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AN AERIAL RADIOLOGICAL SURVEY OF THE OYSTER CREEK NUCLEAR POWER PLANT AND SURROUNDING AREA

FORKED RIVER, NEW JERSEY

DATE OF SURVEY: SEPTEMBER 18-25, 1992

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This work was performed by EG&G/EM for the United States Department of Energy and the United States Regulatory Commission under Contract Number DE-AC08-93NV11265.

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ABSTRACT

An aerial radiological survey was conducted over the Oyster Creek Nuclear Power Plant in Forked River, New Jersey, during the period September 18 through September 24, 1992. The survey was conducted at an altitude of 150 feet (46 meters) over a 26-square-mile (67-square-kilometer) area centered on the power station. The purpose of the survey was to document the terrestrial gamma radiation environment of the Oyster Creek Nuclear Power plant and surrounding area.

The results of the aerial survey are reported as inferred gamma radiation exposure rates at 1 meter above ground level in the form of a contour map. Outside the plant boundary, exposure rates were found to vary between 4 and 10 microroentgens per hour and were attributed to naturally-occurring uranium, thorium, and radioactive potassium gamma emitters.

The aerial data were compared to ground-based benchmark exposure rate measurements and radio-nuclide assays of soil samples obtained within the survey boundary. The ground-based measurements were found to be in good agreement with those inferred from the aerial measuring system.

A previous survey of the power plant was conducted in August 1969 during its initial startup phase. Exposure rates and radioactive isotopes revealed in both surveys were consistent and within normal terrestrial background levels.

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1.0 INTRODUCTION

An aerial radiological survey of the Oyster Creek Nuclear Power Plant and surrounding area in Forked River, New Jersey, was conducted during the period September 18 through September 25, 1992, at the request of the United States Nuclear Regulatory Commission (NRC). The survey was performed using the aerial measuring system (AMS), operated by EG&G Energy Measurements (EG&G/EM) for the United States Department of Energy (DOE).¹ EG&G/EM routinely conducts aerial surveys for DOE, NRC, and other government agencies as part of an ongoing, nationwide program to map and document the radiological conditions at various nuclear sites. Aerial radiological surveys have been effective in detecting regions of enhanced radiation, determining average ground-level exposure rates, and identifying specific radionuclides associated with regions of anomalous radiation levels.

The Oyster Creek Nuclear Power Plant is owned by the Jersey Central Power & Light Company. The power plant contains a General Electric Company boiling water reactor (BWR) capable of producing a net electrical power of 650 megawatts. It was constructed in 1966 and began serving the local communities in December 1969. At the time of the survey, the plant was operating at or near 100 percent capacity. The power plant is situated on 160 acres (approximately 65 hectares) south of Forked River, New Jersey.

The aerial survey was flown at an altitude of 150 feet (46 meters) using a pattern of parallel flight lines spaced 250 feet (76 meters) apart to cover the 26-square-mile (67-square-kilometer) area. The aerial data were used to derive exposure rates at 1 meter above ground level (AGL). In support of the aerial measurements, ground-based exposure rate measurements and soil samples were obtained from various benchmark sites identified by the aerial survey to contain only natural gamma activity. Radionuclide assay of the soil samples was performed to determine radioisotopic concentrations. Oblique aerial photographs of the Oyster Creek Nuclear Power Plant were also obtained in conjunction with the survey.

2.0 SURVEY SITE DESCRIPTION

The Oyster Creek Nuclear Power Plant is located in Ocean County north of Waretown, New Jersey, and south of Forked River, New Jersey. Presented in Figure 1 is a large-scale aerial photograph (September 1992) of the power plant and surrounding area. The survey boundary, outlined in Figure 1, encompasses a 26-square-mile (67-square-kilometer) area centered on the power plant stacks. The terrain within the survey is primarily comprised of marshlands associated with the coastline. The area surrounding the power plant consists of small towns to the north and south.

