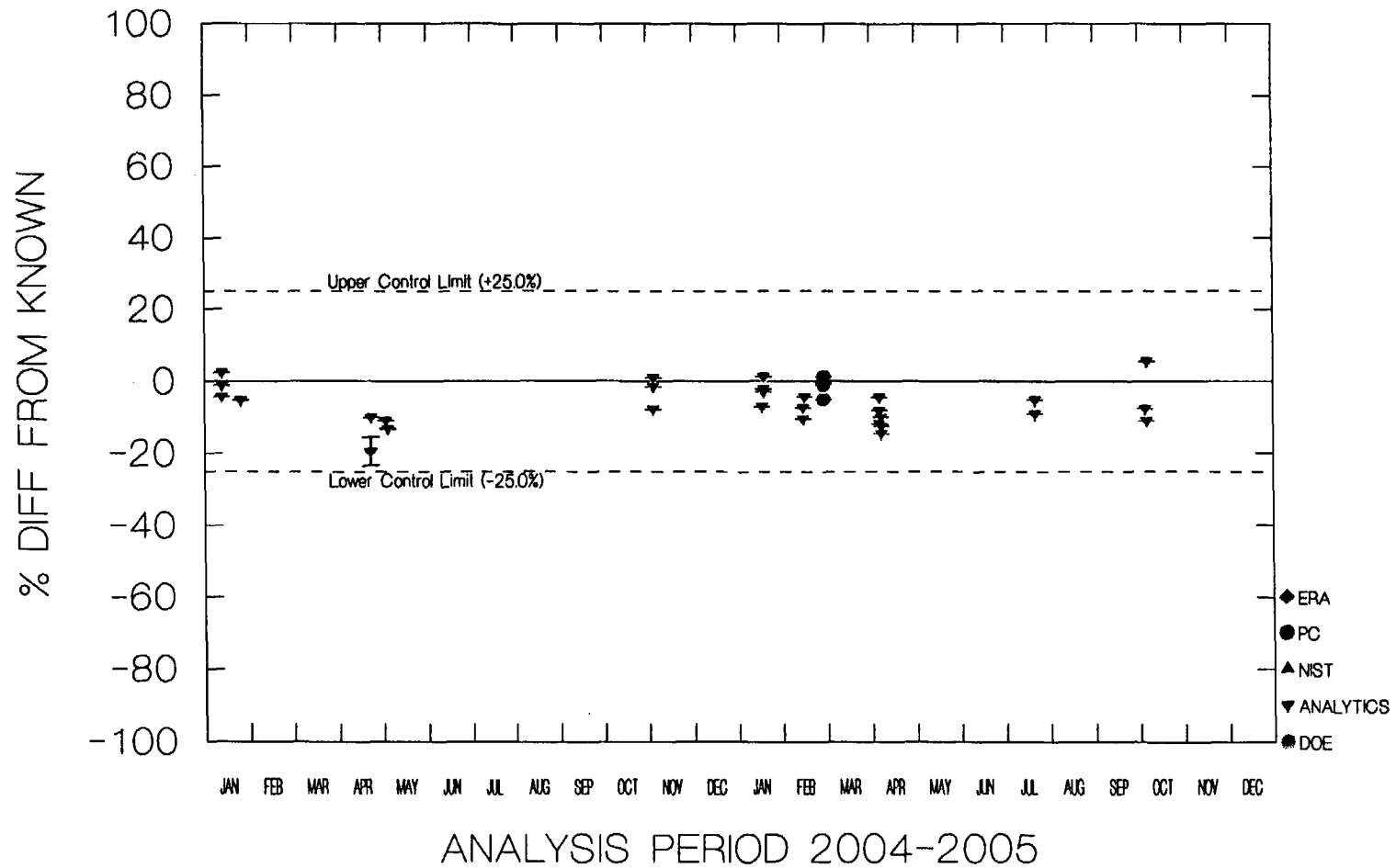
REMP Ra-228 BY GAMMA RESULT BIAS



ANALYSIS PERIOD 2004-2005

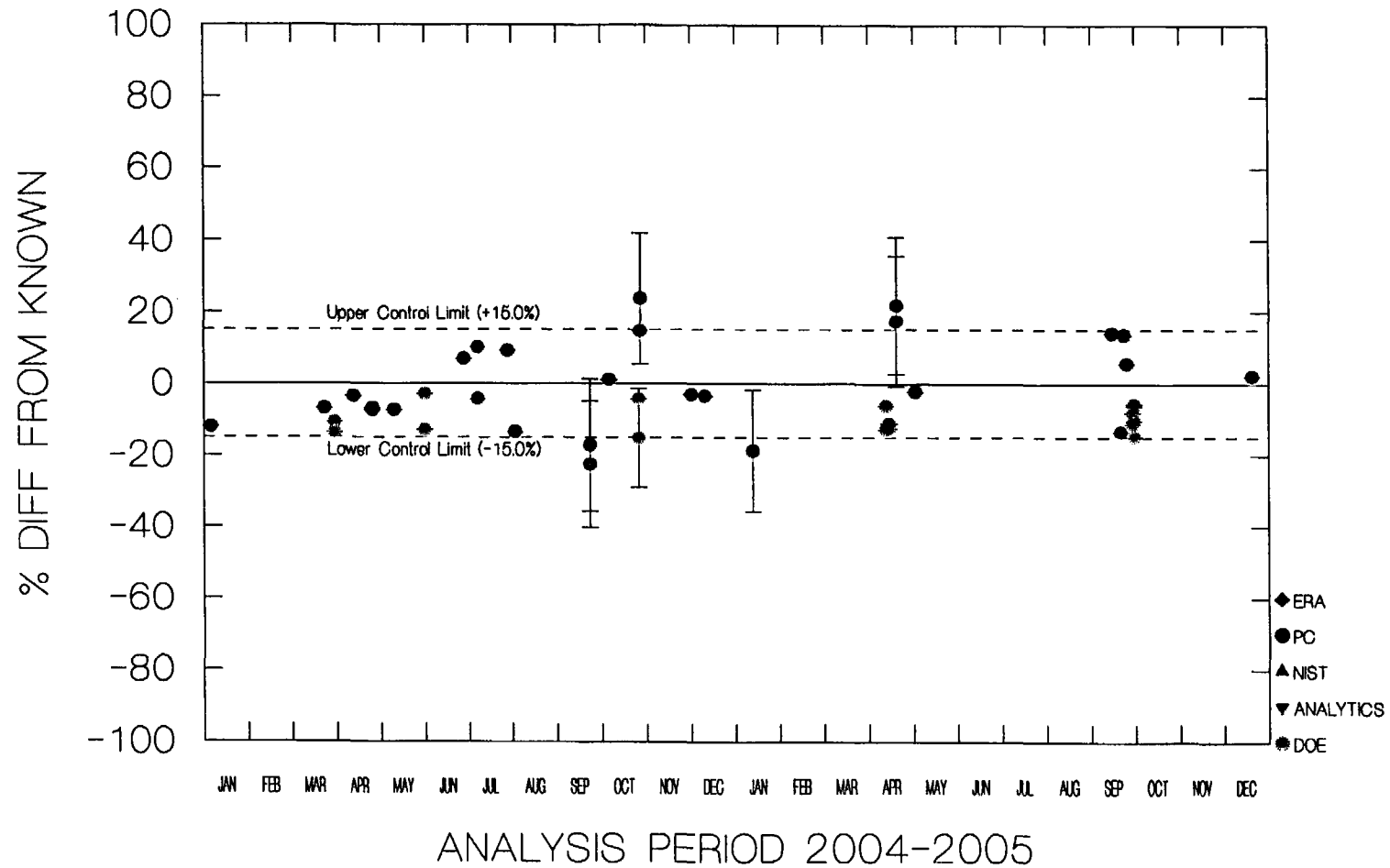
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Sr-89 (COMBINED WITH Sr-90) RESULT BIAS



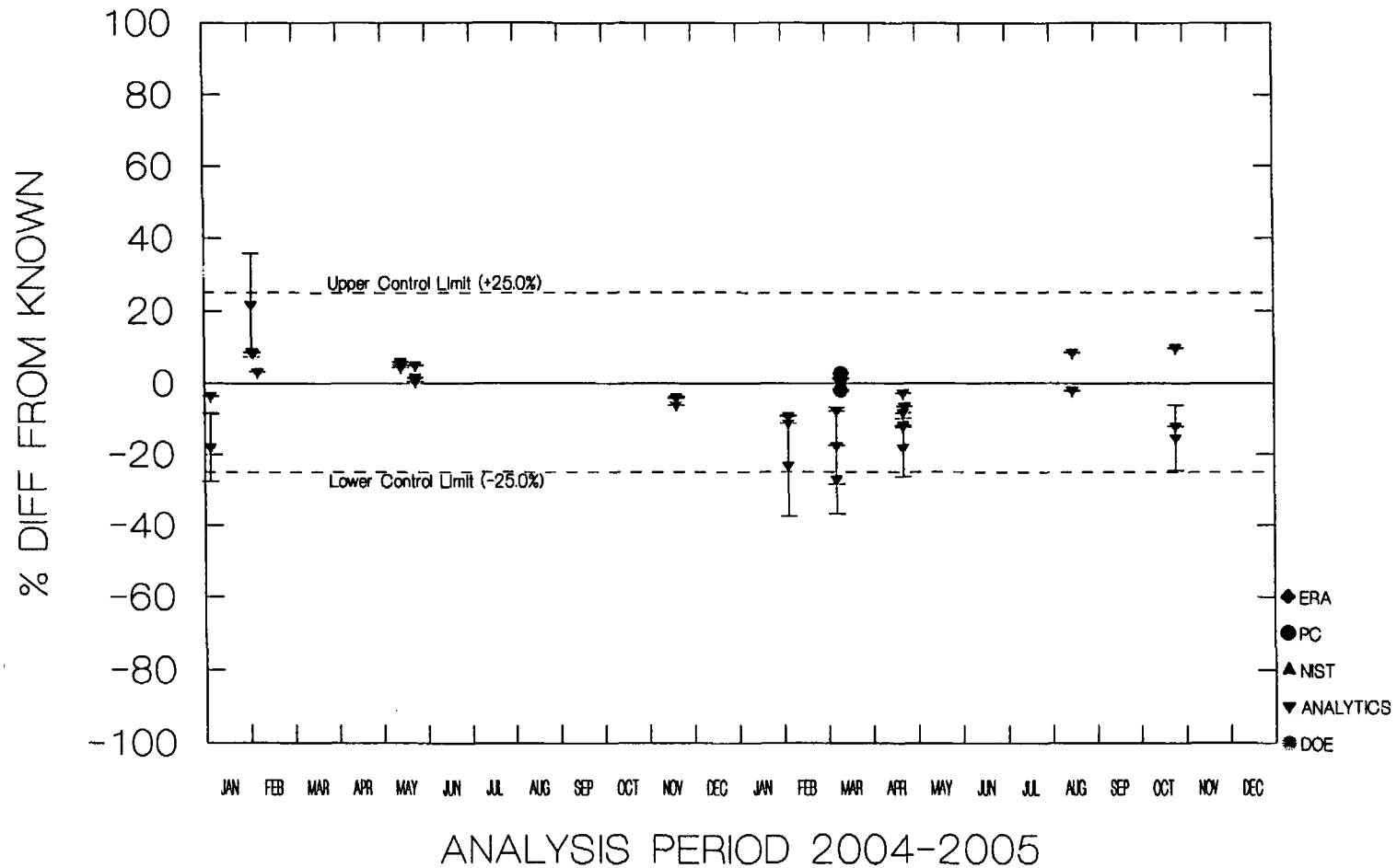
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Sr-90 RESULT BIAS



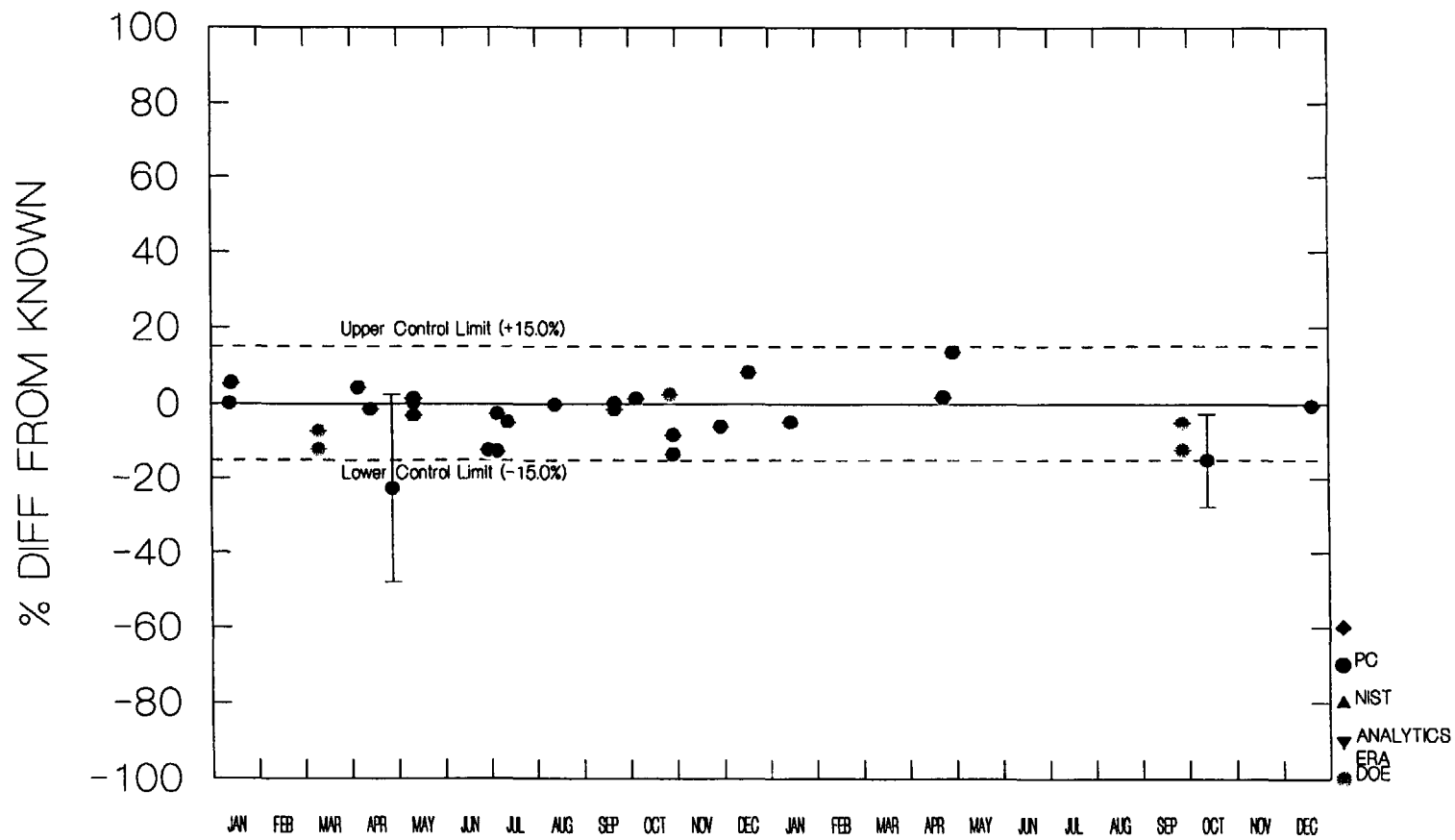
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Sr-90 (COMBINED WITH Sr-89) RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

