0503

(3)

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

June 5, 1984[1]

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD
Glenn O. Bright
Dr. James H. Carpenter
James L. Kelley, Chairman

In the Matter of CAROLINA POWER AND LIGHT CO. et al. (Shearon Harris Nuclear Power Plant, Unit 1)	Docket 50-400 OL ASLBP No. 82-468-01 OL

Wells Eddleman's Response to Summary Disposition on contention 132(c)(2)

This is going to be an unusual ~~x~~ response. I have had an interrogatory to Applicants for some time to provide layouts of the instrumentation on the fronts of the control panels referenced in this contention. Some small prints, totally illegible, were provided. CP&L agreed to provide better prints, and on May 8 1984 delivered a roll of blueprints, the outer one of which showed wiring to a control panel, and which were identified to me as 132(c)(2) prints. However, on digging into them today, I find that they are cable tray blueprints related perhaps to Eddleman 116. Thus I don't have the specific information requested from Applicants. Their motion (p.7) notes my response on 4-12-84 saying the information of what specific instruments,(sizes, locations are obviously relevant) were on the panel fronts, was necessary for me to respond to their question.

[1] Judge Kelley orally approved filing this today. Staff response was ~~re~~received May 30; a signed affidavit with no explanation was sent also, later, and received June 4. It appears identical with the unsigned affidavit received 5-30-84.

Applicants neglected to state, however, that as of 4-~~2~~12-84 they had not provided such information. When I realized that the specific references I needed were not available, I contacted Applicants' counsel Hill Carrow, who promised to look into it.

We have agreed as follows: If he finds that indeed the prints of the control panels were not delivered to me, I'll get 3 or 4 more days after delivery of them, to respond to the motions. If he thinkgs the correct information has been delivered, he will respond to the Board, and allow me two days to respond to his response.

I am now going to check the 132(c)(2) discovery files for other relevant info showing the configuration and instruments on the fronts of the panels referred to in the contention. After an extensive search, all I have found is a list of the drawings (~~that~~ the copies of, most of which were illegible), a not-to-scale sketch of the RCP vibration monitors on PAnel 1, a not-to-scale drawing of the displays on Panel 14's panel for the keyboard, and a not-to-scale drawing of the Panel 15 Decwriter II keyboard. Given the size that the jacks are drawn on Panel 1, it appears the size is about 1;1 (no scales are given), and if so, it would be difficult to read the RCP vibration monitors without coming right up close to the panel. This cannot be done directly from the locations specified. Copies of these 3 documents and of a note from Edie Seykora McCrea of CP&L with my notes on it re receipt of panel cover info, are attached.

The main response I can give without the panel front information is that radiation monitoring info displayed on panels some distance from ordinary operating locations, is not addressed. But this information must be known to protect the health and safety of the public in an accident where radiation is being, or might be, released.

Wells Eddleman

Memorandum from

EDIE SEYKORA

Documents for

Wells Eddleman

CHAPTER 1
OPERATOR'S GUIDE

Panel # 15
Printer Keyboard
Decwriter II

LS120 OPERATOR CONTROLS AND INDICATORS (Figure 1-1)

NOTE
Dot on switch indicates function of switch when pressed.