3.0 NATURAL BACKGROUND RADIATION

Natural background radiation originates from radioactive nuclides which are present in various low-level concentrations in the earth and atmosphere as well as cosmic rays entering the earth's atmosphere from outer space. Terrestrial radiation, which originates primarily from the uranium decay chain, thorium decay chain, and radioactive potassium, is detected at the surface of the earth. The exposure rates from terrestrial radionuclides are dependent on the composition of soil and bedrock near the point of interest. In addition to the above-mentioned sources of natural radiation, cesium-137 (¹³⁷Cs), a product of nuclear fission, is present in trace quantities worldwide from fallout due to aboveground nuclear tests conducted until the early 1960s. Exposure rates due to ¹³⁷Cs in the environment are typically less than 1 μ R/h.²

Radon gas, a by-product in the decay chain of both uranium and thorium, diffuses through the soil into the atmosphere and contributes to radiation levels near the surface of the earth. The radon concentration depends on several factors including meteorological conditions, mineral compositions, and permeability of the soil. Airborne radiation from radon and its decay products typically contributes from 1% to 10% to the natural background radiation.

Cosmic rays, high energy radiation originating from outer space, also contribute to the levels of natural background radiation. The cosmic rays

LEGEND

Soil sample sites are shown
in boxed numerals

FIGURE 1. AERIAL PHOTOGRAPH OF THE OYSTER CREEK NUCLEAR POWER PLANT AND SURROUNDING AREA

from outer space shower the earth with a nearly constant flux of radiation which interacts with elements in the earth's atmosphere and soil producing an additional source of background activity. Radiation levels due to cosmic rays vary with altitude and geomagnetic latitude. Typical values range from 3.3 $\mu\text{R/h}$ at sea level to 12 $\mu\text{R/h}$ (up to 100 mrem/yr) at elevations of 10,000 feet (3 kilometers).³ For the Forked River, New Jersey, area the cosmic ray contribution is approximately 3.6 $\mu\text{R/h}$.

4.0 SURVEY EQUIPMENT AND PROCEDURES

4.1 Aerial Measuring System

The low altitude aerial survey was flown using a Messerschmitt-Bolkow-Blohm (MBB) BO-105 helicopter shown in Figure 2. The twin-engine helicopter was outfitted with a Radiation and Environmental Data Acquisition and Recorder System IV (REDAR IV) and two gamma detection pods which were mounted on the sides of the skid rack on the helicopter. Each pod housed four 2- x 4- x 16-inch log-type, thallium-activated sodium iodide, NaI(Tl), gamma ray detectors. The energy response of the detector array was calibrated using the 60-keV and 1,274-keV gamma rays from americium-241 (^{241}Am) and sodium-22 (^{22}Na), respectively. At an altitude of 150 feet (46 meters), the AMS eight-detector array gives accurate terrestrial gamma spectral information up to 50 $\mu\text{R/h}$. The dynamic range of AMS is extended to 400 $\mu\text{R/h}$ through the independent recording of a single 2- x 4- x 16-inch detector.

Data acquisition was performed using REDAR IV, a rack-mounted portable multi-microprocessor real-time analysis system. The system was designed to operate in adverse conditions such as those encountered in helicopter or fixed-wing platforms. The REDAR IV system recorded on magnetic tape live-time data from the detector array, ambient temperature and barometric pressure sensors, radar altimeter, and the helicopter positioning system. Visual inspection of the data by on-board personnel was

FIGURE 2. MBB BO-105 HELICOPTER WITH DETECTOR PODS

provided by a video display. The REDAR IV system was also equipped with the capability for real-time inspection of gamma energy spectra.

Aircraft positioning was established using an Ultra-high frequency Ranging System (URS) and a radar altimeter. Two ground-based transponders were periodically interrogated by a master unit housed in the helicopter. By method of triangulation, the position of the helicopter was obtained to within a precision of ± 10 feet (3 meters). The position information was recorded on magnetic tape and was also directed into a steering indicator which the pilot used to guide the aircraft along a predetermined set of flight lines.