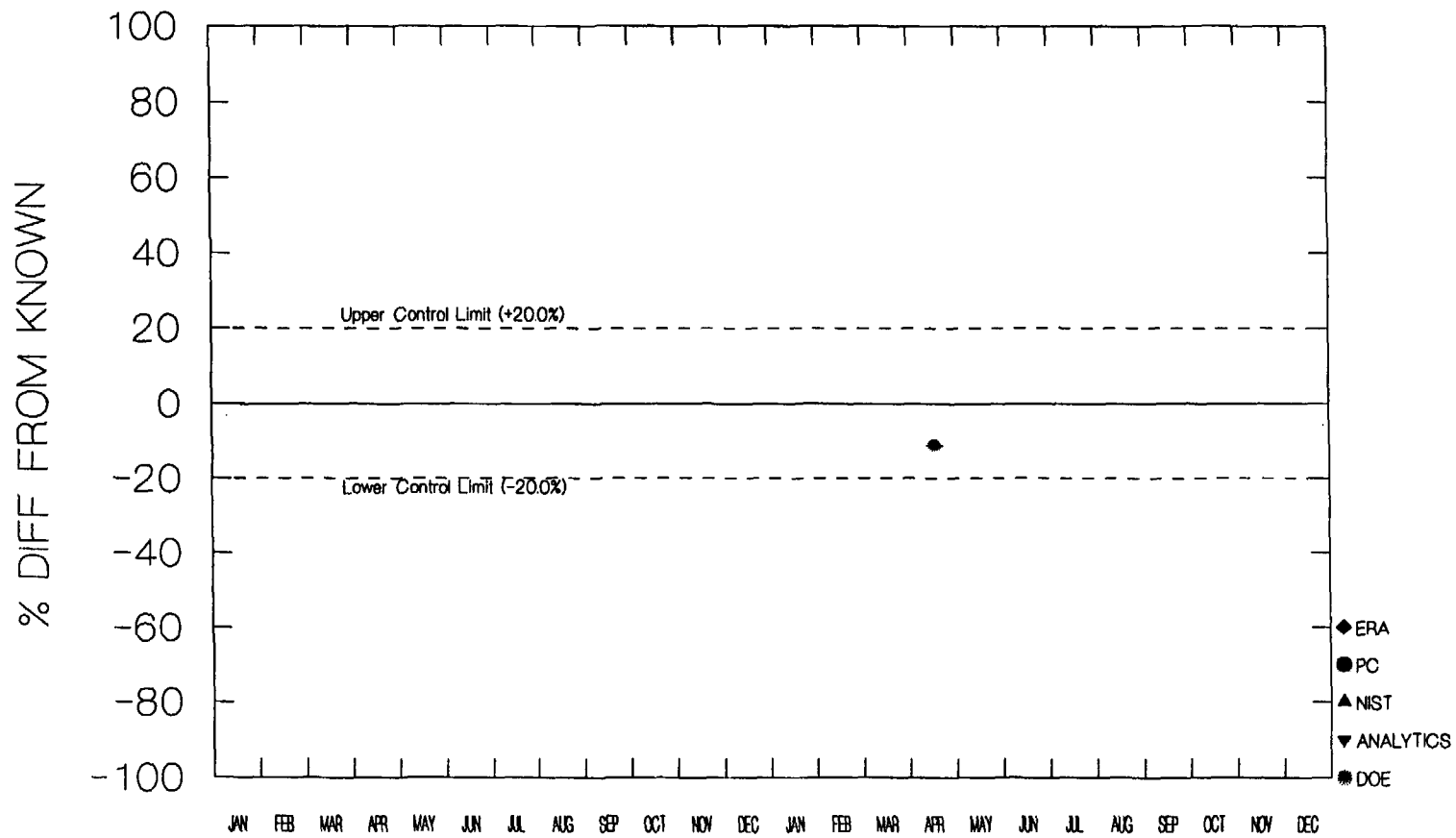
REMP Tc-99 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

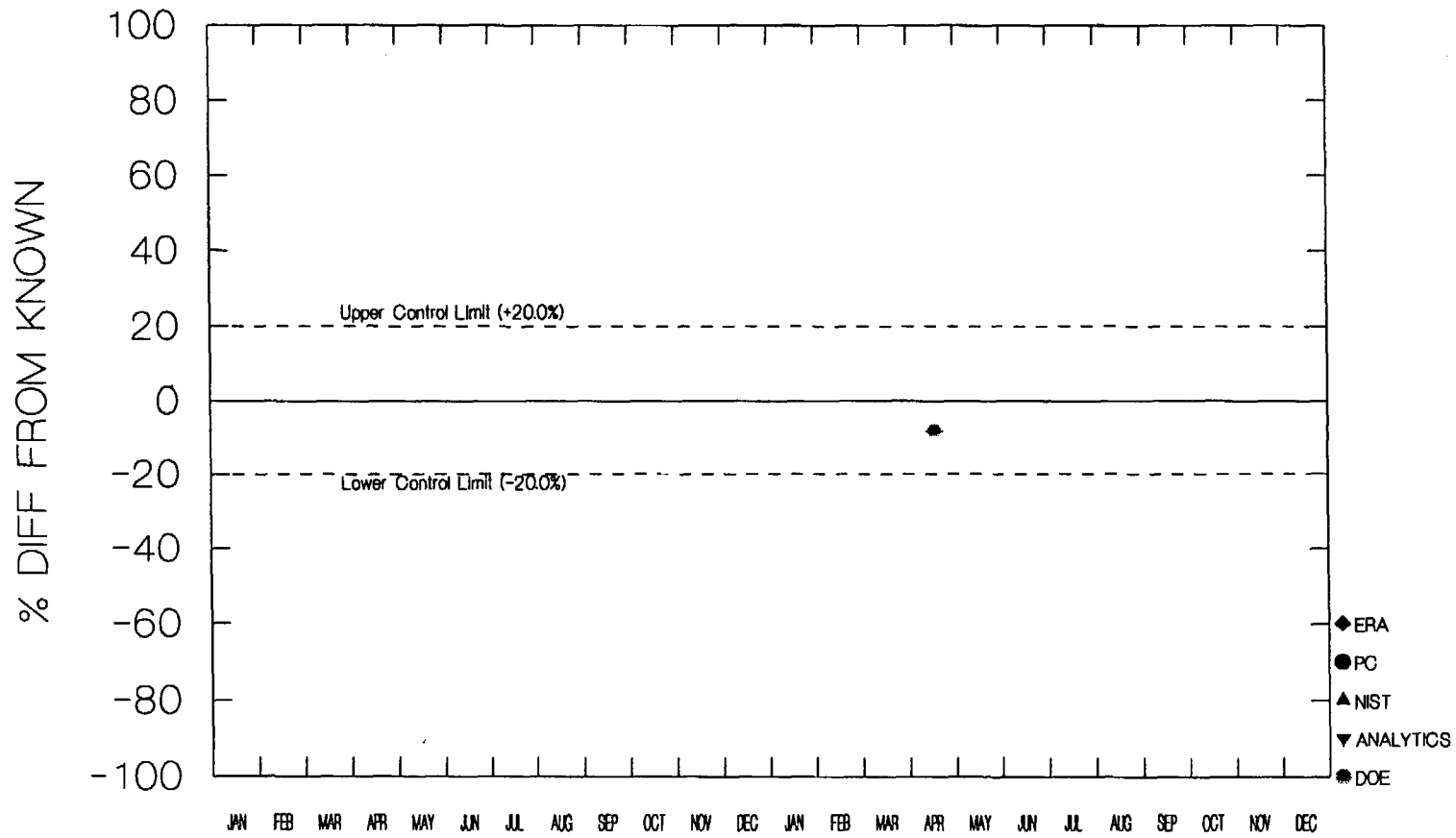
REMP U-234 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

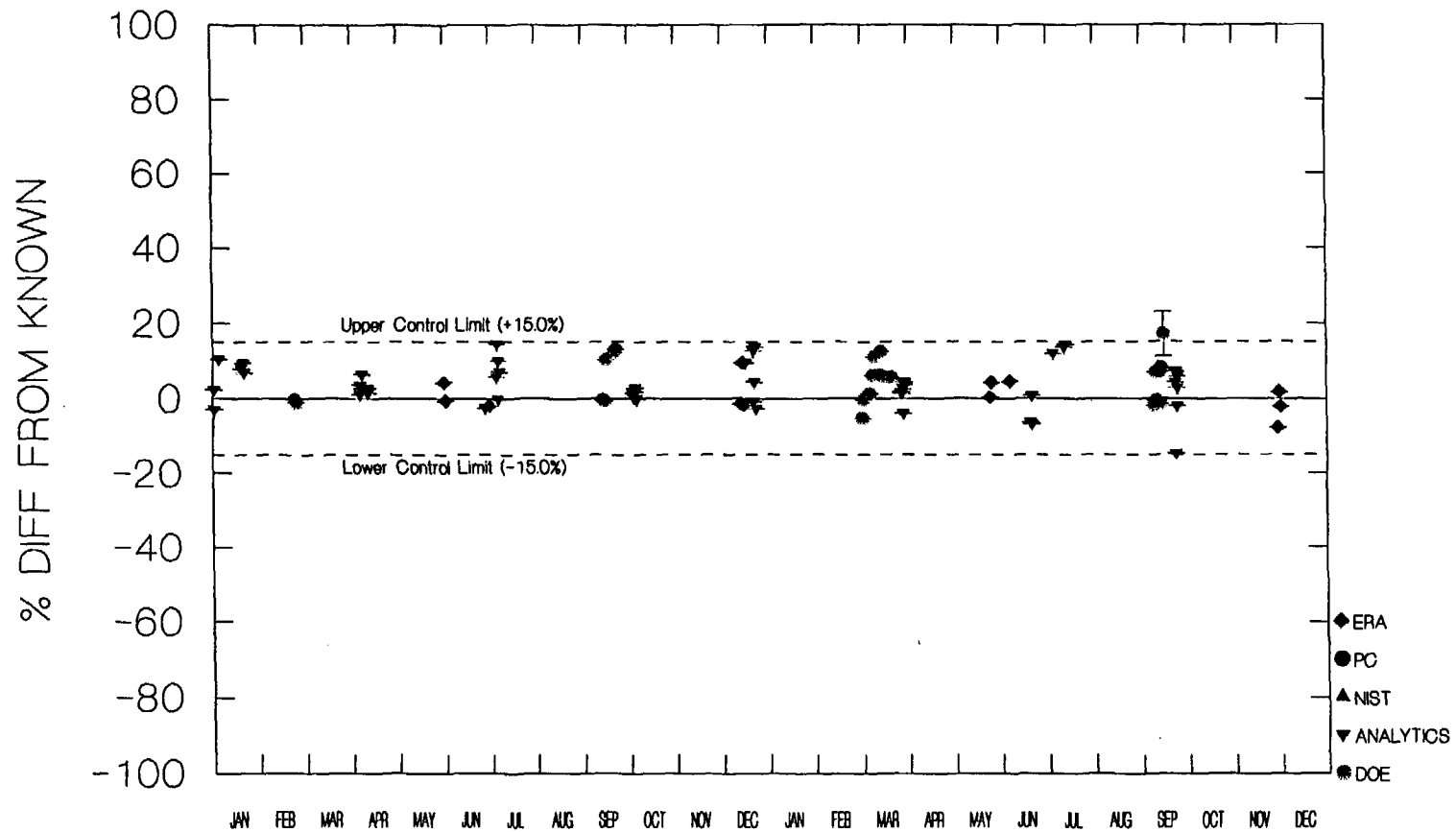
REMP U-238 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

