U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-219/94-09

Docket No. 50-219

License No. DPR-16

Licensee: GPU Nuclear Corporation
1 Upper Pond Road
Parsippany, New Jersey 07054

Facility Name: Oyster Creek Nuclear Generating Station (OCNGS)

Inspection Period: April 18-22, 1994

Inspector: Lonny Eckert, Radiation Specialist — 5/5/94 Date

Approved By: Dr. Robert Bores, Chief, Facilities Radiation Protection Section — 5/12/94 Date

Areas Inspected

Inspection of the licensee's radiological protection programs during normal operations including: quality assurance audits and surveillances, training (in radwaste and transportation requirements) and qualifications of personnel, the radwaste organization, implementation of the radwaste program, and radioactive material shipping records.

Results

The quality assurance and radwaste training programs were well implemented. The radwaste organization was staffed with a stable work force of well qualified individuals in the radwaste and transportation area. The radwaste program was, in general, well implemented.

DETAILS

1.0 Personnel Contacted

1.1 Station Personnel

W. Barkoczy, Group Radwaste Shipping Supervisor (GRWSS)
* J. Barton, Director Oyster Creek Nuclear Generating Station (OCNGS)
* W. Collier, Acting Radwaste Programs Manager (RWPM)
* W. Cooper, Radiological Engineer
* B. DeMerchant, OCNGS Licensing Engineer
J. Derby, ALARA[1] Supervisor
* R. Hillman, Radwaste Operations Manager
* S. Levin, Director, Operations and Enforcement
* R. Shaw, Radiological Controls Director (RCD)
J. Stump, Radiological Engineer
* P. Thompson, Site Audit Manager
A. Wacha, Radwaste Programs Manager
K. Wolf, Manager, Radiological Controls Operations

Other licensee personnel were contacted during the inspection.

1.2 NRC Personnel

* R. Bores, Chief, Facilities Radiation Protection Section
* L. Briggs, Senior Resident Inspector
* J. Joyner, Chief, Facilities Radiological Safety and Safeguards Branch
* S. Pindale, Resident Inspector

* Denotes attendance at the exit meeting.

2.0 Open Items

Closed. (IFI 94-05-01) Internal Exposure Control Program Issues

- Licensee Procedure 6630-ADM-4025.01, "Bioassay Procedure", was revised (to Revision 6) to require achievement of a minimum detectable activity (MDA) level of 1 picoCurie/gram. Also, Step 7.3.2.4 was added to direct Radiological Engineering review regarding the frequency and number of bioassay samples.

- Licensee Radiological Engineering Calculation 94-001, "Alpha Bioassay Requirements", was conducted to determine the need for α bioassay based on air sample results. This study concluded that a reference man (ICRP 23) would need to be subjected to about 13 derived air concentration (DAC) hours before an α bioassay

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[1] As Low As Reasonably Achievable

could demonstrate an uptake of radioactive materials. Several assumptions went into this calculation including: all radioactive materials transported to the gastrointestinal tract would be excreted; the air sample would be exactly representative of intake; and the individual's intake of radioactive materials was 5 DAC-hours.

As noted in NRC Inspection Report 50-219/94-05, evaluation levels (defined in Regulatory Guide 8.9) were established at 10 mrem in any day and 50 mrem in a calendar week committed effective dose equivalent (CEDE). These evaluation levels also hold for internal exposures due in large part from α-emitting radionuclides. Rather than conducting additional whole body counts or fecal analysis when an evaluation level is reached, the licensee intends to attempt validation of the representativeness of air samples taken in the locale and time of the intake and assign CEDE by engineering calculations. In other words, if the initial whole body count and air sample spectral analysis results for gamma bearing radionuclides show good correlation, the air sample would be considered representative and, therefore, an engineering calculation would be performed to determine CEDE.

The licensee sent air samples taken in the Old Radwaste Building (ORW) to be isotopically characterized by a vendor laboratory in order to confirm the validity of the calculated gross α DAC. As noted in NRC Inspection 50-219/94-05, the gross α DAC was calculated to be 5 E-12 μCi/cc based on spent filter media and spent resin samples. The independent analysis showed that no α-emitting radioisotope (Pu-238, Pu-239, U-238, Am-241, etc.) was present in airborne concentration levels with greater than 1 E-12 μCi/cc. There is at least six orders of magnitude difference between these concentration levels and those found in spent filter media and/or spent resin. In conclusion, the established gross α DAC is conservative.

The inspector concluded that the licensee has established sufficient monitoring of the internal exposure control program to ensure that it is being effectively implemented in regards to work conducted in ORW.