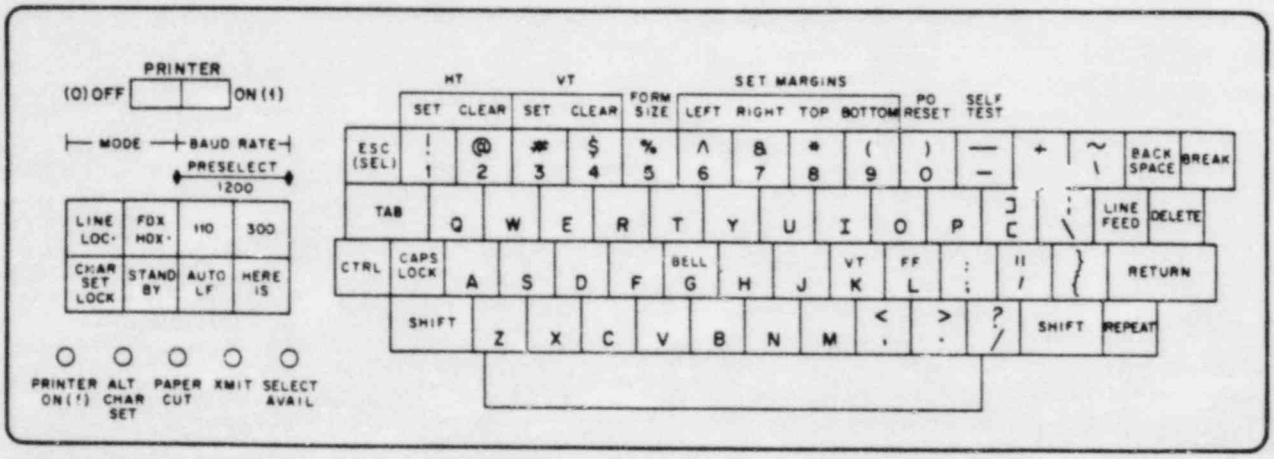


Figure 1-1 Keyboard

PRINTER ON (1)/OFF (0) Switch
The PRINTER ON (1)/OFF (0) switch connects and disconnects the line voltage to the LS120 DECwriter III. The PRINTER switch should be in the ON position for normal operation. When changing paper or ribbon, adjusting the print head, or servicing the unit, the switch should be set in the OFF position. However, when the power is OFF, some of the preset conditions must be reset.

PRINTER ON (1) Indicator
When the PRINTER ON (1)/OFF (0) switch is set to the ON position, the PRINTER ON (1) indicator is illuminated. This indicates that the LS120 is receiving power and ready for operation. The PRINTER ON (1) indicator will blink after a paper out condition is detected or when the plastic paper cover is not properly closed. The blinking will continue until the operator types the paper out-reset (ESC0) on the keyboard.

SYSTEM SPECIAL FUNCTIONS

SYS ACK	PRINTER OFF LINE	STOP LOG	PRINT CRT

GRID 1	GRID 2	GRID 3	GROUP MENU
GRID 4	GRID 5	GRID 6	LOG MENU
CLEAR SCREEN	ALARM HIST		

SYSTEM DISPLAYS

CHANNEL MONITOR CONTROL

FLOW	FILT	PURGE	C/S

TREND 10 MIN	TREND HOURLY	TREND DAILY	
MON ITEMS	CHAN ITEMS	STATUS	

CHANNEL DISPLAYS

SEL	7	8	9
ENTER	4	5	6
CLEAR	1	2	3
LIT	–	0	+

NORMAL

SUPERVISOR

LAMP TEST

EL-3361-1

Fig. 3-1. RM-11 keyboard panel layout

Panel #14 - Rad Mon Console

223.

* All enclosed drawings + sketches referenced by corresponding Panel #.

DSP 4/24/85

Panel # 1) RCP Vib Monitor - Inst. Manual (see Note 1 below)

2) Gross Failed Fuel Det. - 1364-2232 shs. - 1 and 2

3) Loose Parts Monitor - 1364-44834 shs. - 1 and 2

4) Seismic Monitor - 1364-44359

5) APDM - (see note 2)

6) Clg Twr & River M-U Cont - 1364-21021

7) Cond Booster Hyd Cplg Cont - No Outer Controls

8) Gen Relay - 1A - 1364-21823

9) Gen Relay - 1B - 1364-21824

10) S-U Xfmr - 1A - 1364-21854

11) S-U Xfmr - 1B - 1364-21855

12) Rad Mon SA - 1364-35048 and 1364-50325 (Legend)

13) Rad Mon SB - 1364-35048 and 1364-50325 (Legend)

14) Rad Mon Console - Tech. Manual (see note 3)

15) Rad Mon Printer - Tech. Manual - Keyboard (Decwriter II)

Notes:

(1) 7000 Series Systems Operation/Maintenance Manual 50/125

Section 5 -

Drawing - 14953 - View of Cabinet Inserts

14860 - Definitions of Monitors to be placed in inserts

Appendix A pg. A 3-2

Figure A31 - Front View of Power Supply

see enclosed sketches Panel # 1

000596

Note ② ④ Drawing 2338 D57 shows outlying drawing of cabinet only (Block drawing with detail to be in Tech. Manual which is to be received on site later [9/84]).