REMP Zn-65 RESULT BIAS



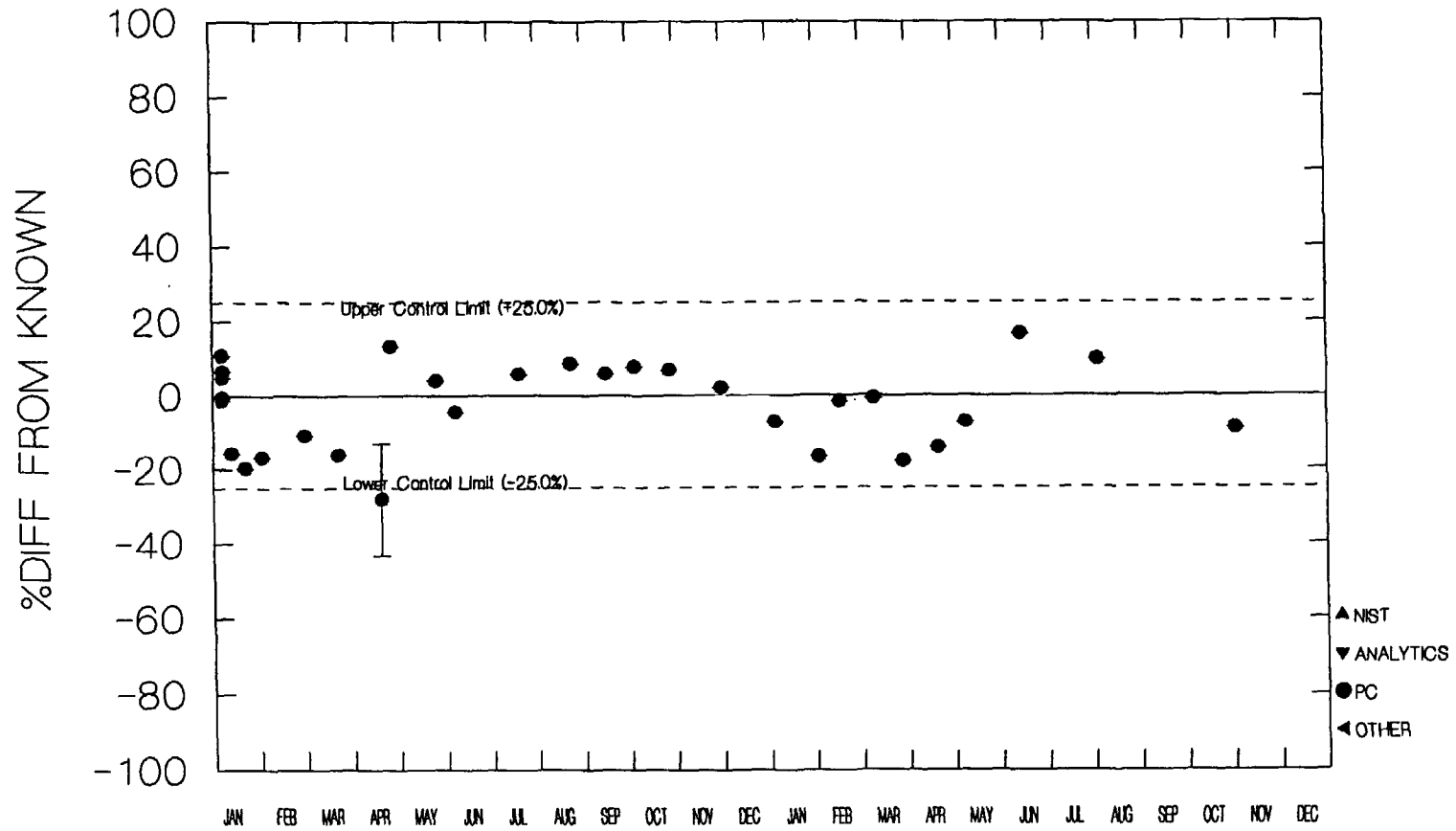
ANALYSIS PERIOD 2004-2005

APPENDIX B

**EFFLUENT MONITORING AND WASTE CHARACTERIZATION
QUALITY CONTROL RESULTS
(10CFR PART 50/61)**

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

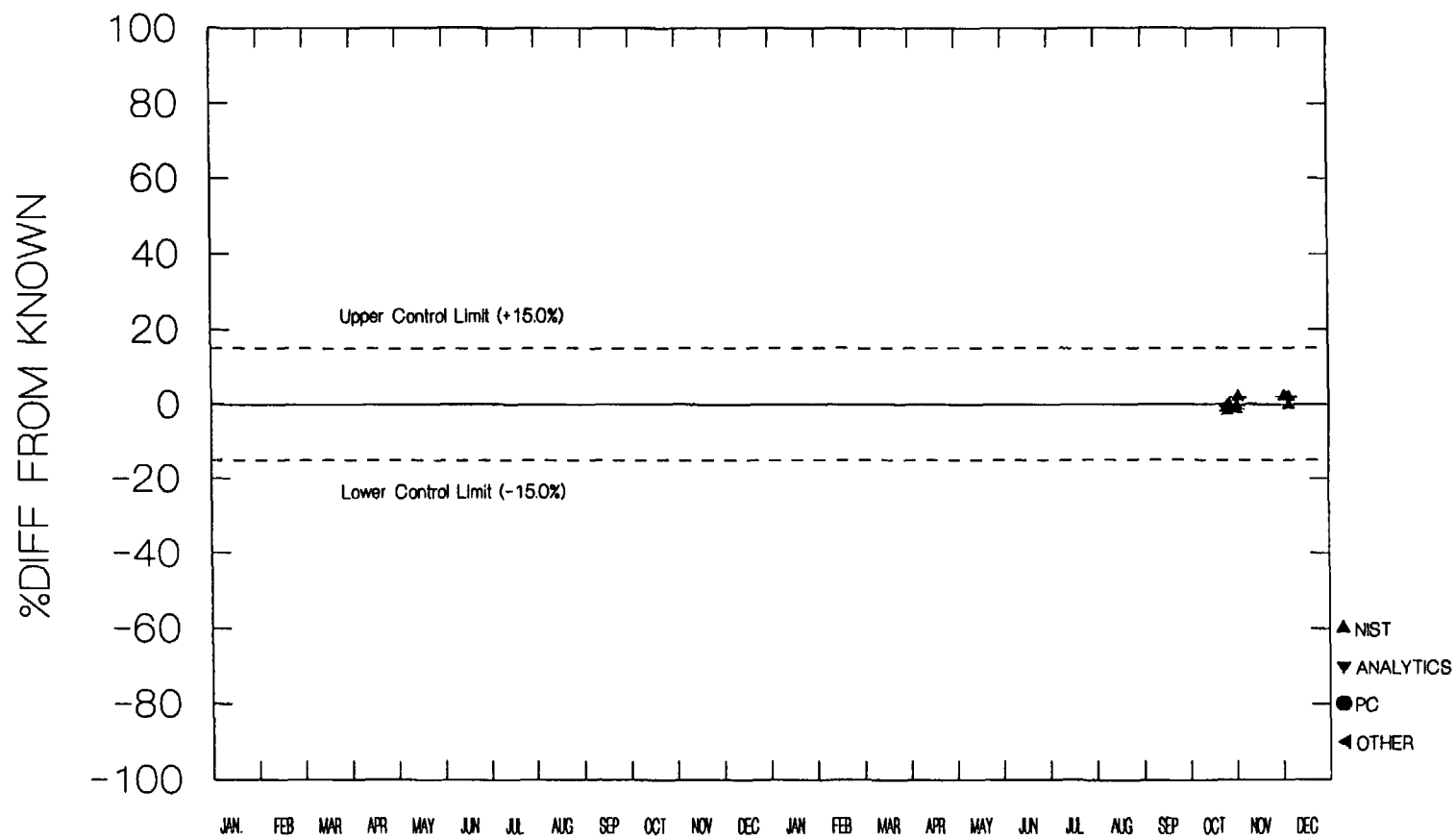
PART 50/61 GROSS ALPHA RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

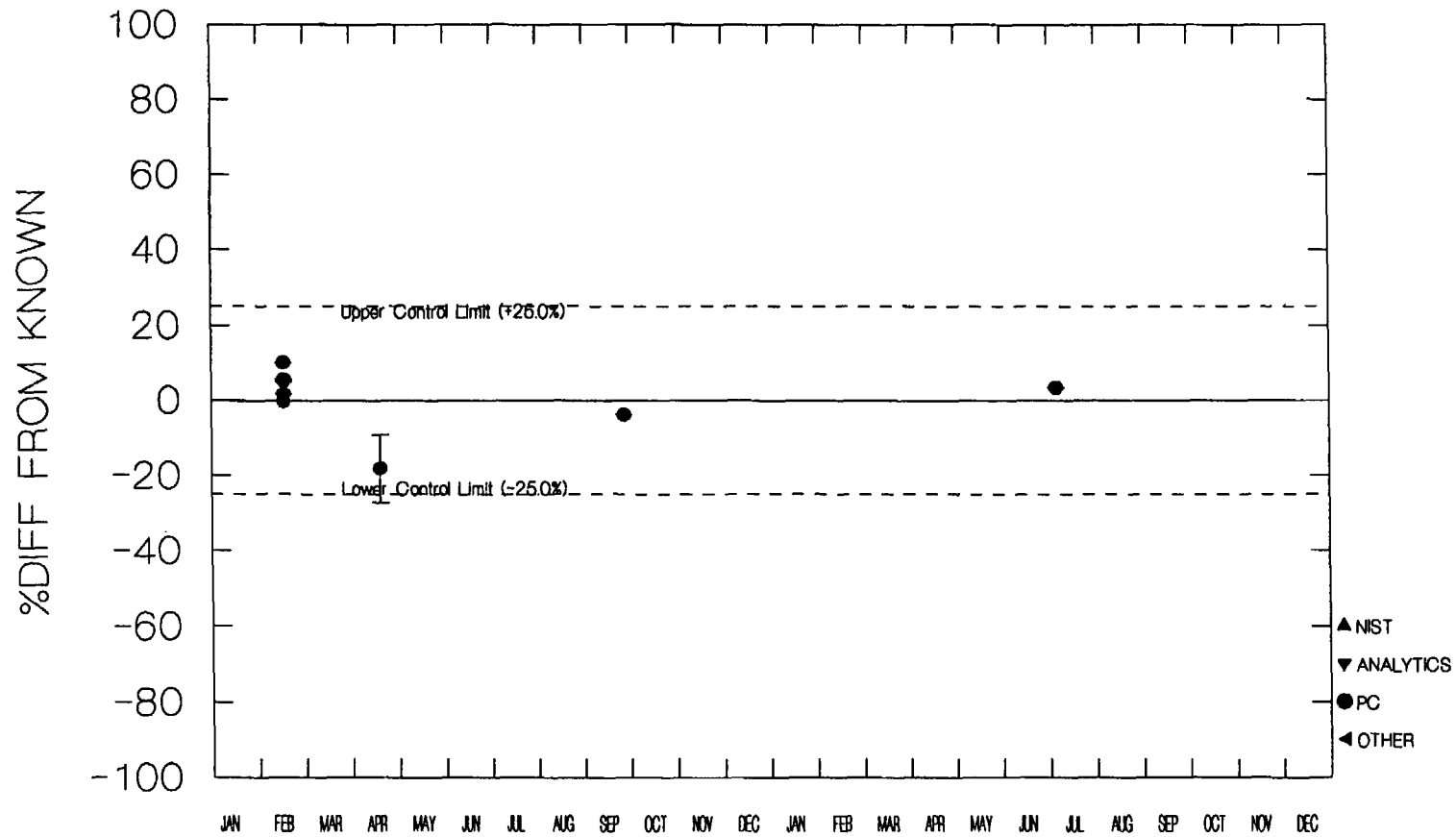
PART 50/61 Ba-133 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