3.0 Audits and Appraisals

Technical Specification (TS) 6.5.3.1 requires that the process control program and implementing procedures for radioactive wastes be audited at least once per 24 months. Licensee Audit S-OC-93-10 was reviewed. In practice, the Quality Assurance Department has been auditing this program area on an annual frequency but is generally focusing their efforts narrowly in order to increase the depth of review. Audit S-OC-93-10 focused on radwaste management activities. The audit was conducted August 12, 1993 through September 16, 1993.

This audit reviewed the following aspects of management control: training, organization/ procedure control, radwaste services/control requirements, radwaste shipment, radwaste packaging, waste classification, radwaste operations, waste minimization, corrective actions, Quality Assurance (QA) monitoring, and Low Level Radwaste Storage Facility (LLWSF). The audit report noted instances of minor deficiencies in radwaste operator shift turnovers. A performance finding was also issued to the Manager, Radwaste Operations because no in-plant training had been provided to radwaste operators (RWOs) since 1991. (See Section 5.2 of this report on training pertaining to the preparation of radioactive waste/material shipments.) The amount and type of in-plant training are decided by the Manager, Radwaste Operations. The inspector discussed this matter further with the Manager, Radwaste Operations. The Manager, Radwaste Operations stated that it was his intent to complete all or most job performance measures (JPMs) for the established biennial requalification program. He also informed the inspector that it was his goal to have RWOs complete a JPM each month. It is important to note that there had been little turnover of radwaste operations personnel.

Several QA surveillances were also reviewed. Most of the surveillances reviewed dealt with shipment preparation. Of the surveillances reviewed, no significant discrepancies relating to shipment preparation were noted by QA Monitoring. The surveillance program was found to be effective in augmenting the biennial audit required by TS since QA monitoring activities are mainly performance-based in nature.

When viewed with the previous audit, licensee auditing of the radioactive waste program was thorough and, where possible, performance based in nature. The licensee's audit and appraisal program was considered good.

4.0 Radwaste Organization

The Manager, Radwaste Operations continued to head the radwaste organization. The radwaste and transportation program remained split into two functional areas; radwaste operations and radwaste shipping. These functional areas were overseen by the Radwaste Engineer and the Radwaste Programs Manager, respectively.

The Radwaste Engineer was supported by several Group Radwaste Shift Supervisors (GRSSs) and Radwaste Operators (RWOs). The RWPM continued to be supported with three Group Radwaste Shipping Supervisors (GRWSSs), a Radwaste Shipping Clerk, and three CNSI contractor employees.

At the time of the inspection, the Radwaste Programs Manager (RWPM) was temporarily reassigned to serve on the Radwaste Improvement Study Group (RWISG), a radioactive waste reduction committee. One of the GRWSSs was assigned to act as RWPM in the interim. The acting RWPM served in the capacity of a radiological controls technician (~3 years), a Station Service Foreman (1+ years), and a Radwaste Engineer (1+ years) at Three Mile Island prior to arriving at OCNGS as a GRWSS in August of 1986.

Support from upper level management was evident. The MITOC system and ALARA improvements to the new Radwaste Building (see NRC Inspection Report 50-219/93-13) are examples of substantive support. Goals have been established. Senior level management has disseminated their expectations concerning the radwaste program to all personnel at the station through the station newspaper and memoranda. As noted above, senior level management has dedicated the RWPM to the RWSIG. One of the RWSIG's ongoing activities has been to visit other nuclear stations within the country. Senior level management has provided the radwaste organization with sufficient staffing and continues to provide sufficient funding to the organization permitting a high level of 49 CFR 172, Subpart H and I&E Bulletin 79-19 required training.

Turnover in the radwaste organization area has been minimal. The licensee has been able to maintain a stable work force of well qualified individuals in the radwaste and transportation area. Also, management support of the program was evident.

5.0 Training and Qualifications of Personnel

To determine if licensee commitments made in response to I&E Bulletin 79-19, "Packaging of Low-level Radioactive Waste for Transport and Burial", and 49 CFR 172, Subpart H requirements had been met, the inspector conducted interviews and reviewed pertinent lesson plans and selected training records.

5.1 Qualifications of Personnel

The inspector reviewed records for I&E Bulletin 79-19 and 49 CFR 172 training. The inspector selected training records for the three GRWSSs, the RWPM, and several RWOs. Licensee records indicated that these individuals had received appropriate training in accordance with the established training requirements. See Section 3.0 of this report for information regarding the status of RWO in-plant training.