Note ③ General Atomic Tech Manual E-1151067 RM-11 OPS Guide Page 3-3 Figure 3-1 (Keyboard Panel Layout)

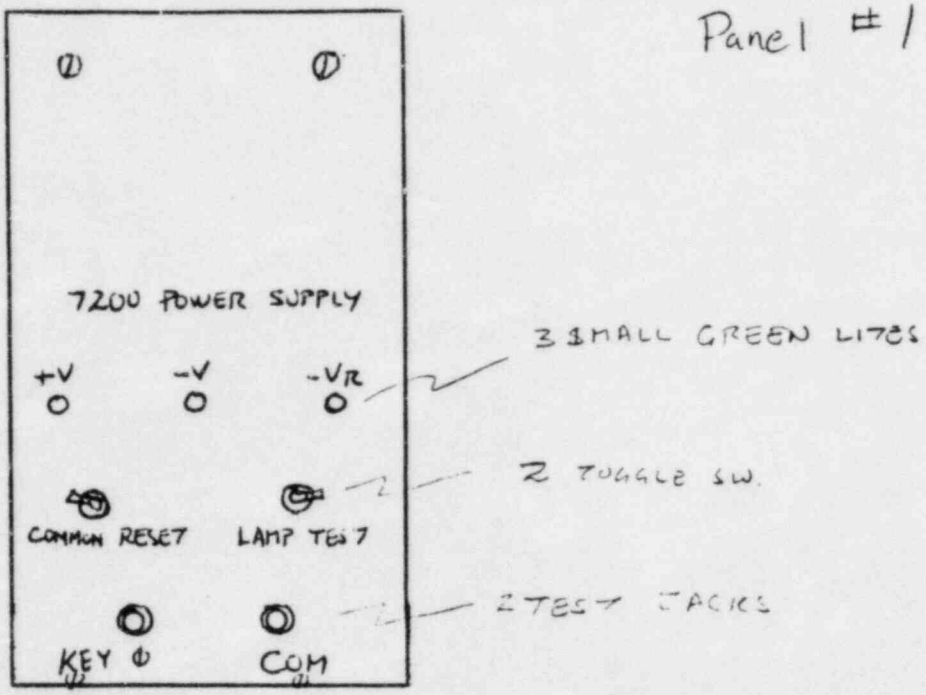
CQL BENTLEY NEVADA EQUIPMENT

1- RCP Vib Monitor

Panel #1

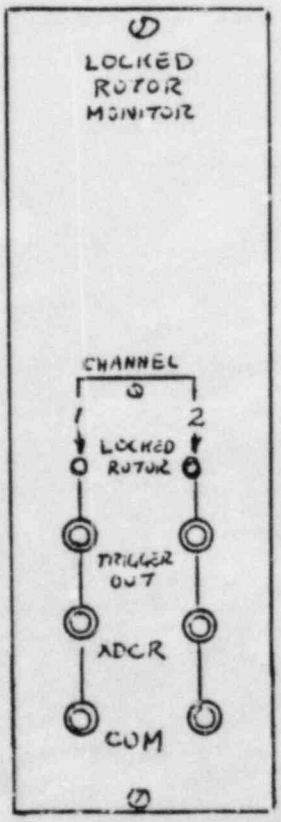
1 ea. -

POWER SUPPLY



2 ea. -

LOCKED ROTOR MONITOR

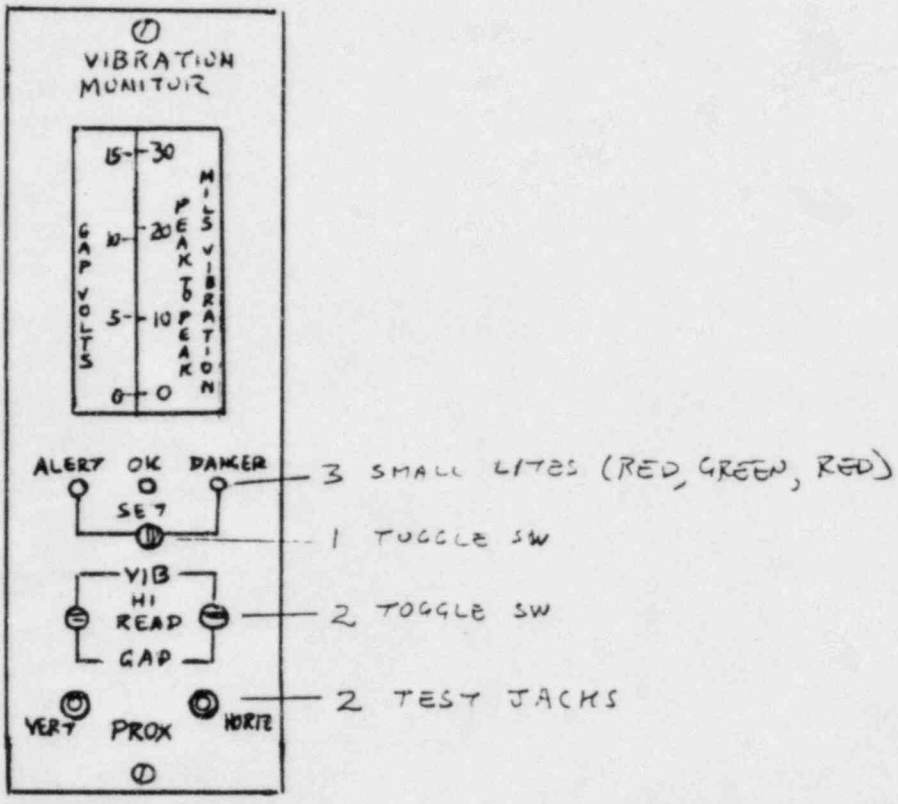


000597

COL BENTLEY NEVADA EQUIP.

1- RCP Vib Monitor

6 ea. - VIBRATION MONITOR



NOTE: 3 ea. VIB. MONITORS HAVE 0-30 P/P MILS VIB SCALE;
3 ea " " " 0-10 " " " "

Docket 50-400

This is the full text of Dr. Carl Johnson's Appendix B. It includes the even-numbered pages left out due to a printer's error.

6-5-84 Wells Eddleman

Wells Eddleman

(3)

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LETTERS TO THE EDITORS

Letters reflect the personal view of the author(s) and not necessarily that of the Editors. Letters are reviewed only to determine the appropriateness of the subject matter, to exclude obvious errors and to assure good taste. Anonymous letters are not published.

Epidemiologic Investigation of Cancer Incidence in People Living near Nuclear Installations

(*Received* 18 *August* 1982)

Dear Editors:

DREYER *et al.* calculated the feasibility of epidemiologic studies of cancer in people living near the Rocky Flats plant (RFP) (Dr82). Such feasibility evaluations and estimates of statistical power are based on a chain of assumptions which must be considered step-by-step. Dreyer *et al.* state "feasibility can be determined by reviewing the magnitude of population exposure and estimating (a) how many extra radiation-induced cancers may be expected to occur and (b) the statistical probability that the occurrence of these extra cancers could be detected."

Dreyer *et al.* focus on exposure to 0.37 fCi/m^3 of ^{239}Pu in air in 1975 as a basis for their dose estimates.* In fact, ^{234}U alone accounts for a greater proportion of the α-emitters released in the plant's exhaust than does ^{239}Pu (FRDA77). Americium-241 and ^{238}Pu from the plant may be more important than ^{239}Pu. Plutonium-241 accounts for more than 8 times more radioactivity in the main exhaust plume than does ^{239}Pu (ERDA77). In addition, a number of other radionuclides other than actinides are released (ERDA77; CDH80; JO81). Thus, Dreyer *et al.* by considering only ^{239}Pu, consider only one of a broad spectrum of radionuclides released by RFP.