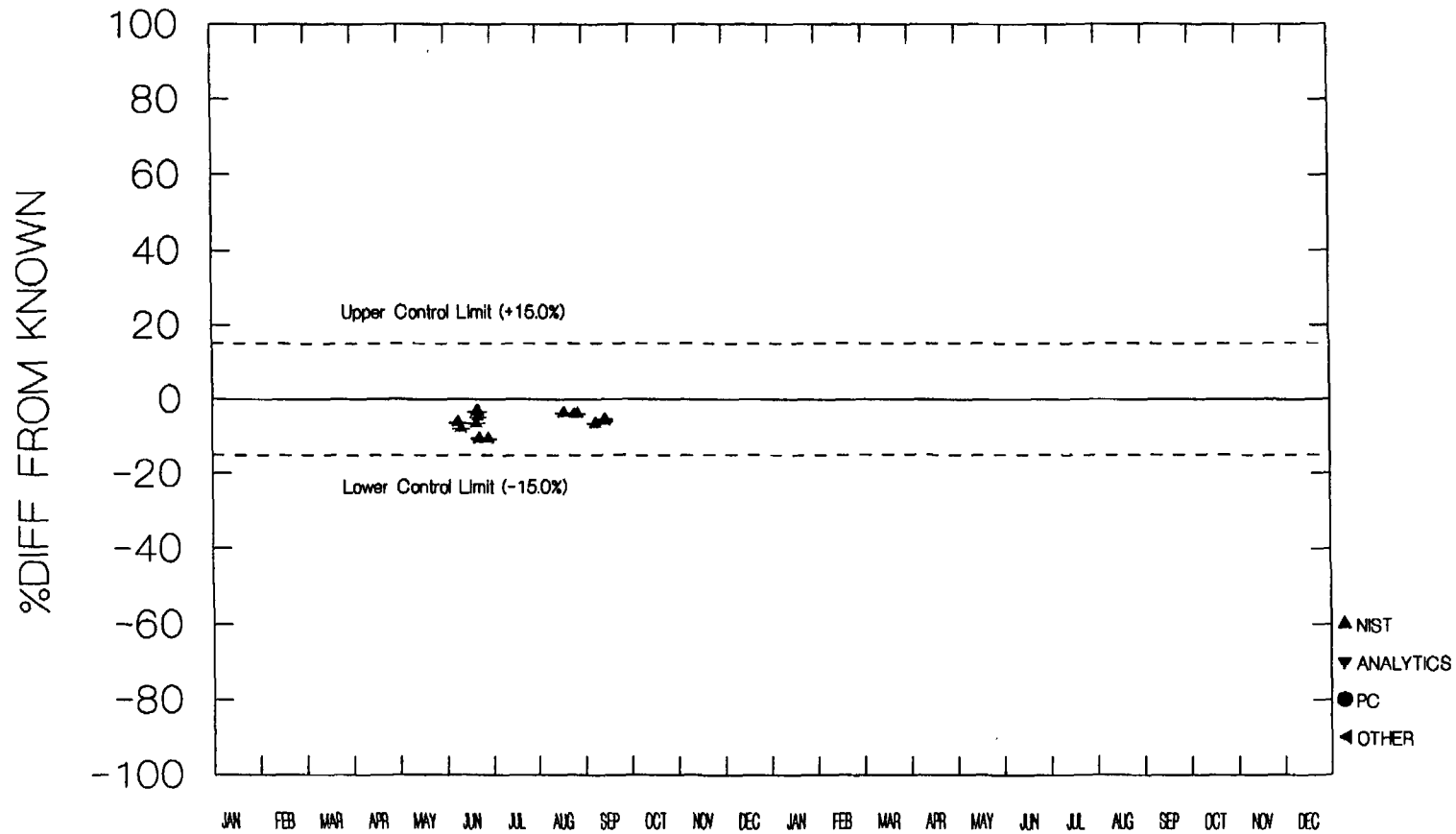
PART 50/61 GROSS BETA RESULT BIAS



ANALYSIS PERIOD 2004-2005

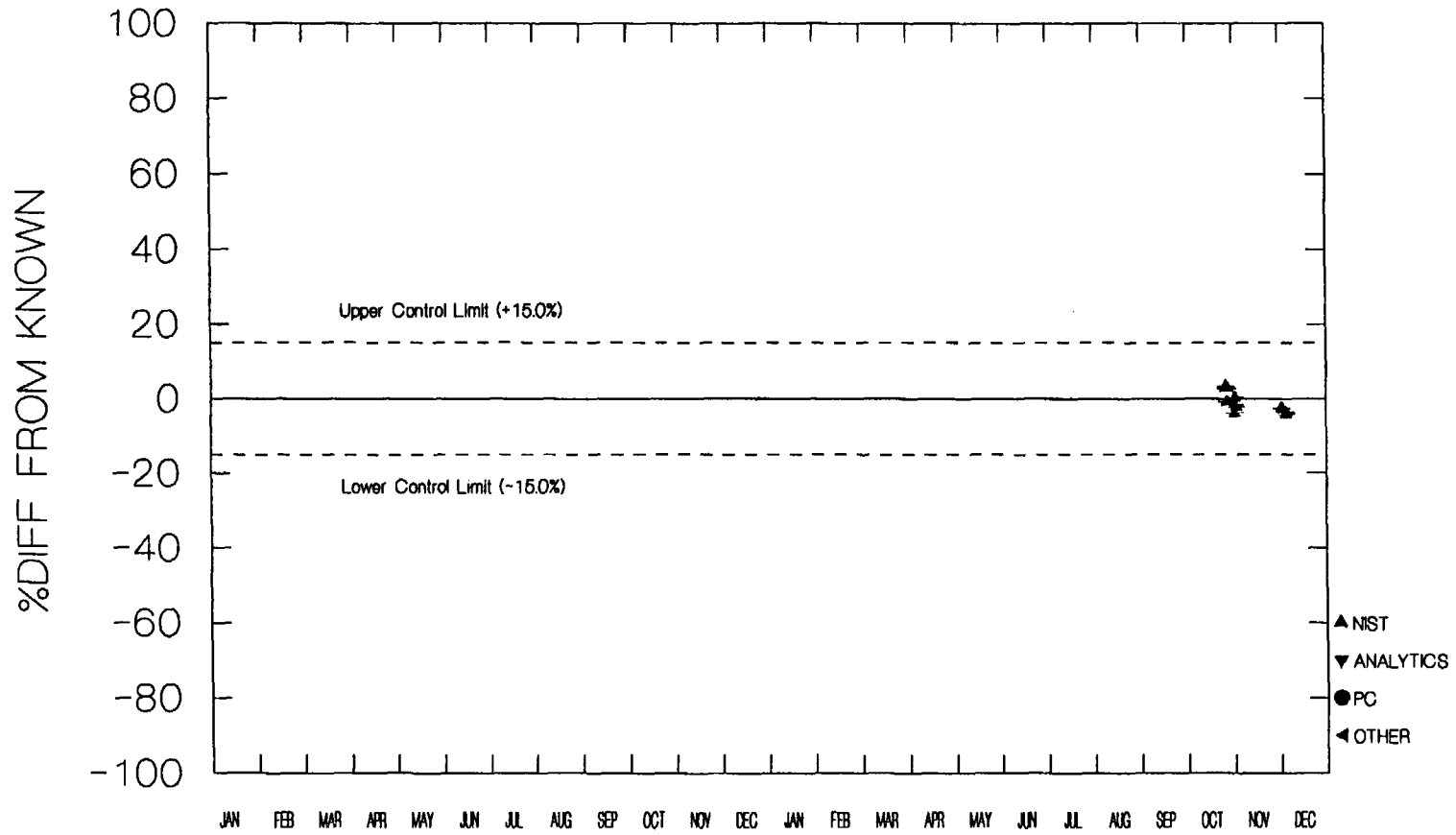
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

PART 50/61 Cd-109 RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

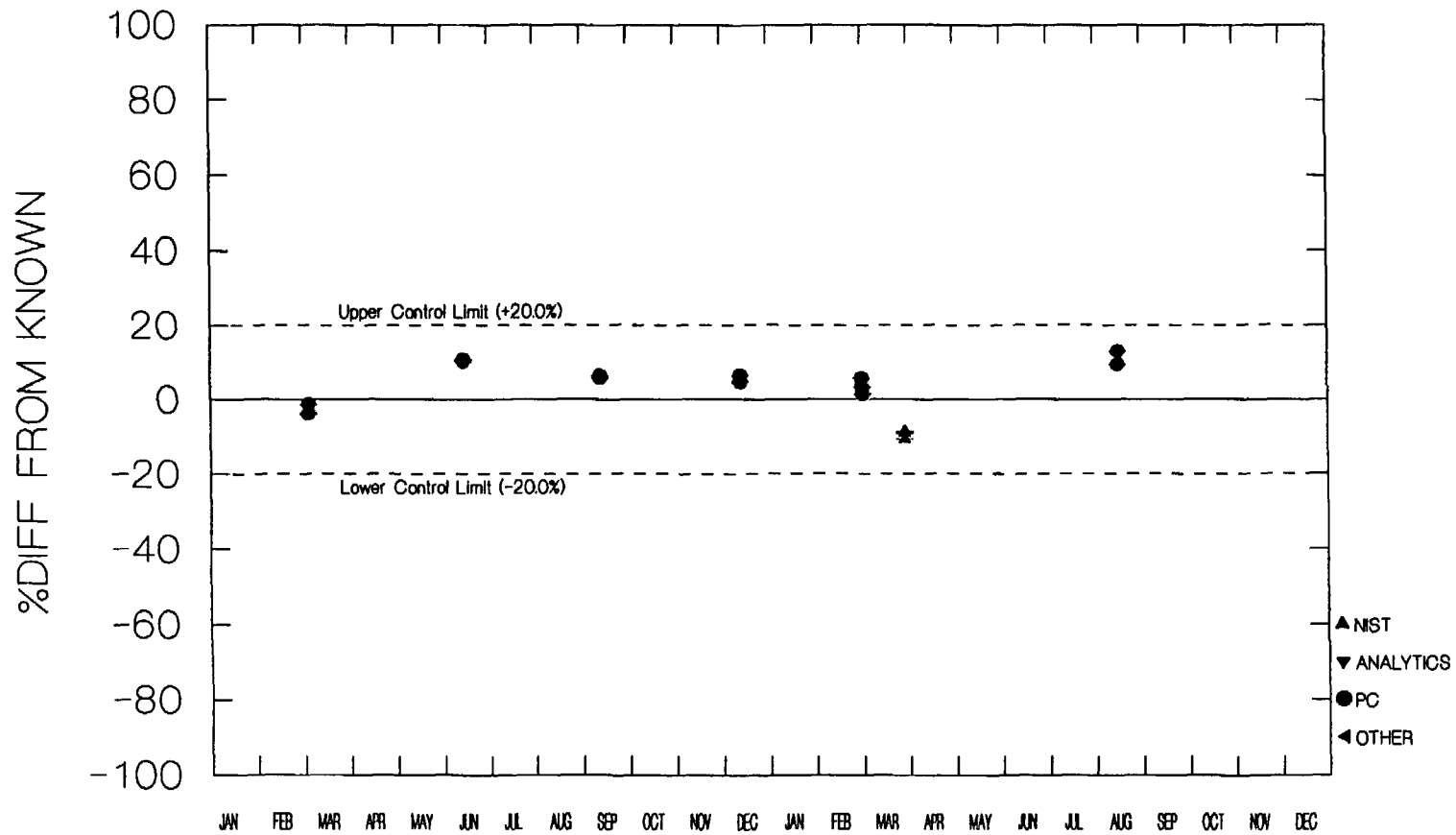
PART 50/61 Ce-141 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

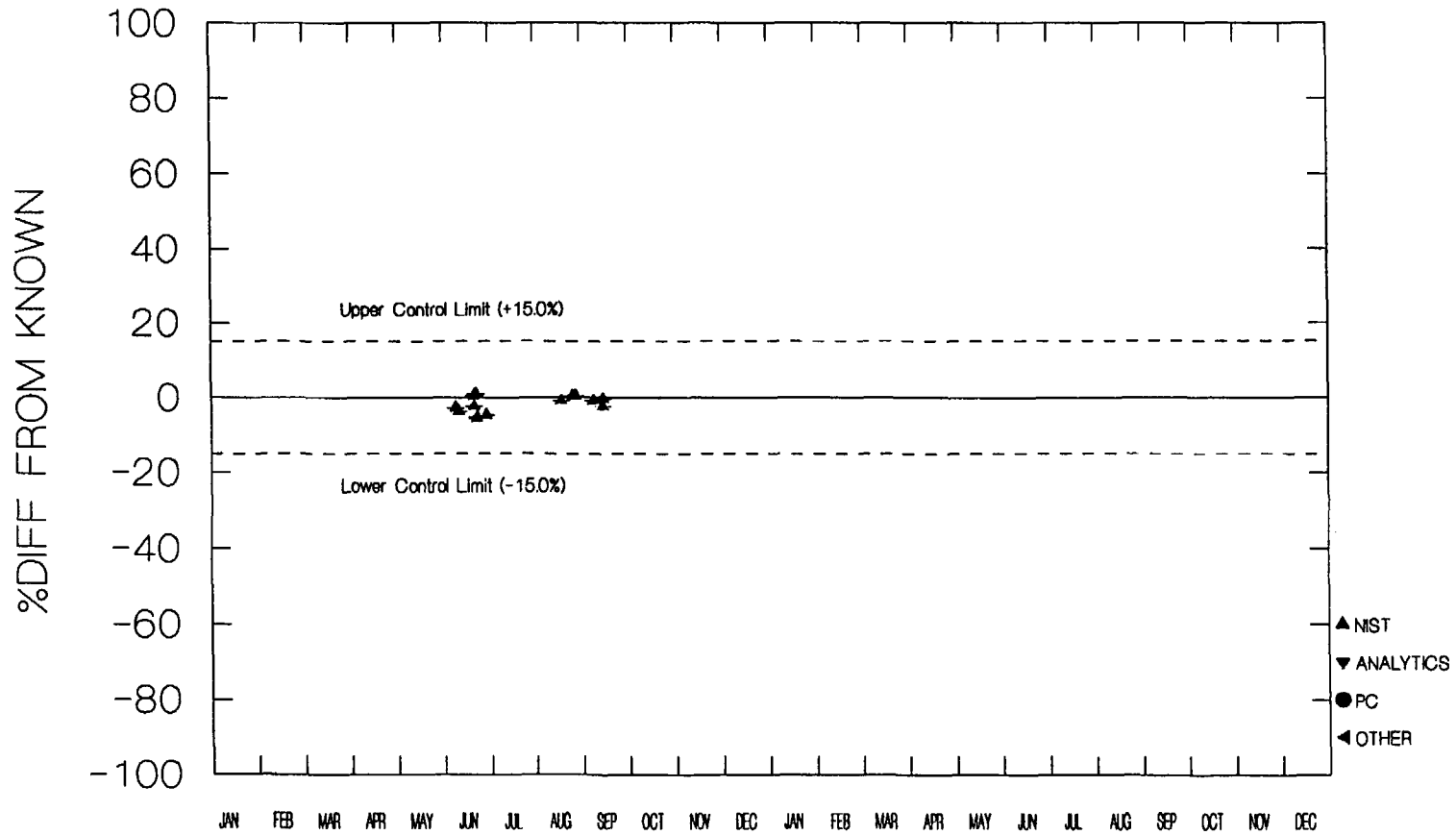
PART 50/61 Cm-243/244 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

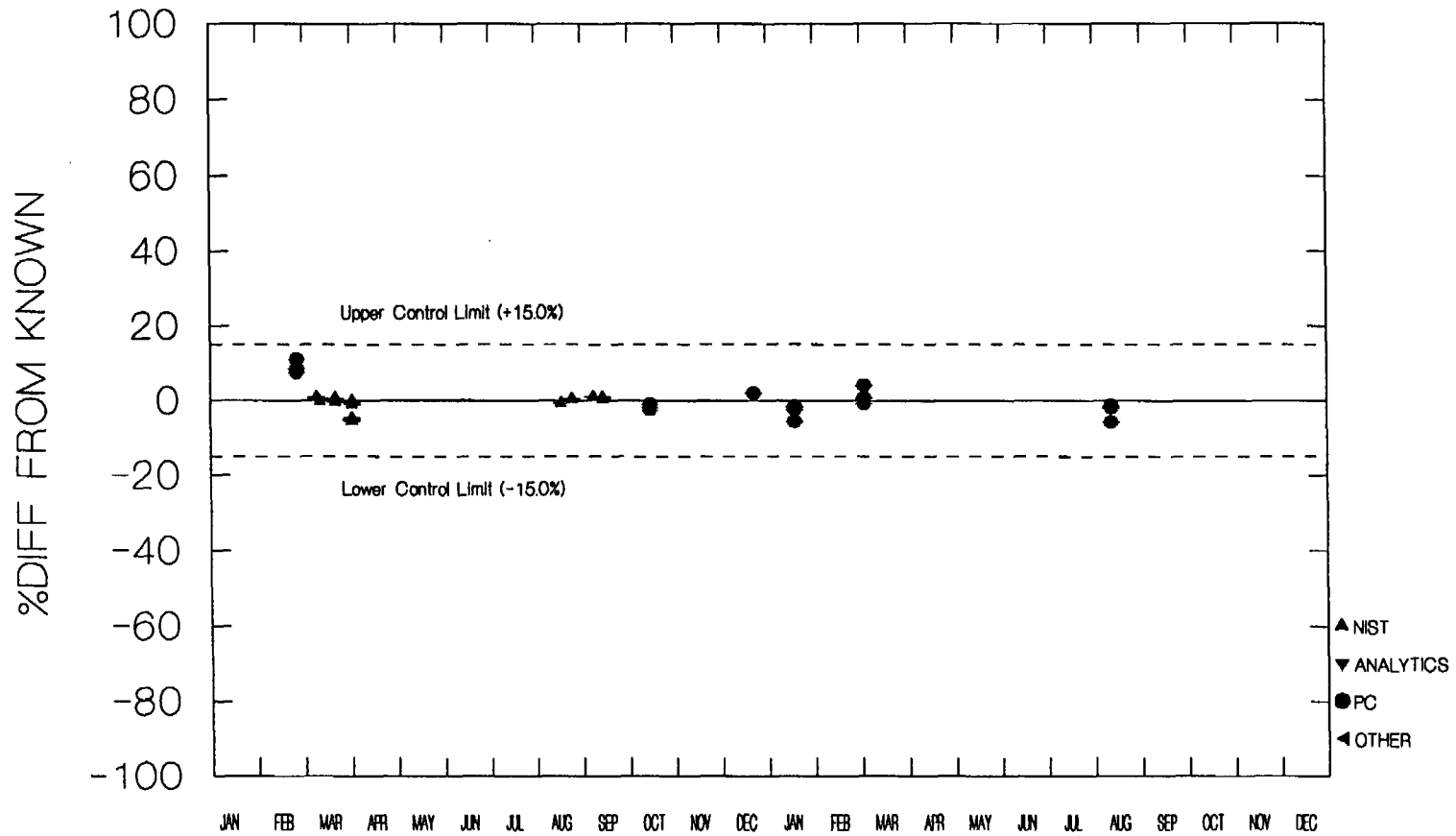
PART 50/61 Co-57 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