5.2 Radwaste Transportation and Shipment Training

For the past several years, the licensee has provided a broad-based course on the radwaste and transportation requirements annually to the GRWSSs and RWPM. In practice, the licensee has either contracted the services of a vendor to supply the required radwaste and transportation training on site or have sent selected personnel to vendor courses off site. In 1994, the acting RWPM attended a course on the RADMAN computer code conducted by Waste Management Group (WMG). Additional training on maintaining regulatory compliance was provided by this course. The licensee intended to send the other two GRWSS-qualified individuals (those individuals responsible for certifying that a shipment of radioactive material meets all of the DOT, NRC and waste burial requirements) to this course in 1994. As noted in the previous inspection report on this program area, the licensee had sent the three GRWSS-qualified individuals, the RWPM, and the Chem Nuclear Services Inc. (CNSI) Supervisor to the CNSI Hazmat Employee Training course in 1993. Also, one of the GRWSSs and the RWPM had attended the CNSI Advanced Training Seminar.

The licensee has developed several lesson plans intended to comply with the new DOT training rule (49 CFR 172, Subpart H). The following lesson plans were reviewed.

- 11.5.01.010, "General Awareness Familiarization"
  This course was about two hours in length and the intended target audience included groups of workers, such as warehouse foremen, stockkeepers, stations services personnel, and CNSI personnel.

- 11.5.01.011, "Packaging, Loading, & Unloading Radioactive Material & Mixed Waste"
  This course was about four hours in length and the intended target audience included stations services personnel and CNSI personnel.

- 11.5.01.012, "Radioactive Material/Mixed Waste Safety Training"
  This course was about two hours in length and the intended target audience included groups of workers, such as warehouse foremen, stockkeepers, stations services personnel, and CNSI personnel.

5.3 Training Program Summary

In summary, the amount and quality of training provided to the those individuals with the responsibility of certifying the adequacy of a shipment of radioactive materials/waste was considered very good.

6.0 Implementation of the Radioactive Waste Program

No dry active waste (DAW) compacting was being done on site. The licensee continued to utilize the services of Interstate Nuclear Services (INS) for laundry, Quadrex for metals, and SEG for other DAW. Filter sludge continued to be processed by a cement solidification process. Spent resins continued to be processed by a dewatering process.

6.1 Scaling Factors

To determine if 10 CFR 61.55(a)(8), "Determination of Concentrations in Wastes", had been met, the inspector conducted interviews, reviewed procedures, and reviewed relevant licensee documentation in this area.

There has been little change in this program area since the last inspection of this area. The licensee continued to use the RADMAN computer code to develop scaling factors. This radwaste/ transportation computer code has been reviewed by the NRC and a topical report has been issued in validation of its method. Co-60 was used as the base nuclide for scaling activation product nuclides, Cs-137 for fission product nuclides, and Ce-144 for transuranics. At the time of the inspection, scaling factors had been developed for DAW (using filter sludge data, a conservative approach), filter cartridges, irradiated metals (developed by Waste Management Group), control rod drives, evaporator bottoms, filter sludge, and resins.

The inspector noted one instance in which a vendor's analytical results for a reactor water cleanup (RWCU) resin sample were rejected by the licensee because the Fe-55 levels, reported by the vendor, were judged too low as compared to historical data and the licensee's self analysis. Split samples were taken. As a result, the licensee did not update the scaling factor database for RWCU resins and waited for the next transfer of RWCU resin to conduct additional sampling and analysis of this waste stream. This response was appropriate and conservative.

In summary, the scaling factor program continued to be well implemented.

6.2 Filter Sludge Gas Generation

In the recent past, the licensee has had problems with the generation of gas from dewatered filter sludge. The licensee's actions associated with this problem were described in NRC Inspection 50-219/93-13. The inspector discussed with the Manager, Radwaste Operations as to whether radwaste operations procedures required flushing piping after sluicing filter media. The following procedures were reviewed.

- 351.37, "Radwaste Processing of Solids and Liquids to the CNSI Cement Solidification System", Revision 8, 3/2/92
- 352.0, "Process Control Plan for Processing Resins into a CNSI High Integrity Container", Revision 20, 3/25/94

These procedures directed flushing after sluicing spent filter media. The inspector questioned the Manager, Radwaste Operations as to whether there might be piping or unvented tanks (in particular in the Old Radwaste Building) where filter media had been erroneously sluiced in the past and which are now isolated. The Manager, Radwaste Operations agreed to review this matter. This matter will be reviewed in a future inspection.