Plutonium-239,240 in surface soil can serve as a surrogate to indicate the presence of a host of other radionuclides released by RFP, although higher relative activity may make other radionuclides of greater importance in air. Thus, ^{238}Pu which is released from the main stack in a ratio of 2:100 to ^{239,240}Pu, has been reported to account for 20–40% of plutonium found in air-borne soil (Se77).

The radiotoxicity of plutonium is of considerable controversy. Dr. Morgan calculates that permissible exposures of plutonium in bone should be reduced about 240 times (Mo75). Dr. Myers suggests a reduction of the maximum permissible lung burden to 0.07 nCi (70 pCi, based on radiotoxicity to pulmonary lymph nodes, a reduction by about 228 times of the official guidelines for maximum lung doses for nuclear plant workers) (My72). A hundred-fold reduction in these recommended occupational maximum permissible doses for the public would permit a lung burden of only 70 fCi, and a body burden of only 166 fCi. A study of RFP workers found that workers who have only 1–10% of the body burden permitted by current DOE guidelines (400–4000 pCi) have about a 33% increase in the rate of chromosomal aberrations in blood lymphocytes (Br76). These findings suggest that the current official estimate of the radiotoxicity of plutonium is not protective by a factor of about 200.

Another area of controversy is the number of Denver area residents exposed to radionuclides from RFP. Figure 1 in the Dreyer *et al.* report is taken from "Krey and Hardy, HASL-255, 1970" (unpublished) indicating contamination from RFP extending for about 6 miles from the plant. Krey later published a report in *Health Physics* showing a different figure, indicating plutonium contamination of soil extending completely across Denver, to the southeast, well over 30 km from the plant (Kr76).