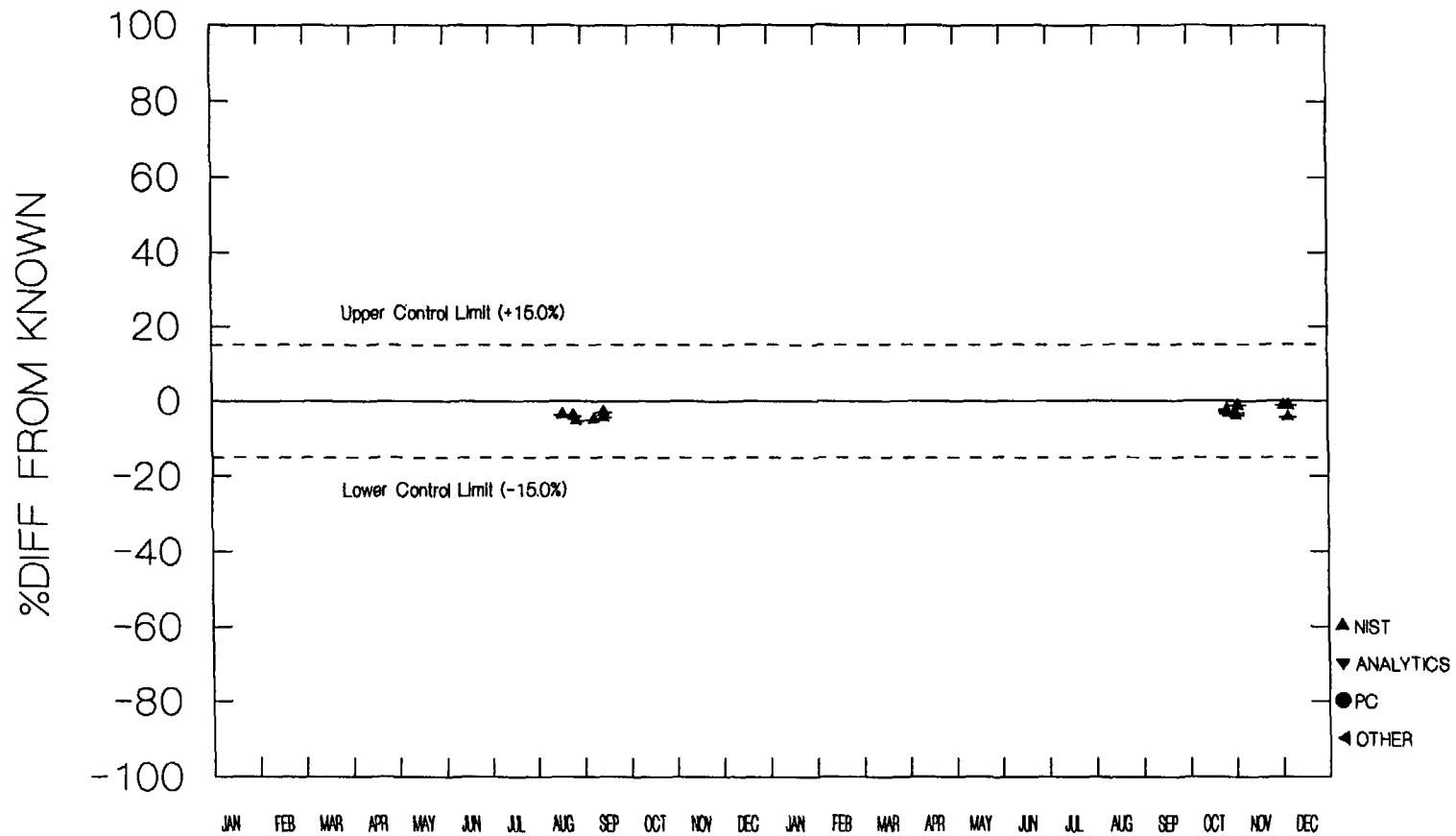
PART 50/61 Co-60 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

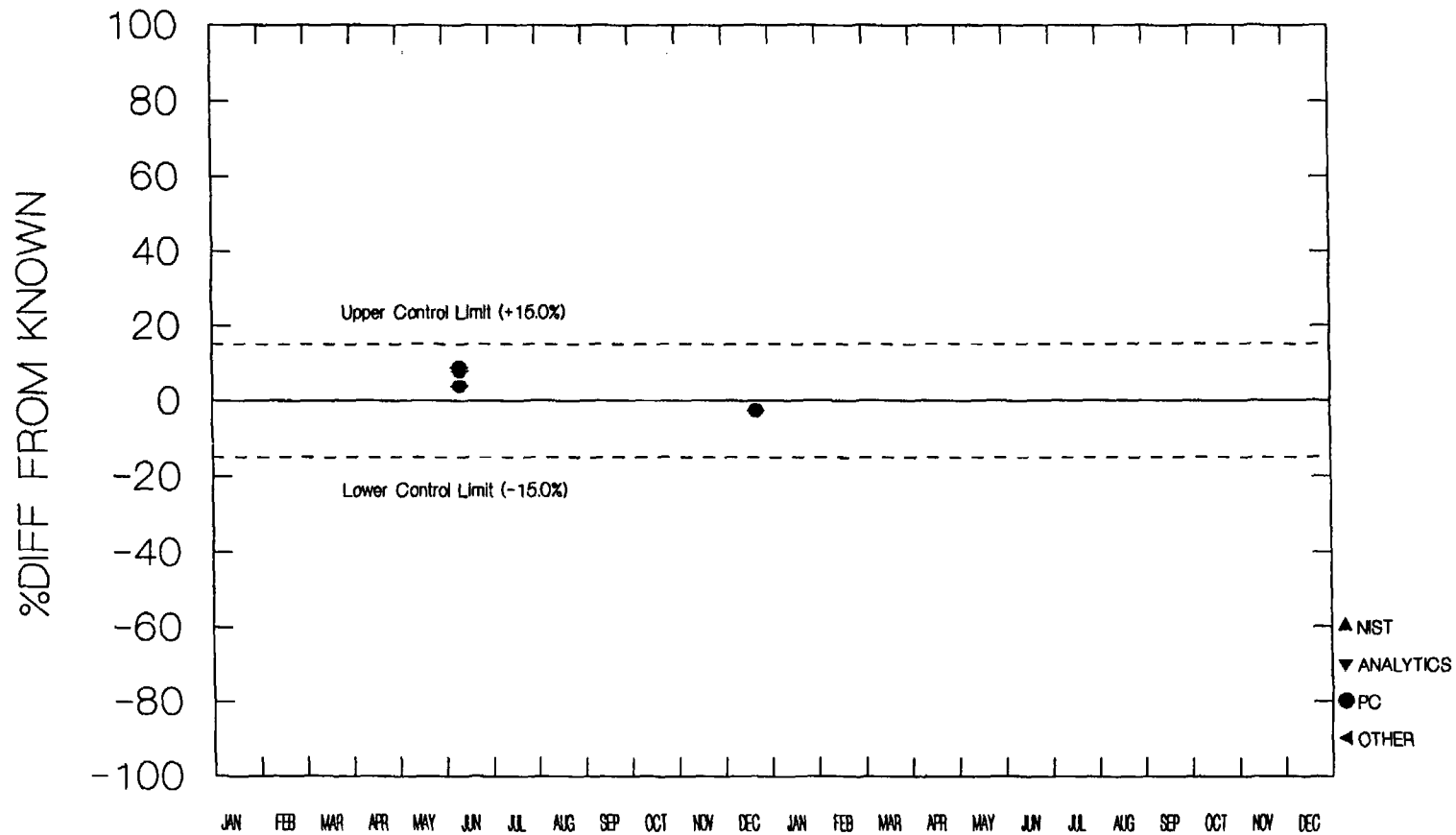
PART 50/61 Cs-134 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

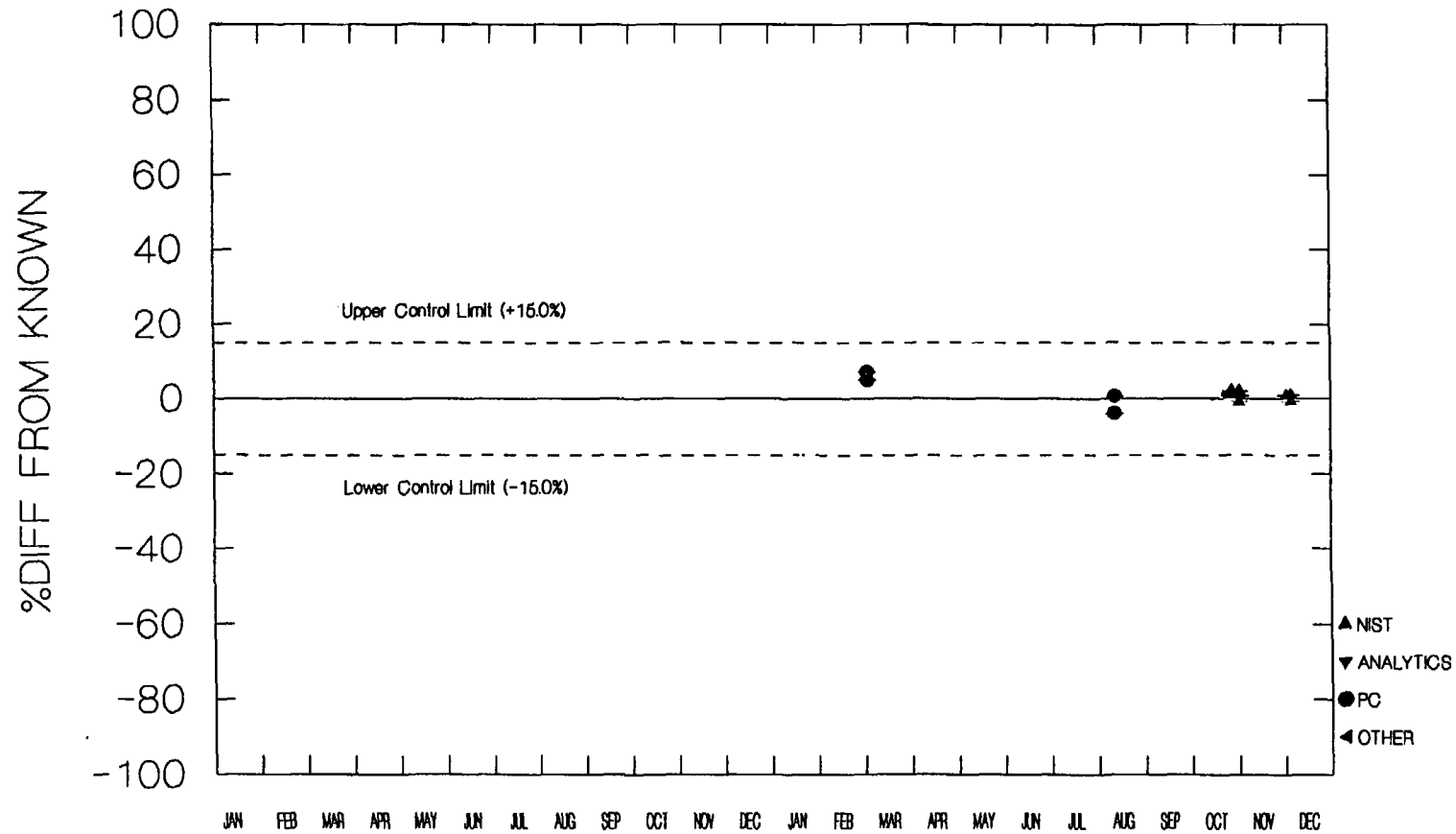
PART 50/61 Cs-137 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

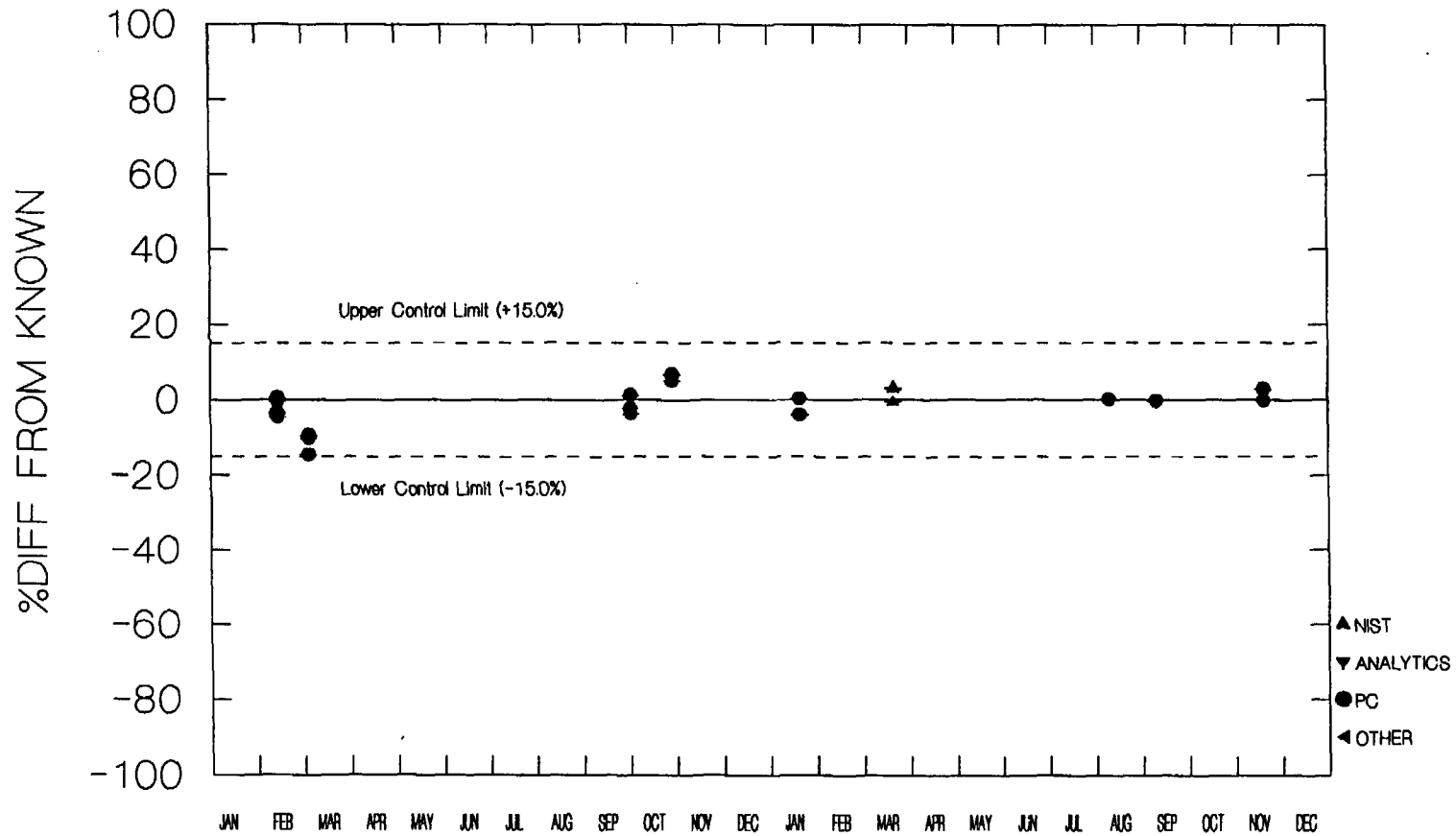
PART 50/61 Fe-59 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