6.3 Radwaste Volume Reduction

As noted previously, the licensee created the RWSIG which is chartered to study the issue of radwaste volume reduction for a period of six months. As part of this study, the licensee is visiting other utilities as one means of finding potential means of minimizing the volume of radwaste generated. Results and suggestions of this study group will be reviewed in a future inspection since this group was created only earlier this year. The importance of radioactive waste minimization was also being stressed by periodic articles in the station newspaper. Attachment 1, Table 1, of this report, displays the volumes of radwaste buried from 1984 through 1993. The amount and type of radioactive waste material generated by the licensee from 1987 through 1993 is displayed in Attachment 1, Table 2 of this report. The amount of radioactive waste or material buried by the licensee after volume reduction activities from 1987 through 1993 is displayed in Attachment 1, Table 3 of this report. These tables were generated based on data provided by the licensee.

6.4 Low Level Waste Storage Facility (LLWSF)

6.4.1 Storage Capabilities

There are two main low-level radioactive waste storage areas in the LLWSF. There is a housed shielded cell storage area and a housed open-floor area. The shielded storage area has a total of thirty storage cells and is itself further subdivided into two areas. Each cell was designed to accommodate four stackable and removable platforms. Each cell can hold either:

36 80-ft^3 liners OR
16 170-ft^3 liners OR
16 200-ft^3 liners OR
12 322-ft^3 liners OR
42 B-25 boxes (for hot trash or incinerated material)
360 55-gallon drums OR
a combination of the above

Total cell storage using the most commonly sized liner (480 170-ft^3 liners) is almost 82,000 ft^3. The housed open-floor portion of the building is 4,320 ft^2 in area and will be used to store DAW. This area will accommodate about 540 B-25 boxes. At current waste generation levels, the licensee estimates that there is sufficient space to accommodate 5 to 10 years' accumulation of low-level radioactive wastes. The inspector also noted that the LLWSF was constructed to facilitate additions to the building, if needed.

6.4.3 Preparations for Barnwell Lockout

The inspectors toured the LLWSF. No work within the LLWSF was being conducted at the time of the tour. Housekeeping was good and radioactive materials stored within the RCA did not obscure postings, compromise contamination control boundaries or otherwise negatively impact radiological control efforts. Postings and barriers clearly indicated the presence of radioactive materials areas, radiation areas, and high radiation areas (HRAs). At the time of the inspection, no area within the LLWSF was controlled as a locked HRA. There has been some effort on the part of the licensee to remove outage related equipment, currently stored in the LLWSF, in preparation for the probable burial site lock out.

The Acting Radwaste Programs Manager did point out to the inspector that he would ensure that additional means would be taken to minimize the possibility of falling into the truck loading potion of the truck bay. There is a removable railing in this location (to permit truck loading/unloading) and no tape was placed on the floor to highlight the elevation difference.

Licensee Procedure 351.68, "Low Level Radwaste Storage Facility (LLWSF) Receipt, Transfer, Storage, and Shipment of Radioactive Waste", Revision 0, 3/24/94, was developed in preparation for loss of burial privileges at the Barnwell site. This procedure implements administrative controls deemed necessary as a result of the safety review on storage of low level radioactive wastes in the LLWSF.

6.4.4 Licensee LLWSF Safety Review (10 CFR 50.59 Analysis)

The assumptions and calculational methodologies used in the licensee conclusion that there is no unreviewed safety question in regards to public exposure as a result of LLWSF operation will be reviewed in a future inspection (IFI 94-09-01).

6.5 Implementation of the Radwaste Program Summary

This program area was assessed as being well implemented.

7.0 Shipping of Low-Level Wastes for Disposal, and Transportation

At the time of the inspection, generators in the State of New Jersey had radwaste burial privileges at Barnwell. The following shipment records were selected and reviewed.

Identification No.	Activity	Description	DOT Type
OC-7001-93	8.2 Ci	ALPS[2] filters and DAW[3]	LSA[4]
OC-6002-93	1.8 Ci	High radiation trash media	LSA
OC-1002-94	112 mCi	DAW to SEG - metals for metal melt	LSA
OC-9001-94	233 mCi	DAW to Barnwell - contaminated wood, piping, hardware	LSA
OC-0101-94	20 mCi	Laundry to INS	LSA
OC-0102-94	29 mCi	Laundry to INS	LSA
OC-5001-94	95 mCi	Concentrates solidified in cement	LSA
OC-4001-94	31.8 Ci	Spent resin	LSA
OC-4002-94	21.9 Ci	Bead resin and charcoal	LSA
OC-3001-94	3.3 Ci	Filter sludge	LSA
OC-3003-94	4.8 Ci	Filter sludge	LSA

These records were found complete. The licensee maintained copies of the consignee's licenses as required. The inspector verified that the licensee was a registered user of the shipping casks used for the shipments noted above. The inspector also visually inspected activities relating to the licensee's preparation of shipment OC-5001-94 noted above. No discrepancies were noted.