4.2 Ground-Based Measurements

Total exposure rates and soil samples were obtained from four ground-based benchmark sites for verification of the aerial measurements. The four sites, designated in Figure 1, were identified by the aerial survey as having only natural background radiation. At each site, total exposure rates were measured with a pressurized ionization chamber and four soil samples were taken for laboratory analysis. Soil sample analysis was performed at EG&G/EM's Santa Barbara Laboratory in accordance with previously outlined procedures.⁴

4.3 Mobile Data Processing Laboratory

The operations base for the survey was the Naval Air Warfare Center Aircraft Division in Lakehurst, New Jersey, located approximately 20

miles (32 kilometers) northwest of the Oyster Creek Nuclear Power Plant. The Radiation and Environmental Data Analyzer and Computer (REDAC) system, a mobile computer laboratory for analysis of the aerial survey data shown in Figure 3, was located at the operations base. The REDAC system consists of a Data General MV-7800XP computer with 4 megabytes of memory, a 2-gigabyte Winchester disk for mass storage, an 8mm tape drive, a Qic-tape drive, 9-track tape drives for data transfer and archiving, a 36-inch-wide plotter for data contouring, a laser printer, and three video graphics display terminals.

FIGURE 3. MOBILE COMPUTER PROCESSING LABORATORY

The REDAC system utilizes an extensive software library for analysis of the pre- and post-flight REDAR IV and detector system checks, and provides on-site preliminary analysis of the aerial measurements on a flight-by-flight basis.

4.4 Survey Procedures

The aerial survey over the Oyster Creek Nuclear Power Plant and surrounding area was conducted according to standardized procedures which will be discussed only briefly in this section.^{1,5} First, a perimeter of the survey area was flown utilizing roads easily identifiable on a large-scale aerial photograph. Intersections of roadways and landmarks were noted by flight-crew personnel for future use in scaling the radiation contour data to aerial photographs.

Altitude profiles were then flown over designated water and land test lines. The altitude profile consisted of several flights over a test line at nominal altitudes ranging from 150 feet (46 meters) to 1,000 feet (305 meters). The water test line and land test line were flown at the beginning and end of each flight. The water test line was flown using a section of the Atlantic Ocean east of the survey site. Data accumulated during the water test line profile were used to determine the nonterrestrial background radiation which originates from airborne radon, the helicopter and detector system, and cosmic rays. The water test line was flown at the survey altitude during each survey flight to monitor fluctuations in the radon concentration. For the land test line, a section of a road north of the survey area was chosen. The terrestrial data from the land test line profile, corrected for the nonterrestrial background, were used to derive the air attenuation coefficient.

The aerial survey covered an area of 26 square miles (67 square kilometers), as outlined in Figure 1. One hundred and eight east-west flight lines, spaced 250 feet (76 meters) apart, were flown at an altitude of 150 feet (46 meters) AGL. All flights were flown at an average ground speed of 70 knots (36 meters/second). The aerial survey over the Oyster Creek Nuclear Power Plant and surrounding area was completed in nine flights over a period of eight days.

5.0 DATA REDUCTION PROCEDURES

5.1 Total Exposure Rate

A contour map of the total gamma radiation exposure rates in $\mu\text{R/h}$ obtained at 1 meter AGL was prepared from the aerial data. The total exposure rate contour map was derived from the gross count rates and aircraft positioning coordinates recorded during the survey flights. The gross count rate data were determined from the integrated yield of all gamma activity within the energy range 33 through 3,026 keV. Gross count rates in counts per second (cps) obtained from the aerial survey were converted to exposure rates in $\mu\text{R/h}$ at 1 meter AGL according to

$$ER (\mu R/h) = \frac{GC - B}{938_{cps/(\mu R/h)}} e^{(A-150) \cdot C} \quad (1)$$

where

- GC = gross count rate at survey altitude (cps)
- B = background count rate at survey altitude (cps)
- A = survey altitude (feet)
- C = air attenuation coefficient