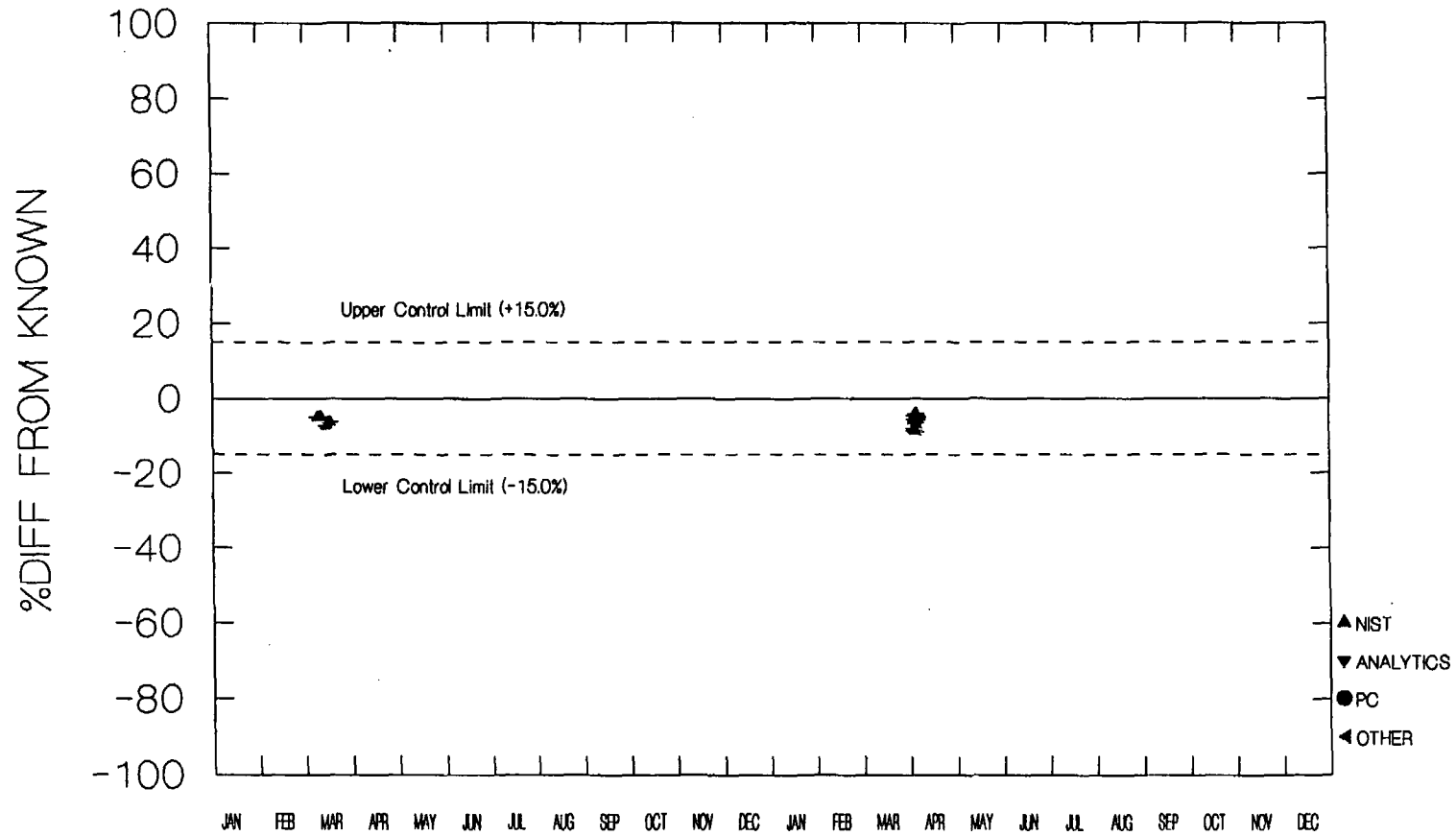
PART 50/61 H-3 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

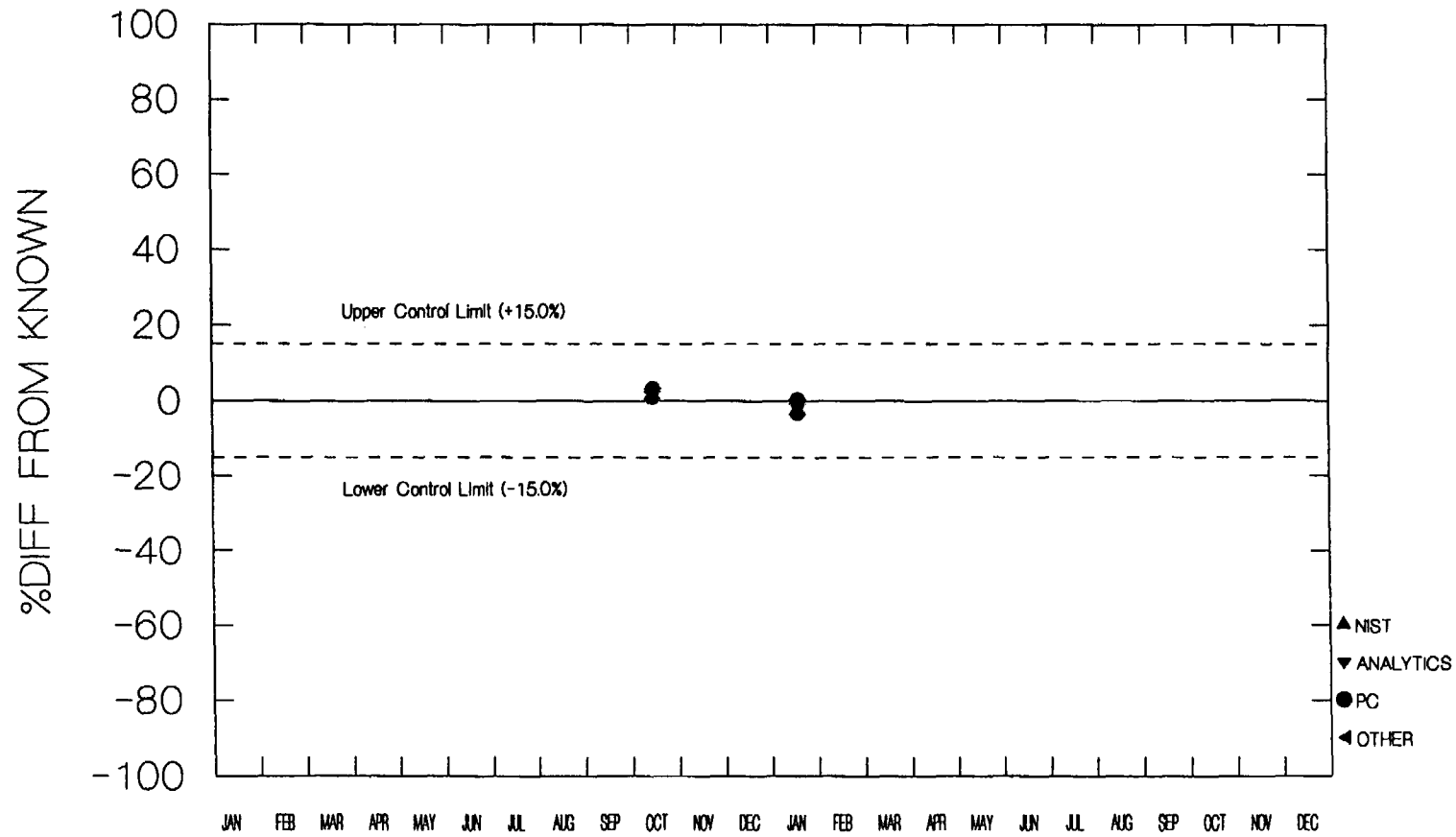
PART 50/61 I-131 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

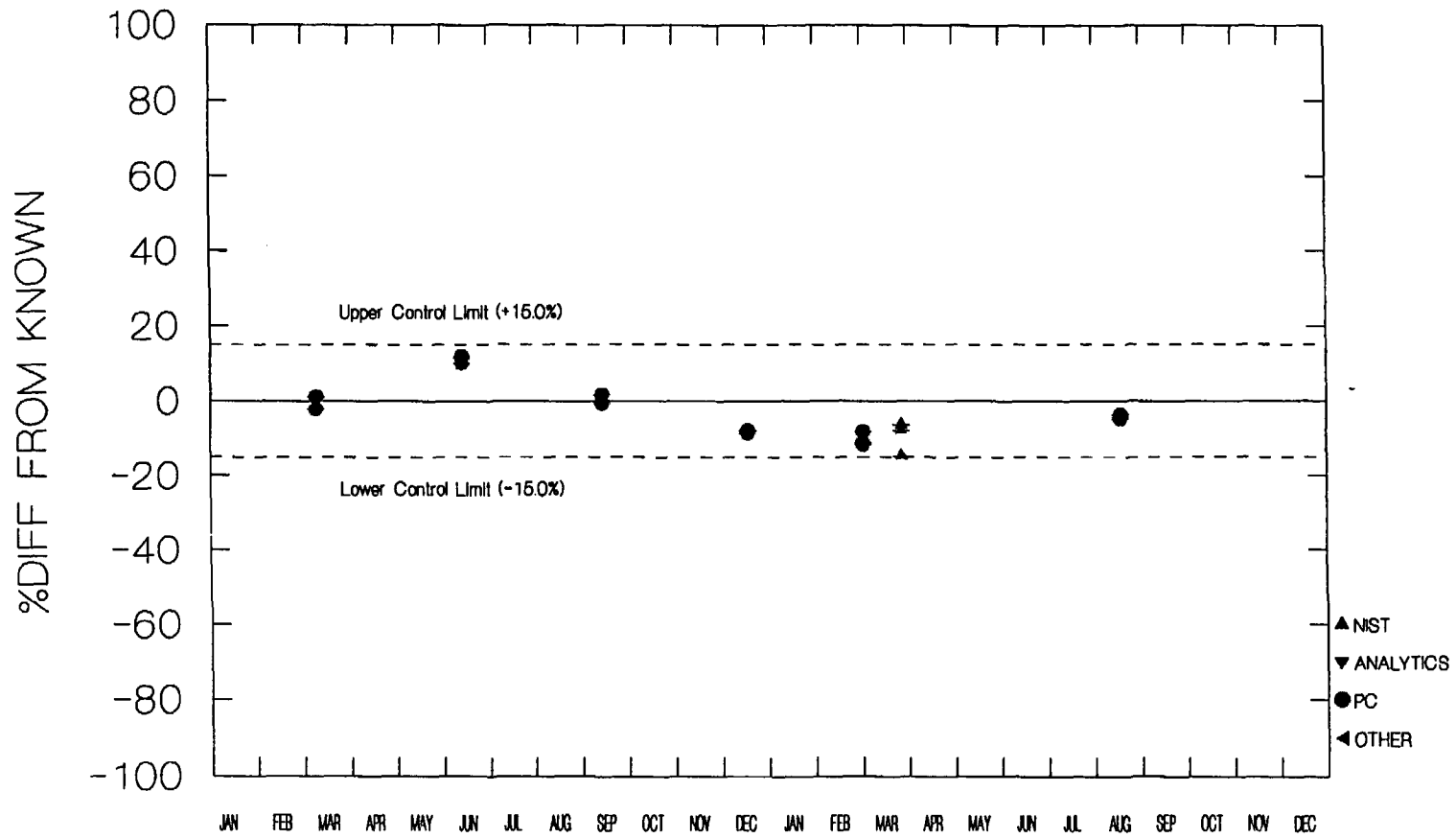
PART 50/61 Mn-54 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