8.0 Status of the OCNGS Radiological Controls Program Briefing

On April 22, 1994 after the exit meeting, the Station Director and OCNGS Radiological Controls department management discussed with NRC personnel the status of the radiological controls program. Attachment 2 is a handout provided by the licensee for this briefing and it summarizes topics discussed during the briefing. NRC staff stated that the briefing was beneficial in increasing NRC staff's understanding of licensee efforts at enhancing the OCNGS radiological controls program.

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[2] Advanced Liquid Processing System

[3] Dry Active Waste

[4] Low Specific Activity

9.0 Exit Meeting

The inspector met with licensee representatives at the end of the inspection, on April 22, 1994. The inspector reviewed the purpose and scope of the inspection and discussed the findings. Licensee management acknowledged the inspection findings.

After the exit meeting, the licensee provided their perspective on the status of the radiological controls program at OCNGS. NRC staff toured the low level radioactive waste storage building after completion of this status briefing.

The licensee was informed in a May 4, 1994 phone call with the Radiological Engineering Manager that an inspector follow-up item (IFI) regarding interim low level waste storage had been opened.

ATTACHMENT 1

TABLE 1: Volume of Radwaste Buried from all Waste Streams

Year	Burial Volume (thousands ft³)	Year	Burial Volume (thousands ft³)
1993	8.6	1988	8.0
1992	12.7	1987	9.3
1991	19.1	1986	21.2
1990	12.2	1985	16.3
1989	15.6	1984	50.3

TABLE 2: Radioactive Waste/Material Generated[5]

WASTE TYPE	1987 (ft³)	1988 (ft³)	1989 (ft³)	1990 (ft³)	1991 (ft³)	1992 (ft³)	1993 (ft³)
Resins	1,038	2,815	1,561	3,739	4,512	3,669	2,178
Filter Sludge	2,128	1,775	3,062	4,142	3,614	4,647	3,074
Concentrates	1,596	533	1,081	901	3,472	342	512
Total Wetwaste Generated	4,762	5,122	5,703	8,782	11,598	8,657	5,765
High radiation trash	1,233	533	535	360	360	540	360
DAW[6]	6,272	19,220	23,764	10,794	50,741	20,016	19,448
Irradiated hardware & other	335	712	1,553	275	1,285	1,680	1,489
Metals[7]	10,581	2,916	3,361	5,091	11,535	3,731	1,917
Total DAW Generated	18,420	23,380	29,213	16,519	63,921	25,968	23,214
TOTAL GENERATED	23,182	28,503	34,916	25,301	75,518	34,796	28,980