An air attenuation coefficient having a value of 0.001906 ft^{-1} was determined empirically from the background-subtracted gross count data obtained from the altitude profile over the land test line. The gross count rates were converted to exposure rates using a conversion factor of 938 counts/second/ $\mu R/h$ at 150 feet (46 meters) derived from data obtained at the Calvert County calibration range near Washington, D.C.⁶ The reported exposure rates include a contribution from cosmic rays, which is estimated to be $3.6 \mu R/h$.

The total gamma exposure rates measured using AMS represent average exposure rates for gamma rays emitted from nuclides distributed over an area on the ground which is much larger than the detector footprint. The detector footprint is a complex function of survey altitude, detector shape, air mass attenuation, aircraft velocity, and source gamma energy. For a first order approximation, one may assume a simplified isotropic detector model. The footprint width will be: twice the altitude at 50% of the peak, six times the altitude at 10% of the peak, and twenty times the altitude at 1% of the peak.

5.2 Man-Made Gross Count Rate

The aerial survey data were also used to determine the location of man-made radionuclides. The man-made gross count (MMGC) is defined as the fraction of the gross counts which is directly attributed to gamma rays emitted from man-made radionuclides. In general, the detection of man-made radioisotopes can be found

from increases in the gross count rates. However, slight changes in the gross count rates are not considered adequate reason to suspect a man-made radioisotope. Slight variations in the gross count rates often occur because of fluctuations in the geologic composition of the earth, as well as changes in the ground vegetation coverage.

A more conclusive approach for detecting man-made radioisotopes involves a comparison of gross counts from various regions of the gamma energy spectrum. In particular, the ratio of spectral intensities from different regions of the gamma spectrum will remain nearly constant when only background radiation is present. Although this procedure can be applied to any region of the gamma spectrum, the most common practice is to place into the source window all counts below 1,394 keV, i.e., where most long-lived man-made radiation occurs, and to place into the background window all counts above 1,394 keV. The MMGC algorithm has been found to be sensitive to low levels of man-made radiation, i.e., $< 1 \mu R/h$, even in the presence of large variations in the natural background.

The MMGC rate can be expressed analytically in terms of the integrated count rates in specific spectral energy windows (in keV) from the gamma energy spectrum

$$MMGC = \sum_{E=38keV}^{1394keV} Counts_E - K \cdot \sum_{E=1394keV}^{3026keV} Counts_E \quad (2)$$

where

$$\sum_{E=38keV}^{1394keV} Counts_E = \text{integral count rate in the energy window from 38 to 1,394 keV}$$

$$\sum_{E=1394keV}^{3026keV} Counts_E = \text{integral count rate in the energy window from 1,394 to 3,026 keV}$$

and

$$K = \frac{\sum_{E=38keV}^{1394keV} Counts_E}{\sum_{E=1394keV}^{3026keV} Counts_E} \quad (3)$$

The constant, K , was obtained from the summation spectrum composed of the gamma spectra acquired over a region of the survey area which was identified to contain only gamma activity from naturally-occurring radionuclides. The resultant MMGC will yield an average value approximately equal to zero for areas containing only natural radionuclides and a value greater than zero for areas containing man-made radionuclides. Identification of the radionuclides responsible for anomalous behavior in the man-made gross count data can be determined from the corresponding gamma energy spectrum.

6.0 SURVEY RESULTS AND DISCUSSION

6.1 Aerial Survey Results

Presented in Figure 4 is a contour map showing the total gamma exposure rates ($\mu R/h$) at 1 meter AGL inferred from the aerial data at the Oyster Creek Nuclear Power Plant and surrounding area. The contour map is superimposed on a large-scale aerial photograph. Exposure rates were found to vary from 4 to 10 $\mu R/h$ outside the plant boundary and approximately 675 $\mu R/h$ directly over the power plant. Included in the exposure rate data is a cosmic ray contribution of 3.6 $\mu R/h$. The location of the nuclear power plant is readily identifiable from the series of concentric rings near the center of the map.