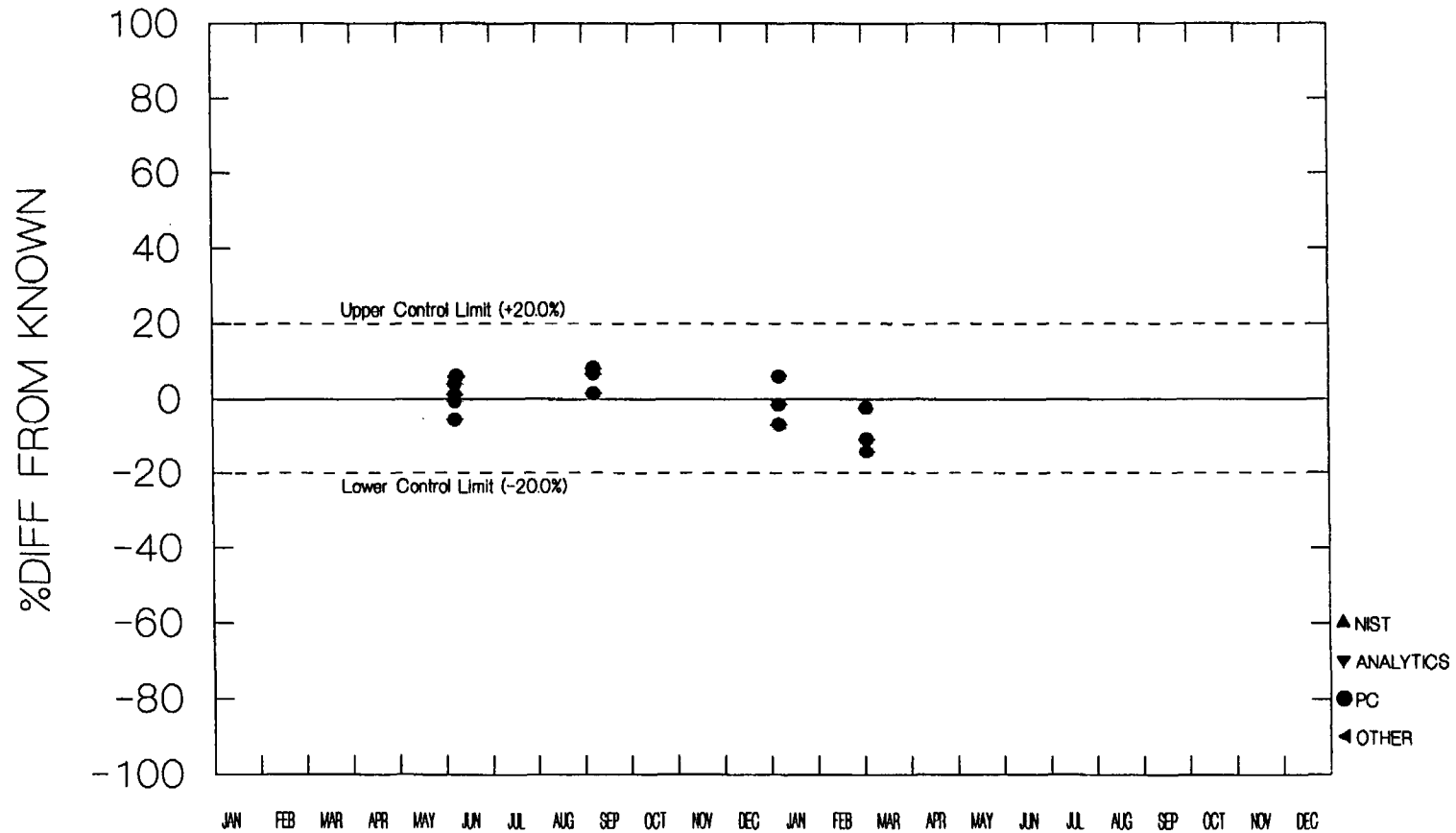
PART 50/61 Ni-63 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

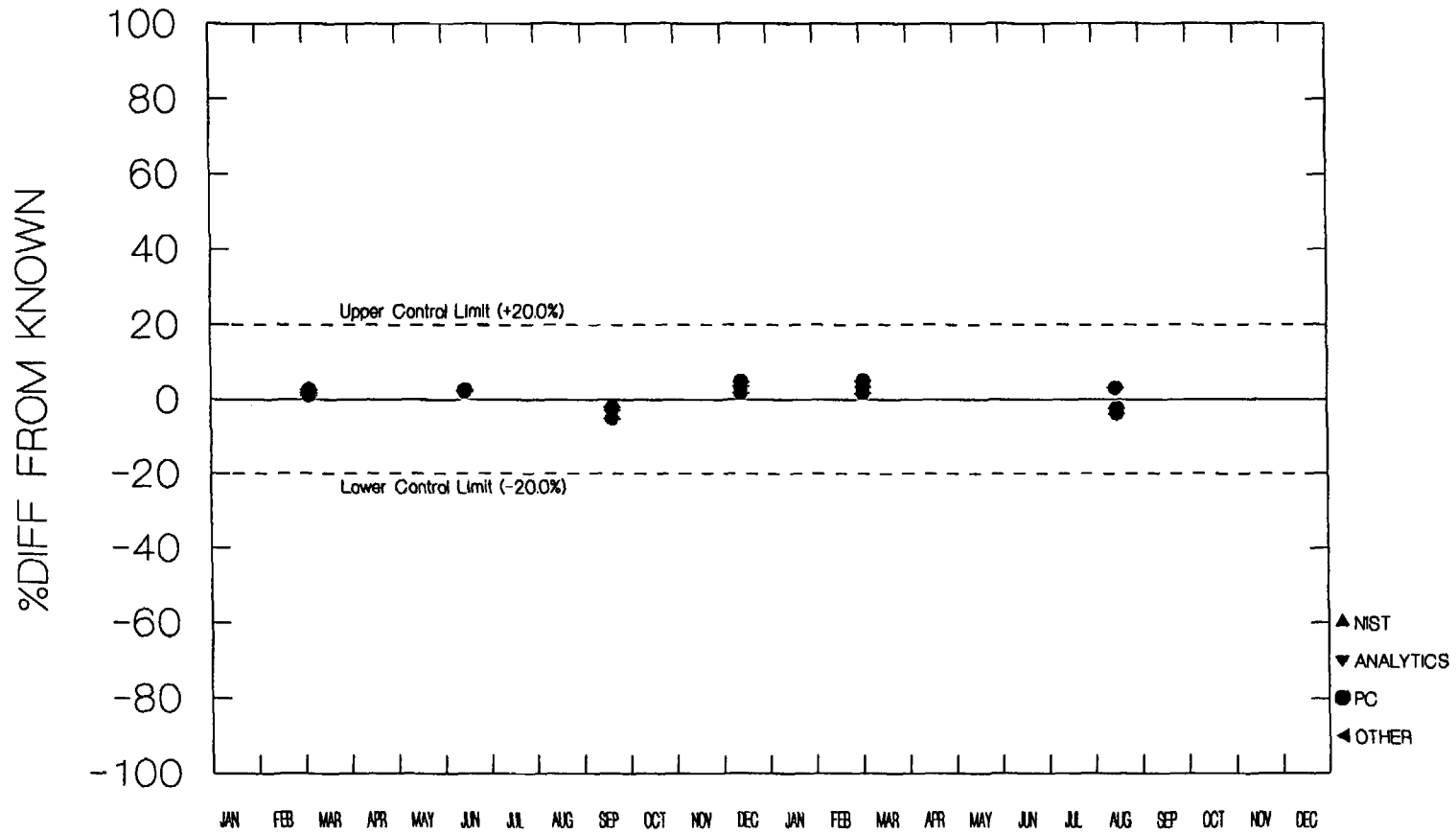
PART 50/61 Np-237 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

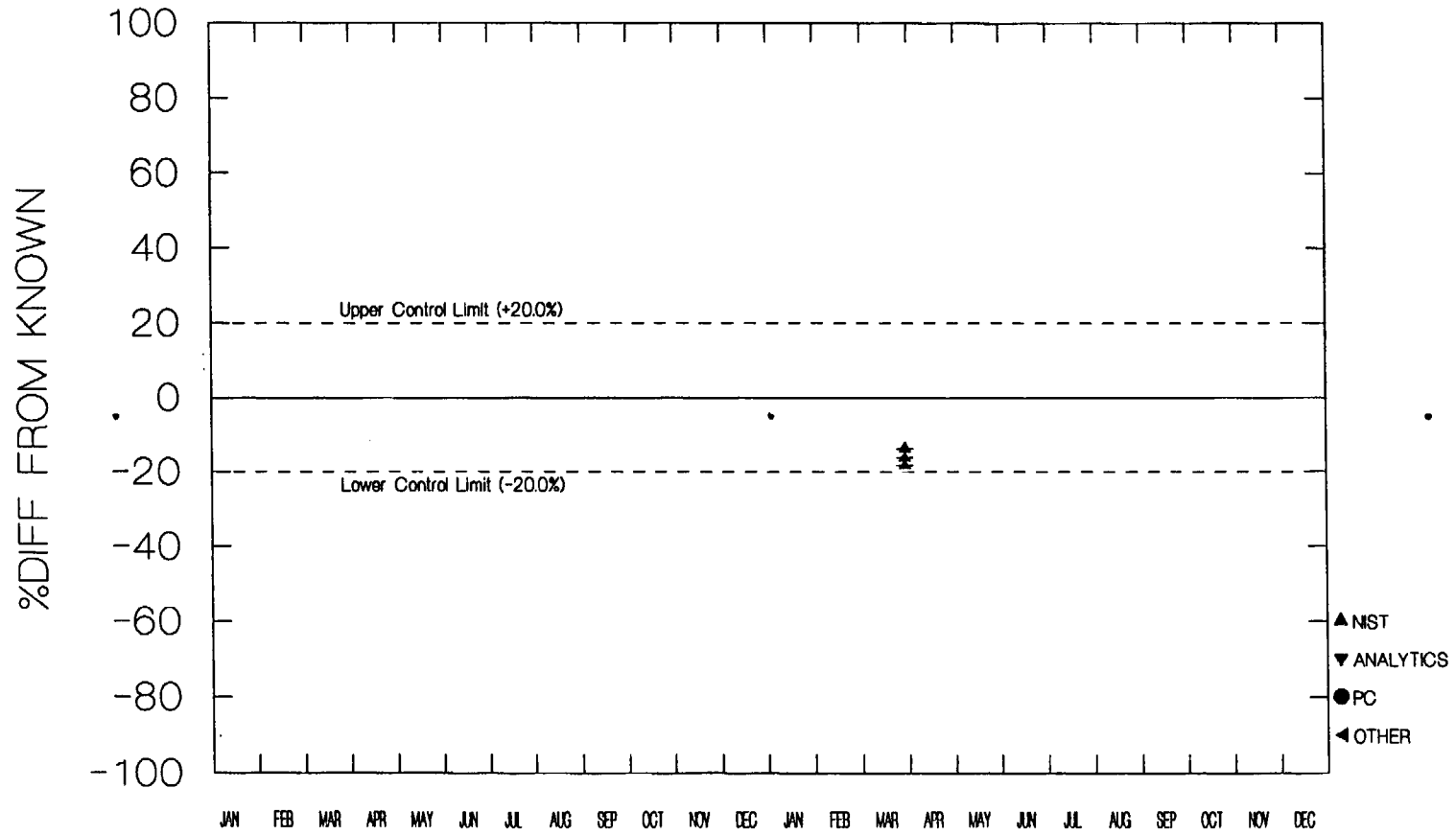
PART 50/61 Pu-238 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

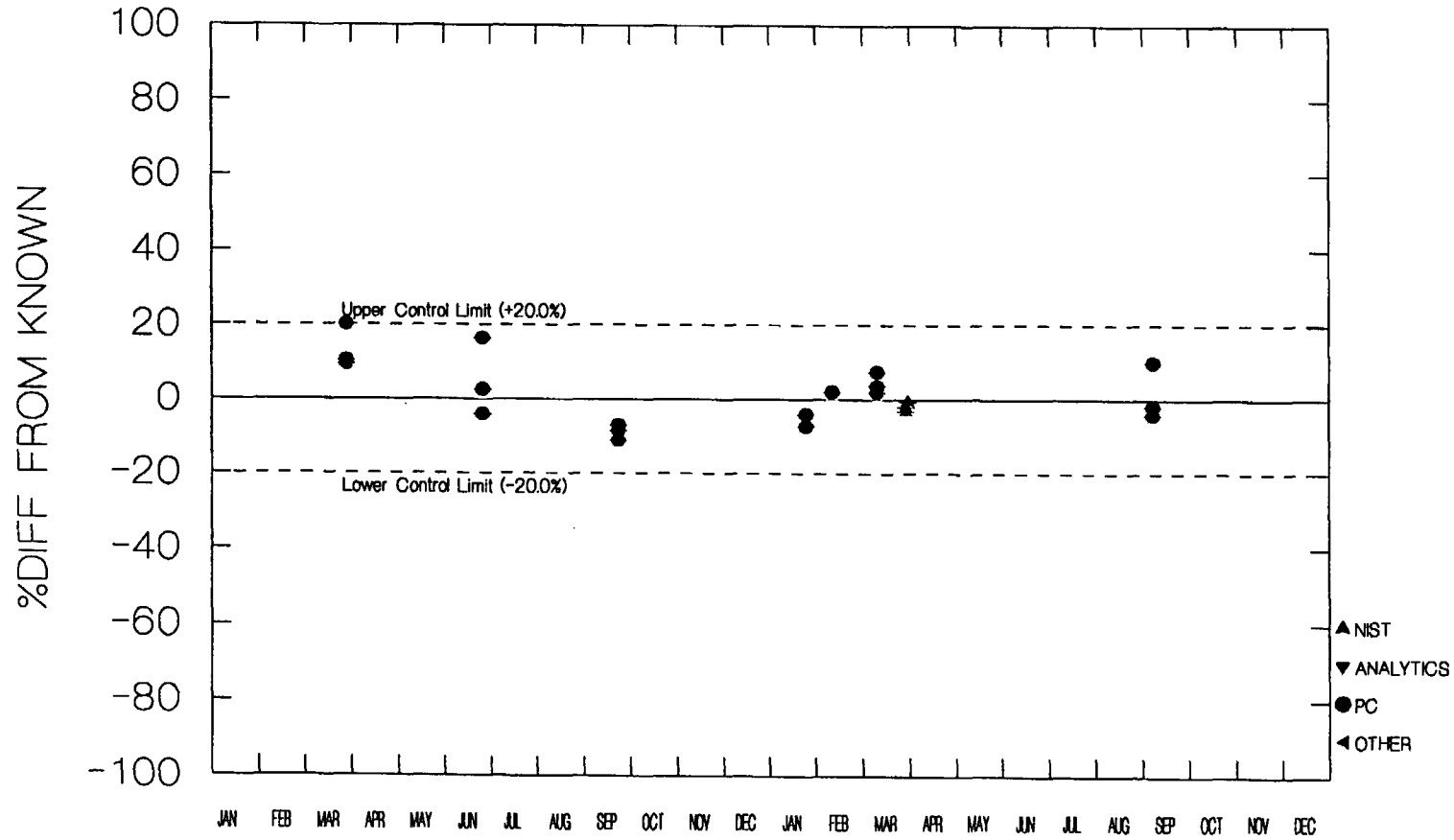
PART 50/61 Pu-239 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