[5] Rounded to the nearest cubic foot

[6] Processed by super compaction or incineration

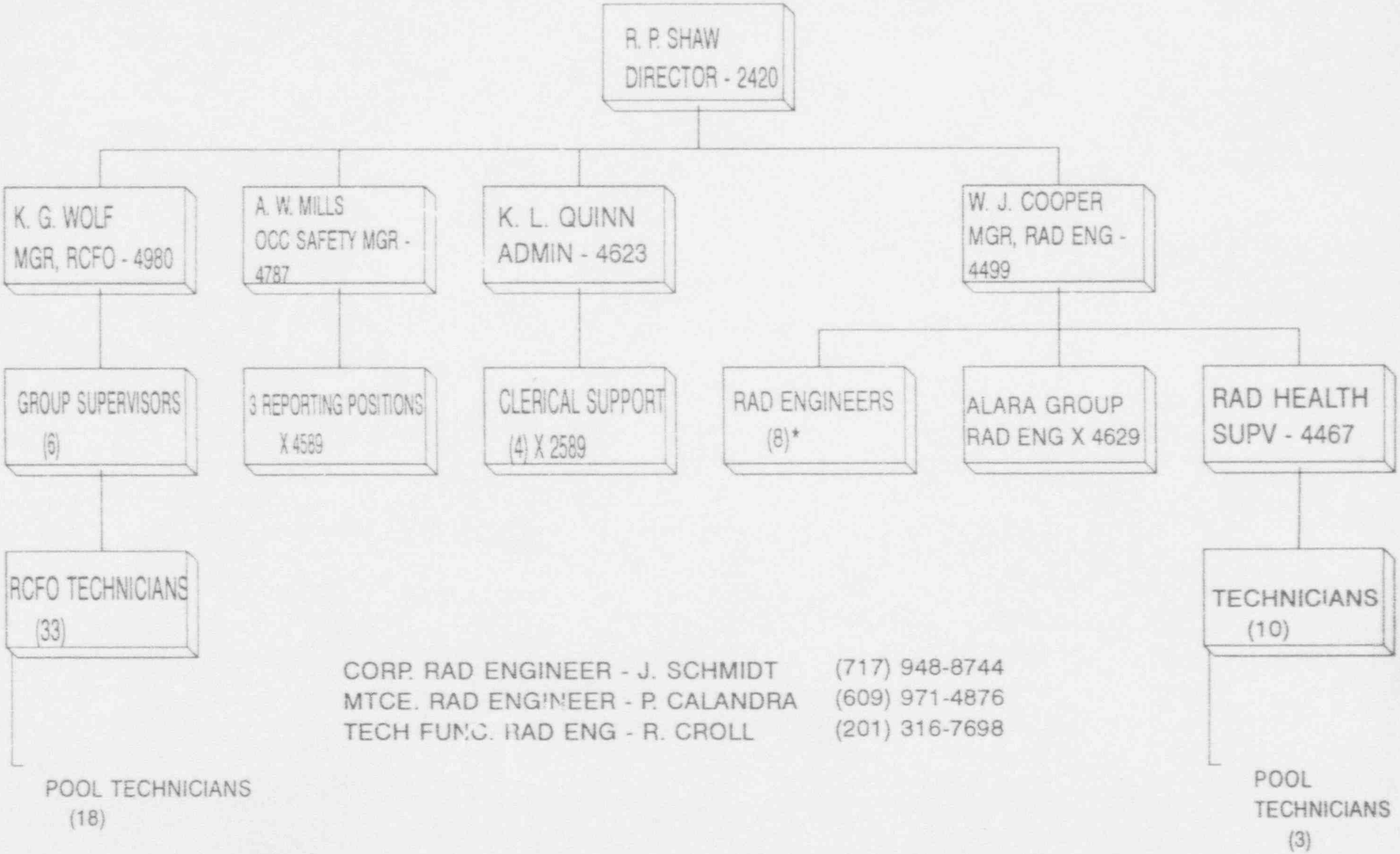
[7] Decontaminated/recycled

TABLE 3: Radioactive Waste/Material Buried (post-volume reduction)

WASTE TYPE	1987	1988	1989	1990	1991	1992	1993
Total Wetwaste Buried (ft^3)	4,762	5,122	5,703	8,782	11,427	8,828	5,765
DAW Buried (ft^3)	3,595	2,551	9,135	2,606	5,986	3,412	2,364
% Volume Reduced DAW	43%	87%	62%	76%	88%	83%	88%
Metals Buried (ft^3)	982	357	740	821	1,685	477	489
% Volume Reduced Metals	91%	88%	78%	84%	85%	87%	74%
TOTAL BURIED (ft^3)	9,338	8,031	15,578	12,208	19,098	12,717	8,618