Dreyer *et al.* report that "leaking cutting oil drums were determined to be the actual source of contamination which began in about 1967." Actually, this source of contamination began in 1959 and was a problem until 1968 (Se71). However, a fire and explosion in 1957 blew out all 620 industrial high-efficiency particulate air (hepa) filters in the main exhaust system at the Rocky Flats plant and was a much more serious incident (DOE70; DOE58; Ow63; Wo71). The filters had not been changed in the 4 yr of the plant's operation. The plant requires this extensive filter system to prevent large releases of plutonium and uranium to the environment, but is only partially successful (Ow63). The rate of accumulation of plutonium on the filters was described in

*Although Dreyer *et al.*, refer to an estimate based on air concentrations of ^{239,240}Pu, their estimate is based on the air concentration of ^{239}Pu in 1975 (0.37 fCi/m^3) reported by the D.O.E. Environmental Measurements Laboratory (EML).

several RFP reports and a single filter could accumulate more plutonium than the ERDA-EIS acknowledges releasing throughout the period of the plant's operation (Ow63; Wo71). Most of the plutonium on the filters was water-soluble plutonium nitrate (Ha70), which would not be represented by a core sample of sludge on the bottom of a nearby lake, upon which Dreyer *et al.* depend for most of their estimates in their Table 1.

A survey by plant personnel conducted after the fire found 12,000 disintegrations per minute per kilogram (dpm/kg) of "possible enriched uranium" in the schoolyard at the Ralston Elementary School, 12 miles southwest of the plant, 16,000 dpm/kg of soil in the schoolyard at the Semper Elementary School, 6 miles east and 18,000 dpm/kg of soil of "possible plutonium" on private land. (Plutonium concentrations were not reported for the schools (Ha58).) This 1957 survey was not made public until a report was published last August by the Royal Swedish Academy of Sciences (Jo81), and is not cited in the report by Dreyer *et al.*

In addition to the release of plutonium oxide, plutonium nitrate and uranium on the filters, an additional 12–20 kg of plutonium metal were burned in the fire. An RFP report notes that burning plutonium forms sub-micron sized particulates in air and that these particulates do not settle out from industrial exhaust plumes, and do not account for the pattern of soil contamination around the plant (Kr70). The same comment would apply to the accumulation of filtered uranium and plutonium in the exhaust filter system which blew out in the explosion, and to the routine releases of plutonium, uranium and other radionuclides in the plant exhaust. Plutonium and uranium and other α emitters are subject to the α recoil phenomenon, described in *Health Physics* in 1977 (Mc77). The highly energetic projection of α particles from α emitters produces an energetic recoil which drives off single atoms and groups of atoms from the surface of particles. The effect is that small particles of plutonium and uranium and other α emitters continuously are sub-dividing and self-scattering, and migrate through filters and do not settle out to any great extent from industrial plumes, but can provide a risk of inhalation to persons in the path of those plumes.

Dreyer *et al.* take inhalation as the only significant pathway for human exposure to plutonium and "therefore, airborne plutonium must be estimated from 1967, the estimated time of the initial environmental contamination" (Dr82). As indicated by the RFP Environmental Impact Statement, and data from RFP reports summarized in a recent report (Jo81), they have overlooked some very important exposures. They cite Hardy *et al.* who studied a sediment core taken from Standley Lake, located about 4 miles from the plant site, and use their data for $^{239,240}Pu$ to make estimates of air concentrations of $^{239,240}Pu$ between 1967 and 1974, and then make calculations of $^{239,240}Pu$ in air in fCi/m^3 at EML site # 4 (To79).

The only data for release of α radiation emitters that is complete for the period 1953–76 is that for "normal" releases of α radiation to the air from Rocky Flats plant, expressed in mCi/yr (ERDA77). These values can be disputed by reference to other reports (Jo81; DOE70; DOE58; Ow63; Wo71), but do represent one estimate of the relative releases from the plant over this period. Average plutonium concentration measured in the exhaust, from the main stack at RFP has been reported (Ow63) and ranged from 27.27 fCi/m^3 in 1954 (the first full year of operation) to 3451 fCi/m^3 for the month of February in 1962. Stack air monitors were not operational during the fire and explosion (11 September 1957), but when put back in operation on 19 September 1957, recorded an average of 948,000 fCi/m^3 for that day (Ow63). Daily exhaust volume is about 13 million m^3 from the main stack.