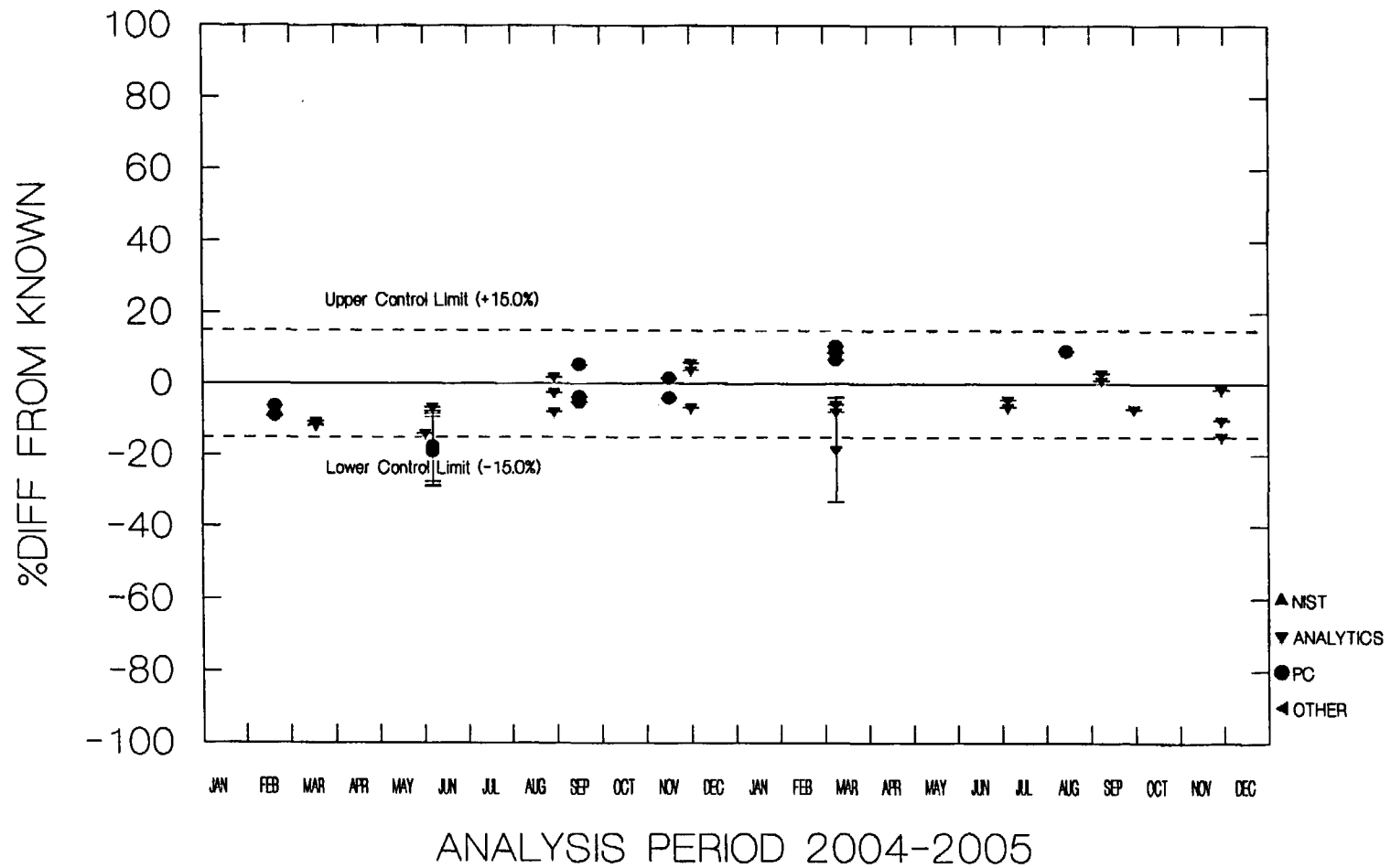
PART 50/61 Pu-241 RESULT BIAS



ANALYSIS PERIOD 2004-2005

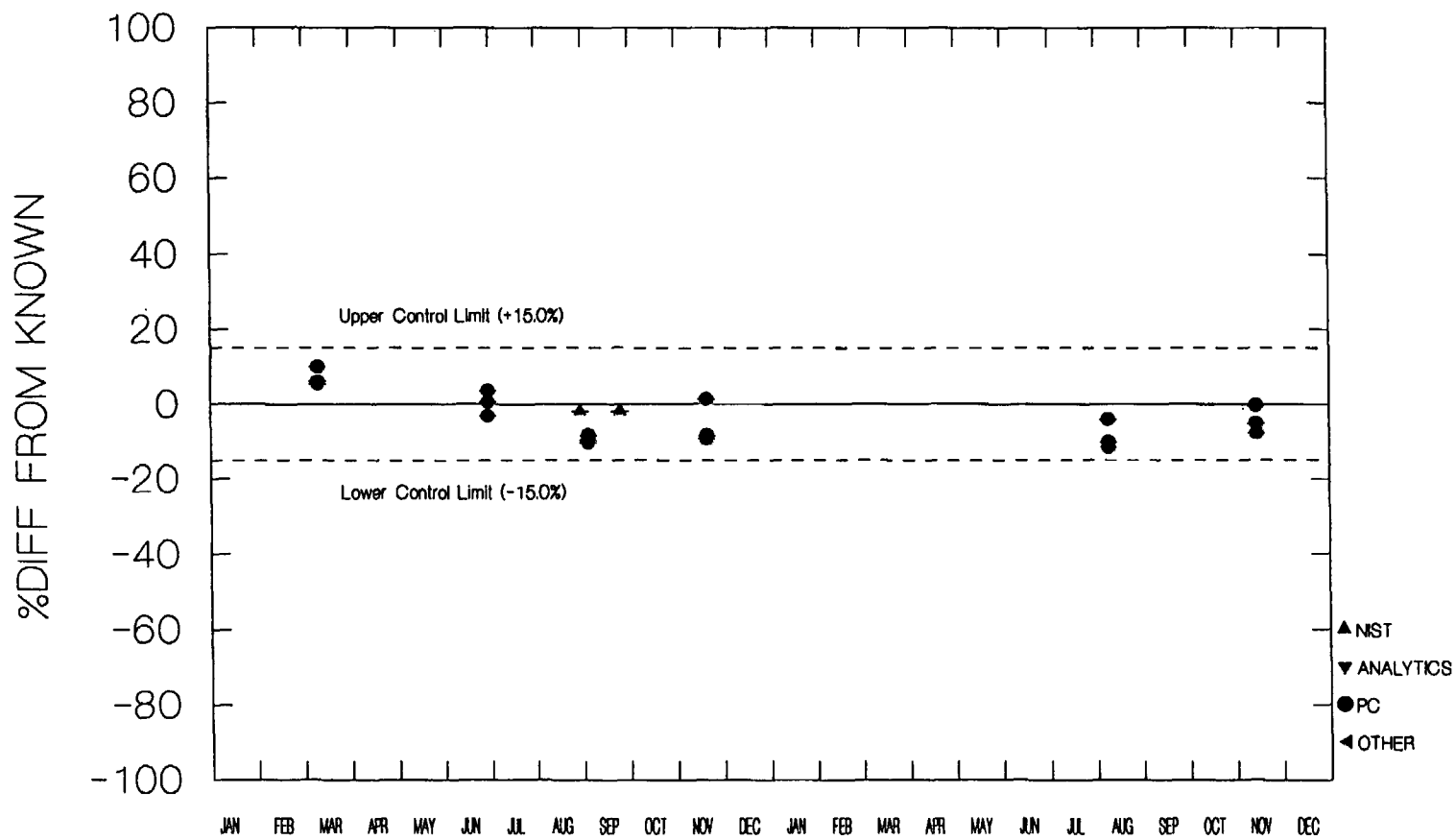
2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

PART 50/61 Sr-90 RESULT BIAS



2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

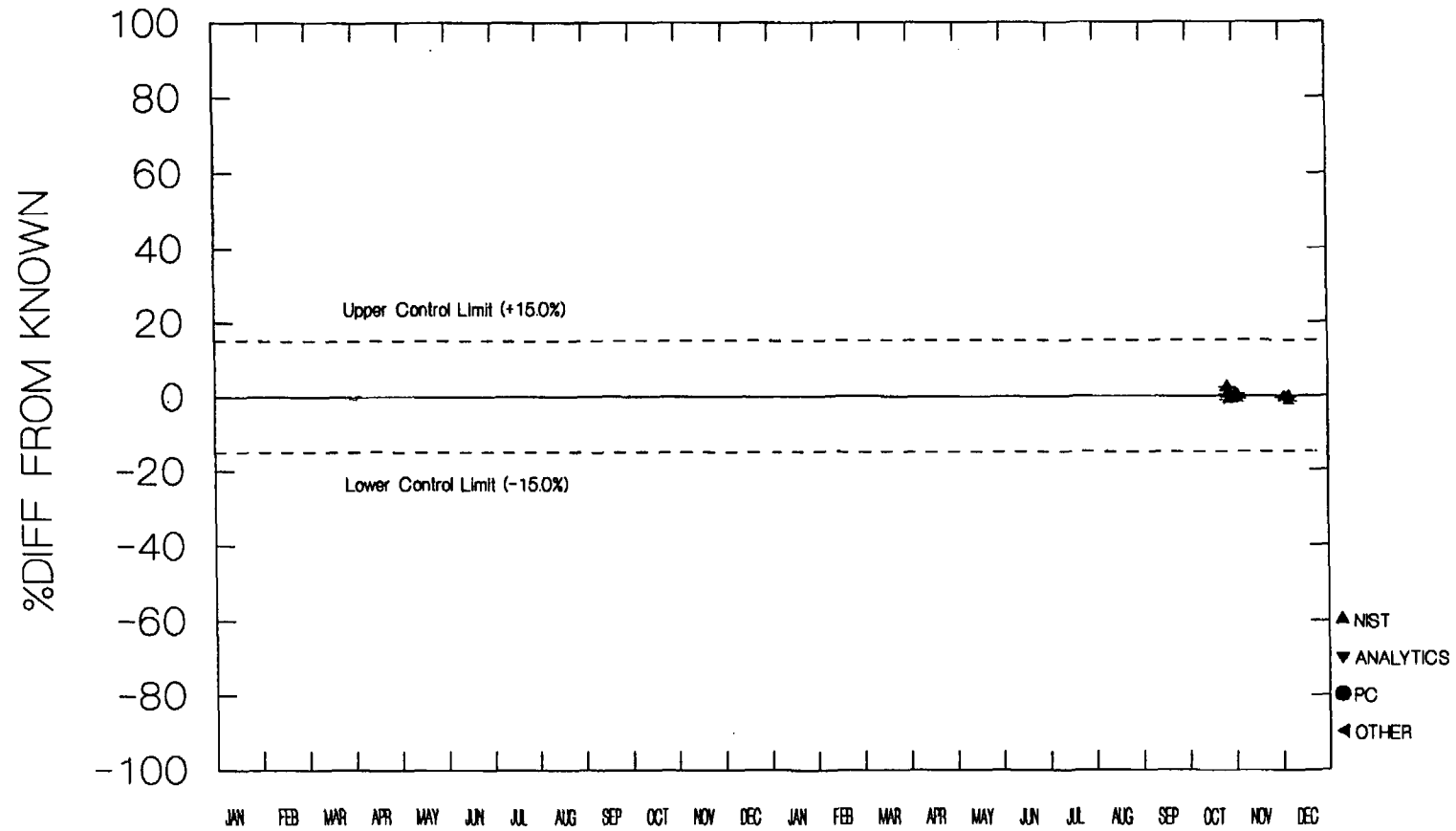
PART 50/61 Tc-99 RESULT BIAS



ANALYSIS PERIOD 2004-2005

2004-2005 QUALITY ASSURANCE TRENDING ANALYSIS

PART 50/61 Zn-65 RESULT BIAS



APPENDIX C

BIOASSAY QUALITY CONTROL PROGRAM RESULTS

There are no charts for the bioassay quality control program for this semi-annual report period.

ATTACHMENT 1

RESULTS OF THE LABORATORY BLIND DUPLICATE PROGRAM



February 2, 2006
EL 023/06

Distribution

Subject: Second Half of 2005, Blind Duplicate Program Results

The Framatome ANP Environmental Laboratory (E-LAB) participates in a Blind Duplicate Program administered by the participating utility companies. For the second half of calendar year 2005, 99.5% of the paired sample measurement results were within the program's criteria for acceptance.

The Blind Duplicate Program began in 1979 as a cooperative effort among the participating companies. Samples are collected and split in the field and submitted to the E-LAB for analysis. The E-LAB Quality Assurance Officer verifies and reports the program results to the participants. The results are evaluated against the E-LAB acceptance criterion established in Reference 1, which states that a paired measurement is in agreement if the individual values are within $\pm 15\%$ of the mean value. If this condition is not met, a two-sigma range is established for each of the results, which are in agreement if the two ranges overlap.

Table 1 summarized the types of media submitted as part of the Blind Duplicate Program by each participant for a total of 21 paired samples.

Table 2 presents the results of the Blind Duplicate Program by analysis type for each participating company. For the second half of 2005 program, 99.5% of the paired measurements met the acceptance criteria as specified in Reference 1. The number of paired measurements falling outside the acceptance criteria is listed before the dash (/) in each company column. For example, the number 1/2 should be interpreted as 1 paired measurement out of 2 falling outside the acceptance criteria. Totals are presented for each participating company as well as for the entire program.

REFERENCES

1. Framatome ANP Environmental Laboratory Manual 100, "Laboratory Quality Assurance Plan," Revision 9, November 16, 2005.



Christopher Shelton
Quality Assurance Officer
Framatome ANP Environmental Laboratory

CAS/cas

Attachment

Distribution:

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E. Mercer (MY)
D. Montt (YR)

J. Pelczar
D. Perkins (SB 02-12)
E. Moreno

M. Strum

Table 1

Summary of Paired Samples Submitted July through December 2005

| Sample Media | Yankee Atomic | Maine Yankee | Seabrook Station | Total |
|---------------|---------------|--------------|------------------|-------|
| Ground Water | 2 | 0 | 0 | 2 |
| Surface Water | 3 | 4 | 8 | 15 |
| Algae | 0 | 0 | 2 | 2 |
| Mussel | 0 | 0 | 2 | 2 |
| Total | 5 | 4 | 12 | 21 |

Table 2

Summary of Paired Measurements Analyzed July through December 2005⁽¹⁾

| Analysis Type | Yankee Atomic | Maine Yankee | Seabrook Station | Total |
|----------------------|---------------|--------------|------------------|-------|
| Gamma ⁽²⁾ | 1/130 | 0/52 | 0/208 | 1/390 |
| Gross Beta | 1/5 | 0/0 | 0/0 | 1/5 |
| Tritium | 0/5 | 0/2 | 0/4 | 0/11 |
| Total | 2/140 | 0/54 | 0/212 | 2/406 |

(1) The number of measurements that fail to meet the acceptance criteria is shown before the slash.

(2) The gamma numbers represent the total radionuclide measurements in a gamma isotopic analysis.

Appendix G
Meteorological Data

***Fermi 2 - 2005 Annual
Radioactive Effluent Release and
Radiological Environmental Operating Report***

In accordance with Section 5.9.1.8 of the Fermi 2 Offsite Dose Calculation Manual (ODCM), a summary file of required meteorological data for 2005 is retained on site and available upon request.