A typical gamma energy spectrum obtained outside the plant boundary is presented in Figure 5. The most prominent gamma peaks are identified as those from naturally-occurring radionuclides from the uranium and thorium decay chains as well as radioactive potassium-40 (^{40}K).

A net gamma energy spectrum obtained over the plant is presented in Figure 6. Peaks associated with the radioactive decay of cobalt-60 (^{60}Co), an activation product, were observed at 1,173 and 1,333 keV. This isotope is produced during normal reactor operations.

In addition to the exposure rate contours (Figure 4), an MMGC contour map was also produced. The only significant gamma activity shown by the MMGC extraction was directly over the plant. As plant activity is adequately described by the exposure rate contour, the MMGC contour is not presented in this report.

6.2 Ground-Based Measurement Results

Identified in Figure 1 are the locations of the four ground-based measurements. Total exposure rates and soil samples were obtained at four benchmark sites for comparison and verification of the aerial measurements.⁷ A comparison of the exposure rates from the aerial and ground-measurements is given in Table 1. Both soil analysis estimates and the inferred aerial results include an additional 3.6 $\mu R/h$ cosmic contribution for direct comparison with the gamma ionization chamber readings. The results from the aerial and ground-based measurements are essentially in agreement.

Presented in Table 2 are the results of the radionuclide assay of the soil samples from the four benchmark sites. Soil sample results represent those from averages of four closely spaced samples obtained from each site. In addition to the naturally-occurring isotopes from the decay chains (uranium and thorium) and ^{40}K , all sampling sites exhibited a presence of ^{137}Cs . Cesium-137 is present in the environment as a result of worldwide fallout from aboveground nuclear tests conducted until the early 1960s. The level of ^{137}Cs activity measured at the benchmark sites is typical of that measured at several locations within the continental United States.²

7.0 SUMMARY

An aerial radiological survey of the Oyster Creek Nuclear Power Plant was conducted during the

CONVERSION SCALE	
LETTER LABEL	TERRESTRIAL EXTERNAL EXPOSURE RATE AT 1 METER $\mu\text{R/h}$ *
A	< 4
B	4 - 5
C	5 - 6
D	6 - 7
E	7 - 10
F	10 - 19
G	19 - 150
H	> 150

*Terrestrial external exposure rates are inferred from aerial data collected at 150 feet (45.5 meters) AGL. For total external exposure rate a cosmic contribution of 3.6 $\mu\text{R/h}$ is included.

FIGURE 4. TERRESTRIAL GAMMA EXPOSURE RATE CONTOUR MAP

FIGURE 5. **TYPICAL BACKGROUND GAMMA ENERGY SPECTRUM.** LT stands for *liveltime*, the amount of time included in the "active" region.

FIGURE 6. **NET GAMMA ENERGY SPECTRUM OVER REACTOR**

period September 18-25, 1992. An area of 26 square miles (67 square kilometers) was surveyed at an altitude of 150 feet (46 meters) using a grid pattern consisting of nominally parallel

flight lines. The typical terrestrial gamma radiation exposure rate was found to vary from 4 to 10 $\mu\text{R}/\text{h}$. No significant man-made radioactivity was detected outside the plant boundary.

Table 1. Exposure Rates from Aerial and Ground-Based Measurements ^a			
Site	Soil Analysis ^b	Ion Chamber ^c	Aerial Survey
1	5.5 $\pm$ 0.6	5.8 $\pm$ 0.5	5.3 $\pm$ 0.5
2	5.3 $\pm$ 0.6	5.7 $\pm$ 0.5	5.2 $\pm$ 0.5
3	5.7 $\pm$ 0.5	6.1 $\pm$ 0.5	5.4 $\pm$ 0.5
4	6.4 $\pm$ 0.7	6.5 $\pm$ 0.5	5.6 $\pm$ 0.5

^a Exposure rate ($\mu\text{R}/\text{h}$ at 1 meter AGL) $\pm$ standard deviation.