Dreyer *et al.* refer to monitoring of plutonium in the ambient air in the vicinity of the plant "over the last 10 yr" by EML which, however, they did not cite (To79). They rely on the EML measurement of ^{239}Pu in air at site # 4 in 1976 for their dose estimates. Site # 4 is about one-half mile due east of the plant and more distant from the usual direction of exhaust plumes from the plant than site # 1 (Kr76). The EML report indicates 1890 aCi/m^3 of ^{239}Pu at site # 1 for June in 1970, rising to a peak of 2260 aCi/m^3 in November, an average for the 7 months reported of 1256 aCi/m^3 (1.26 fCi/m^3). In 1971 levels were as high as 9730 aCi/m^3 (9.73 fCi/m^3) for April, and an average for the year of 5070 aCi/m^3 or 5.07 fCi/m^3. Annual average concentrations of ^{239}Pu at site # 1 in fCi/m^3 were 2.90 in 1972, 2.13 in 1973, 1.76 in 1974, 1.18 in 1975, 1.18 in 1976, and 1.09 fCi/m^3 in 1977, or an average concentration over this 8-yr period of 2.07 fCi/m^3, or about 6 times greater than the 0.37 fCi/m^3 figure used by Dreyer *et al.* for dose calculations, the concentration reported by Toonkel *et al.* for EML site # 4 in 1975 (To79). Further, the ERDA EIS report for the Rocky Flats plant states on p. 2-175 "as of 1975 the total site release from Rocky Flats had been reduced nearly 1000 times from 1965 levels" (ERDA77). Yet Dreyer *et al.* state "for the purpose of estimating a 50-yr α dose it is assumed that the air concentrations as measured at site # 4 *in 1975* (emphasis added) will persist without reduction for 50 yr, and the air concentrations may be scaled from sampling site # 4 to other sites according to the

ratio of the measured ^{239,240}Pu in soil." According to the ERDA EIS, the concentrations of ^{239}Pu in air at site # 4 were about 1000 times higher in 1965, or equivalent to about 370 fCi/m^3. At site # 1, nearer the usual direction of exhaust plumes from the Rocky Flats plant, the concentration of ^{239}Pu was 1.18 fCi/m^3 in 1975, and so could have been about 1180 fCi/m^3 in 1965 and earlier.

The calculated air concentrations by Dreyer *et al.* ranging from 0.27 fCi/m^3 in 1967 to a peak of 2.1 in 1969, can be compared to the measured releases between 1954 and 1962 from the main stack (Jo81; Ow63) and the reported "normal operational release" from all Rocky Flats plutonium facilities (ERDA77). The average concentration of plutonium in the exhaust plume reported for 1962 was 1059 fCi/m^3, equivalent to 5025 μCi of plutonium released from the main stack alone that year (daily exhaust volume is about 13 million m^3). This can be contrasted with the ERDA claim that there was "a normal operational release" of 2974 μCi from all facilities in 1962 (ERDA77).

Since only 28% of α radiation released in the main exhaust plume is ^{239,240}Pu, the amount of α radiation released from the main exhaust stack alone in 1962 can be calculated to be about 18,000 μCi, not considering releases from many of the other stacks or from radioactive waste stored outside (ERDA77).

The D.O.E. EML fallout data for New York City may approximate levels for plutonium from world-wide fallout from nuclear weapons testing, although there is more precipitation there than in more arid parts of the U.S. such as Colorado (To79). The annual average concentrations of plutonium in air for New York City range from 0.006 fCi/m^3 in 1976 to a high of 0.07 fCi/m^3 in 1970, probably due to occasional weapons testing and perhaps also due to nuclear installations located around New York City. The average concentration for the eight-yr period reported (1970–77) was 0.03 fCi/m^3. This "background from world-wide fallout from weapons-testing" can be compared to the estimates by Dreyer *et al.* for the period 1967–74 for site # 4 at RFP. The average of the estimates of Dreyer *et al.* is 1.05 fCi/m^3, about 30 times higher than that for New York City. The average concentration for ^{239}Pu at RFP site # 1 reported by the Toonkel group for the period 1971–76 was 2.37 fCi/m^3. This was over twice the average concentration for site # 4 estimated by Dreyer *et al.*, and about 80 times the fallout level.

It is clear that these levels of plutonium in the air are due to RFP and not to world-wide fallout, and should bring us to question the apparently trivial emissions of α radiation from RFP reported by ERDA (ERDA77). In any event, it is quite clear that in looking at earlier years, the routine releases were very much higher. This is confirmed both by the EIS report and by the AEC internal report indicating the measured releases of plutonium in the main exhaust from the plant (ERDA77; Ow63). The trend over time and the RFP reports suggest exposures ranging from about 80 fCi/m^3 in 1959 to over 300 fCi/m^3 in 1965, four orders of magnitude higher than fallout levels. Further, there is very good evidence that exposures in 1957 and 1958 were much larger than these (Jo81).