OYSTER CREEK

RADIOLOGICAL CONTROLS/SAFETY



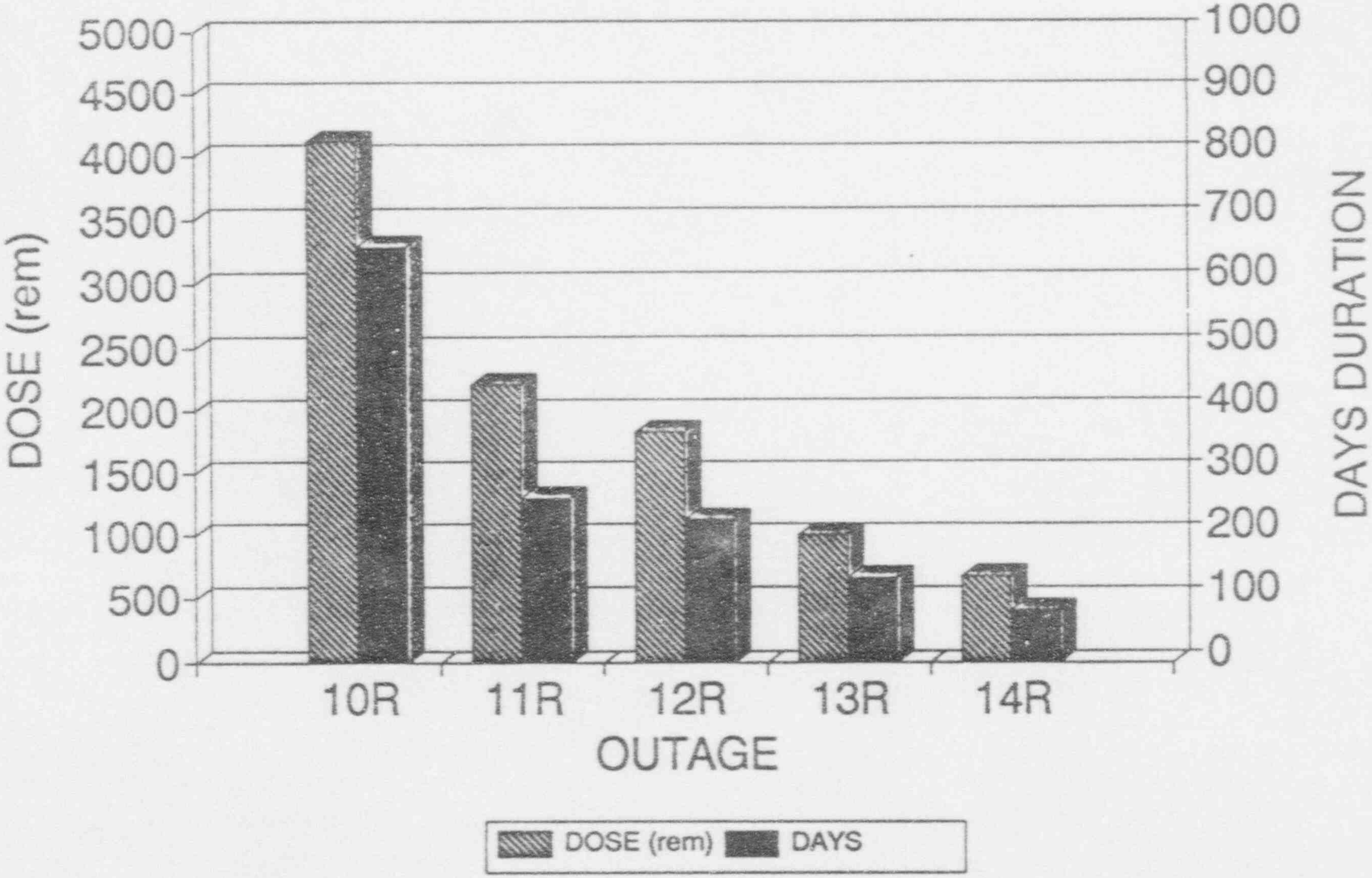
*includes one vacancy

11/2/93
(609) 971-X

ATTACHMENT 2

OYSTER CREEK

RECENT OUTAGE RESULTS



OYSTER CREEK

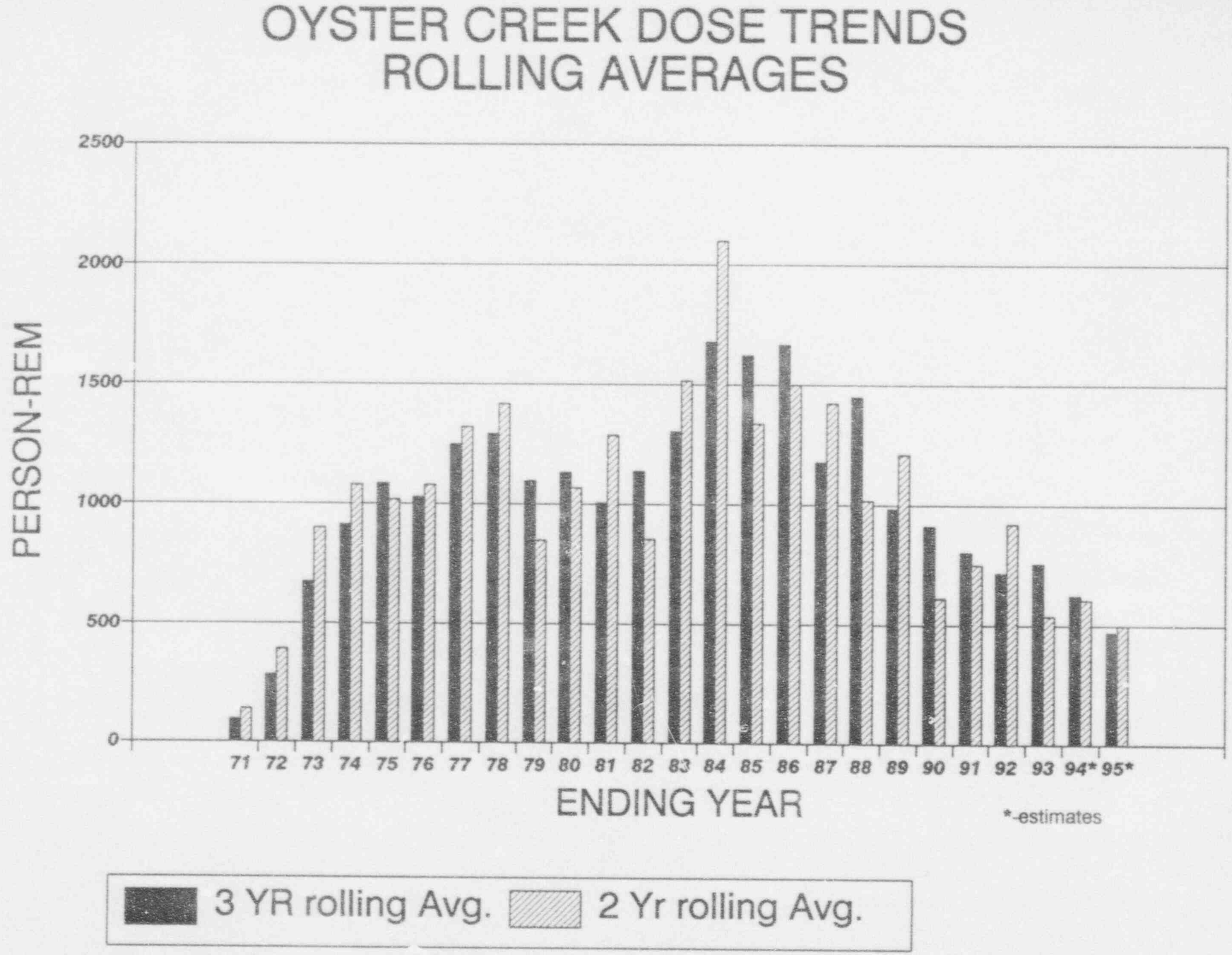
NUCLEAR GENERATING STATION

THE LOWEST DOSE MONTHS IN OYSTER CREEK HISTORY

(Monthly TLD Data Since Jan. 1975)

Date	Cycle	Dose (rem)	# personnel monitored	Dose/person monitored (mrem/person)
1. SEP-93	14	8.627	1130	7.635
2. JUL-93	14	10.007	1142	8.763
3. JUN-93	14	10.021	1155	8.676
4. AUG-93	14	10.144	1114	9.198
5. MAR-94	14	10.465	1145	9.140
6. OCT-93	14	11.111	1137	9.772
7. APR-93	14	11.885	1141	10.416
8. MAY-93	14	12.686	1138	11.148
9. APR-92	13	13.175	1122	11.742
10. DEC-93	14	13.308	1152	11.552

dose/April 18, 1994


OYSTER CREEK DOSE TRENDS
ROLLING AVERAGES
PERSON-REM
2500
2000
1500
1000
500
0
71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94* 95*
ENDING YEAR
*-estimates
3 YR rolling Avg.
2 Yr rolling Avg.

OYSTER CREEK RADIOLOGICAL PARAMETERS HISTORICAL TRENDS