^b Calculations include a cosmic ray contribution of 3.6 $\mu\text{R}/\text{h}$ and a moisture correction of the form $1/(1+m)$.

^c Reuter-Stokes Model Number RSS-112, Serial Number G-003.

Table 2. Radionuclide Assay of Soil Samples ^a					
Site	% Moisture	²²⁶ Ra (pCi/g)	²³² Th (pCi/g)	¹³⁷ Cs (pCi/g)	⁴⁰ K (pCi/g)
1	7.0 ± 2.0	0.40 ± 0.1	0.32 ± 0.02	0.20 ± 0.01	1.0 ± 0.1
2	10.0 ± 1.0	0.46 ± 0.1	0.28 ± 0.02	0.14 ± 0.05	0.5 ± 0.1
3	8.0 ± 2.0	0.45 ± 0.07	0.37 ± 0.07	0.60 ± 0.06	1.30 ± 0.05
4	8.0 ± 1.0	0.40 ± 0.1	0.43 ± 0.04	0.02 ± 0.01	5.0 ± 2.0

^a pCi/g ± standard deviation.

APPENDIX A

SURVEY PARAMETERS

Survey Site:	Oyster Creek Nuclear Power Plant Forked River, New Jersey
Survey Dates:	September 18-25, 1992
Survey Coverage:	26 mi ² (67 km ²)
Project Scientist:	H.A. Hopkins
Data Scientist:	K.A. McCall
Survey Aircraft:	MBB BO-105 helicopter
Acquisition System:	REDAR IV
Detector Array 1:	Eight 2- × 4- × 16-inch NaI(Tl) detectors
Detector Array 2:	One 2- × 4- × 16-inch NaI(Tl) detector
Lines Surveyed:	108
Line Direction:	East-West
Survey Altitude:	150 ft (46 m)
Line Spacing:	250 ft (76 m)
Navigation System:	URS transponders
Average Ground Speed:	70 knots (36 m/s)

REFERENCES

1. Jobst, J.E. "The Aerial Measuring System Program." *Nuclear Safety*, March/April 1979, 20:136-147.
2. Mohr, R.A. and L.A. Franks. *Compilation of Cs-137 Concentrations at Selected Sites in the Continental United States*, Report No. EGG-1183-2437, S-724-R. EG&G/EM, Santa Barbara, California, 1982.
3. Klement, A.W., et al. *Estimates of Ionizing Radiation Doses in the United States 1960-2000*, EPA Report ORP/CSD72-1. EPA, Washington, D.C., 1972.
4. Mohr, R.A., A.E.Fritzsche, and L.A. Franks. *Ground Survey Procedures*, Report No. EGG-1183-2339. EG&G/EM, Santa Barbara, California, 1976.
5. Boyns, P.K. *The Aerial Radiological Measuring System (ARMS): System, Procedures and Sensitivity*, Report No. EGG-1183-1691. EG&G/EM, Las Vegas, Nevada, 1976.
6. Mohr, R.A. *Ground Truth Measurements at the Calvert County, Maryland Test Line*, Report No. EGG-10282-2066. EG&G/EM, Santa Barbara, California, 1985.
7. Mohr, R.A. "Oyster Creek Survey Ground Truth Data," Memorandum RM-93-022. EG&G/EM, Santa Barbara, California, 1993.

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AN AERIAL RADIOLOGICAL SURVEY OF THE
OYSTER CREEK NUCLEAR POWER PLANT
AND SURROUNDING AREA

FORKED RIVER, NEW JERSEY

EGG 11285-1050

DATE OF SURVEY: SEPTEMBER 1992

DATE OF REPORT: MAY 1994

DATE

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