Dreyer *et al.* cite Krey's estimate that the mean plutonium levels from world-wide fallout in soil in the Denver area were 1.7 ± 0.5 mCi/km^2, and they say that an equal or greater exposure than that from world-wide fallout would be necessary from RFP before one could distinguish the cause of any increased disease in the population. However, the submicron sized plutonium particles in exhaust plumes simply do not settle out to any appreciable extent (Kr70). Isopleths of plutonium concentrations in soil can only serve to identify the usual direction of exhaust plumes from the plant over a period of years, and do not represent actual exposures to populations in the area.

A study of surface dust on private land found the concentration of plutonium to be as much as 3390 times higher than background levels in the area where Krey shows plutonium in whole soil samples to be only about 30 times higher than fallout levels (Jo81).

Further, the type of soil survey done by Krey *et al.* is designed to measure soil inventories of plutonium to a depth of 10 cm (including fine gravel) and does not get at levels of contamination of plutonium in surface dust or the windblown material on the surface of soil as described by reports in *Science* (Jo76; Jo77).

Another study reports 50,000 fCi of plutonium per g in air-borne soil (Se77) in the area (there may be 0.01–0.02 g dust/m^3 of air*), which can be compared to the 0.37 fCi/m^2 of plutonium used by Dreyer *et al.* to calculate population doses (Dr82). In fact, they based their estimates on air concentrations of plutonium, not on soil concentrations, because "inhalation is the only significant pathway for human exposure to plutonium and other actinides (Dr82). It seems that even the air concentration of plutonium selected by Dreyer *et al.* a concentration about 30 times greater than background levels of plutonium in air, would meet their criterion for an exposure equal or greater than that from worldwide fallout necessary to produce detectable disease in a population.

Dreyer *et al.* continue with their assumptions: "Fifty-year α-dose estimates for basal cells in the

*The frequency of dust storms of ambient concentration 12 mg/m^3 is approximately 14 days per yr over 10 Great Plains states (Sh74).

trachiobronchial tree and bone surface cells are shown in Table 2." Relying on the 0.37 fCi/m^3 concentration of ^{239,240}Pu (actually only ^{239}Pu) measured in 1975 by EML at site ≠ 4, they arrive at a dose of 0.3 mrad to the basal cells in the trachiobronchial tree, and 1.8 mrad to cells on bone surfaces over a 50-yr period beginning in 1967, with correspondingly smaller doses farther from the plant. The estimated average concentration of plutonium in the air over the period 1967–75 indicated by figures in Table 1 (Dreyer *et al.*) are 0.98 fCi/m^3. The average ventilation volume of a person per yr is about 7000 m^3, or for the 9-yr period in Table 1, about 63,000 m^3. If a person absorbed most of the sub-micron plutonium inhaled, using the air concentration of plutonium assumed by Dreyer *et al.*, this would amount to an intake of about 62 pCi of ^{239}Pu for that 9-yr period. The total intake (adding 41 more years of the 1975 concentration of 0.37 fCi/m^3) would be about 170 pCi. A study of plutonium radiotoxicity in which dogs were allowed to inhale 1 μCi of ^{239}Pu produced the following doses: 863 rem to lung, 43,700 rem to pulmonary lymph nodes, 3250 rem to bone, 1320 rem to liver, 170 rem to kidney and 46 rem to gonads (Ba74). Similar doses were produced by the inhalation of 1 μCi of ^{241}Am, ^{238,240}Pu. Persons inhaling 170 pCi of ^{239}Pu alone, by these estimates (assuming equal effects in man) would receive about 144 mrem to lung, 7.4 rem to pulmonary lymph nodes, 552 mrem to bone, 224 mrem to liver and 29 mrem to kidney. This dosage estimate is several orders of magnitude greater than that provided by Dreyer *et al.* (Table 2), considers only one radionuclide of many released by RFP, and considers not at all the much larger releases actually recorded prior to 1975 and does not consider the really major releases in 1957. Also not addressed is the evidence that these larger mrem doses of plutonium may actually be 200 or more times greater, due to an under-estimation of the radiotoxicity of plutonium (Mo75; My72; Br76). Thus the population dose estimates of radiation exposure may under-estimate actual exposures by more than five orders of magnitude.