	1989	1990	1991	1992	1993	1994 Goal
Person Rem	910	309	1184	657	416	795
Skin Con Rate (>10 mrem per 10K RWP-hrs)	1.2	0.14	0.48	0.38	0.36	0.5
Clothing Con Rate (per 10K RWP-hrs)	16.1	9.0	7.4	4.7	4.0	4.3
Contaminated Area (ft^2)	72,655	61,542	56,368	86,713	33,518	8,423
Radwaste Volume (m^3)	441	345	540	360	244	331

RADIOLOGICAL CONTROLS

	1992	1993
Cumulative Dose (person-rem)	657	417
Highest Individual Dose (rem) (1993 through November only) (OC dose only)	3.155	2.518
Annual Dose Rate (mrem per RWP-hr)	1.18	0.85
RWP-hrs	557K	493K
Number of RWPs	1615	476
Skin Contaminations		
#	194	138
# >10 mrem	21	18
# per 10K RWP-hrs	3.5	2.8
# >10 mrem per 10K RWP-hrs	0.4	0.4
Clothing Contaminations		
#	261	199
# per 10K RWP-hrs	4.7	4
WBC >INPO Reportable Level (INPO Criteria change in 1993)	51	1
Contaminated Area (sq. feet) (1992 lowpoint prior to outage)	51,754	33,518
RIRs	16	14
RARs	45	21
NRC Violations (1992 non-cited)	1	*2
INPO Findings	1+	0

*One Level III violation

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