To further minimize their estimates of dosage, Dreyer *et al.* estimate that the segmental bronchi of the lung receive an α dose of about 140 rem over 50 yr from inhaled, naturally-occurring radon daughters, and a dose to cells on bone surfaces of about 3 rem. However, the EPA estimates those doses to be only 300 mrem to the whole body for a 50-yr period (or 6 mrem yr), and to the endosteal cells, 1.2 rem for the 50-yr period (24 mrem yr) for the average person in the U.S. (EPA76).

Are the ambient levels of uranium and its daughters really much higher in Colorado than elsewhere? Not according to the EPA. For the year of July 1974-June 1975, the average concentration of uranium in air-borne particulates in the Denver area was 0.08 fCi/m^3 (EPA76). The overall network summary for uranium, which includes sampling locations in Alabama, California, Colorado, Florida, Idaho, North Dakota, New Mexico, Nevada, New York, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina and Virginia, was 0.05 fCi/m^3 (EPA76). Some of the uranium may have come from world-wide nuclear weapons fallout, some from nuclear installations. This view is supported by the measureable levels of fissionable ^{235}U in air-borne particulates, which in Denver accounted for 0.005 fCi/m^3. Are these levels of uranium in air important? Not in comparison with the much more radiotoxic plutonium.

Dreyer *et al.* assumed that the air concentrations as measured at site ≠ 4 in 1975 (see their Fig. 1) would persist without reduction for 50 yr into the future. Why not consider the effect of RFPs releases since it began operation in 1953 and consider the much higher dosage levels which must have been sustained by people in the Denver area in the 1950s and 1960s, and develop population radiation dose estimates from that data?

In summary, Dreyer *et al.* report that "the statistical power for detecting one extra cancer against (an expected) background of either 4400 (lung cancers) or 70 (bone cancers) would be no greater than 6%" and "generally, an epidemiological study would not be indicated unless the statistical power was at least 75%." This estimate of "statistical power" is based on very questionable assumptions about radiation exposure levels to the population in the Denver area to only one radioisotope, whose air concentration was measured at one site in 1975 by EML (Toonkel *et al.* report only concentrations of ^{239}Pu in air). There are a number of important documents relative to offsite contamination by the RFP which Dreyer *et al.* do not cite. One such report describes concentrations of 50,000 fCi of plutonium per g in air-borne soil. Other key studies of the efficiency of filters used to monitor levels of plutonium in ambient air indicate gross underestimations of actual concentrations of plutonium in the air (cited in Jo81). Dreyer *et al.* do not consider a host of other radionuclides other than ^{239}Pu acknowledged by the plant to be released routinely, which would certainly contribute to the radiation exposure of persons downwind from the plant. Major releases of radionuclides by the RFP are simply not considered in the dose estimates made by Dreyer *et al.* and the chain of assumptions which provide the foundation for dose estimates are absolutely critical in any evaluation of the feasibility of the type they have attempted to do. It is my view that the weight of evidence presented in reports cited here indicates exposures to radionuclides released by the

RFP to be more than five orders of magnitude greater than those assumed by Dreyer *et al.*

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CDH80 Colorado Department of Health, U.S. Atomic Energy Commission, 1970–80, "Rocky Flats Plant Environmental Surveillance Reports", The Colorado Department of Health.

DOE58 U.S. Department of Energy, Washington, DC, 1958, "The Report of Investigation of Serious Incident in Building 771 on September 11, 1957", Dow Chemical Co.

DOE70 U.S. Department of Energy, Washington, D.C, 1943–70. "Operational accidents and radiation exposure experience within the United States Atomic Energy Commission", WASH 1192.

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of CAROLINA POWER & LIGHT CO. Et al.) Docket 50-400 O.L.
Shearon Harris Nuclear Power Plant, Unit 1)

CERTIFICATEOF SERVICE + Notice of W/drawal of Eddleman 85/86 + 2d motion to admit Contention 58(2d)

I hereby certify that copies of WE Response to Summary Disposition on Contention 67 and of WE response to Summary Disposition on 132(c)(2), and of Carl Johnson Appendix b in full HAVE been served this 5 day of June 1984, by deposit in the US Mail, first-class postage prepaid, upon all parties whose names are listed below, except those whose names are marked with an asterisk, for whom service was accomplished by Hand delivery of Johnson Appendix b in full, also

Judges James Kelley, Glenn Bright and James Carpenter (1 copy each)
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US Nuclear Regulatory Commission
Washington DC 20555

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