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Formerly Utilized Sites Remedial Action Program (FUSRAP)

ADMINISTRATIVE RECORD

for Maywood, New Jersey



U.S. Department of Energy

**Department of Energy**

Field Office, Oak Ridge
P.O. Box 2001
Oak Ridge, Tennessee 37831— 8723

June 7, 1993

Mr. Jeffrey Gratz
Federal Facilities Section
U. S. Environmental Protection Agency,
Region II
26 Federal Plaza
Jacob K. Javits Federal Building
New York, New York 10278

Dear Mr. Gratz:

MAYWOOD SITE - BASELINE RISK ASSESSMENT - CORRECTION TO FINAL DOCUMENT

The purpose of this letter is to transmit to you a correction to the subject document. This information will be placed in the administrative record file in July 1993. If you have any comments, please submit them before this time.

Please contact me at (615) 576-5724 if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Susan M. Cange".

Susan M. Cange, Site Manager
Former Sites Restoration Division

Enclosure

Maywood Baseline Risk Assessment
Correction to Final Document
June, 1993

Actual gamma radiation measurements taken indoors at Maywood Property Unit 7H were entered into the database as outdoor data, and vice-versa. This resulted in an overestimation of the risk present at Property Unit 7H, due to the differences in exposure assumptions. The actual interior readings for this property unit range from 8 to 13 $\mu\text{R/hr}$ and the exterior readings range from 10 to 146 $\mu\text{R/hr}$.

Based on this correction, the following changes are required to the Maywood Baseline Risk Assessment:

- p. 3-44, Table 3-6, "Total Exposure Dose Summary": Under the Current Use Scenario, change the Unit 7H Employee mean to 67 (from 141); change the RME to 117 (from 281). Under the Future Use Scenario, change the Unit 7H Resident mean to 240 (from 499); change the RME to 341 (from 859).
- p. 3-60, Figure 3-10, "Annual Radiological Exposure in the Current Use Scenario (Mean)": Change the 7H exposure range to 25 to 100 mrem/yr (from 100 - 500 mrem/yr).
- p. 3-63, Figure 3-11a, "Annual Radiological Exposure in the Future Use Scenario (RME)": Change the 7H Exposure Range to 100-500 mrem/yr (from > 500mrem/yr).
- p. 5-5, Figure 5-1, "Excess Radiological Cancer Risk for the Current Use Scenario (Mean)": Change the risk range designation for Property Unit 7H to 10^{-4} (from 10^{-3}).
- p. 5-9, Section 5.2.1.1, paragraph 3: Change the second sentence to read: "RME risks range from 3×10^{-3} to 2×10^{-4} ." Change the third sentence to read: "The employees at Property Unit 7H (Sears/Desaussure) are estimated to receive an excess carcinogenic risk of 3×10^{-4} and 2×10^{-3} for the mean and RME conditions, respectively."
- p. 5-11, Section 5.2.1.2, paragraph 1: Change the third sentence to read "Maximum estimated risks are for the future residents at Property Unit 6B, which exceeds 5×10^{-2} ."
- p. C-2, Table C-1, "Estimated Exposure Dosage - Current Employee": For Property Unit 7H, change the direct radiation mean to 34 (from 108), and RME to 66 (from 230). Change the total dose mean to 66.8 (from 140.8), and RME to 116.86 (from 280.86).
- p. C-8, Table C-7, "Estimated Exposure Dosage - Future Resident (Child)": For Property Unit 7H, change the direct radiation mean to 32 (from 351), and RME to 49 (from 748). Change the total dose mean to 239.8 (from 558.8) and RME to 350.6 (from 1049.6).

- p. C-9, Table C-8, "Estimated Exposure Dosage - Future Resident (Adult)": For Property Unit 7H, change the direct radiation mean to 32 (from 351), and RME to 49 (from 748). Change the total dose mean to 59.89 (from 378.89), and RME to 111.73 (from 810.73).
- p. C-10, Table C-9, "Estimated Exposure Dosage - Future Resident (Adult and Child)": For Property Unit 7H, change direct radiation for the mean to 32 (from 351), and RME to 49 (from 748). Change total dose mean to 240.23 (from 498.89), and RME to 341.09 (from 858.51).
- p. D-9, Table D-7, "Actual Measured Data for the Maywood Site": For Property Unit 7H, beginning with indoor gamma, change the numbers in the row to 2 (from 4), 4 (from 61), 5 (from 130), and 5 (from 140). For outdoor gamma, change the numbers to 4 (from 2), 61 (from 4), 130 (from 5), and 140 (from 5).
- p. D-10, Table D-8, "Radiological Dose from Actual Measured Values": For Property Unit 7H, change the numbers in the first four columns for direct gamma to 34 (from 108), 66 (from 230), 32 (from 351), and 49 (from 748).
- p. G-2, Table G-1, "Slope Factor Risk - Current Employee": For Property Unit 7H, change the direct radiation mean to $9E-05$ (from $3E-04$), and RME to $6E-04$ (from $2E-03$). For total without radon, change the mean to $9E-05$ (from $3E-04$), and RME to $7E-04$ (from $2E-03$). For total dose, change the mean to $2E-04$ (from $3E-04$), and RME to $8E-04$ (from $2E-03$).
- p. G-8, Table G-7, "Slope Factor Risk - Future Resident (Child)": For Property Unit 7H, change the direct radiation mean to $7E-05$ (from $7E-04$), and RME to $1E-04$ (from $2E-03$). For total without radon, change the mean to $9E-05$ (from $7E-04$), and RME to $1E-04$ (from $2E-03$). For total dose, change the mean to $6E-04$ (from $1E-03$), and RME to $8E-04$ (from $3E-03$).
- p. G-9, Table G-8, "Slope Factor Risk - Future Resident (Adult)": For Property Unit 7H, change the direct radiation mean to $1E-04$ (from $1E-03$), and RME to $6E-04$ (from $8E-03$). For total without radon, change the mean to $1E-04$ (from $1E-03$), and RME to $7E-04$ (from $9E-03$). For total dose, change the mean to $6E-04$ (from $2E-03$), and RME to $1E-03$ (from $9E-03$).
- p. G-10, Table G-9, "Slope Factor Risk - Future Resident (Adult and Child)": For Property Unit 7H, change the direct radiation mean to $9E-05$ (from $1E-03$), and RME to $5E-04$ (from $7E-03$). Change the total without radon mean to $1E-04$ (from $1E-03$), and RME to $6E-04$ (from $7E-03$). Change the total dose mean to $6E-04$ (from $1E-03$), and RME to $1E-03$ (from $8E-03$).

- p. G-12, Table G-11, "Dose Factor vs. Slope Factor Risk Comparison": For Property Unit 7H, under the current use scenario, change the employee risk mean to 0.8 (from 1.7), and RME to 0.9 (from 2.1). For the future use scenario, change the resident risk mean to 0.9 (from 1.8), and the RME to 0.8 (from 1.9)

Note: Amended tables are attached.

Table G-11. Dose Factor vs. Slope Factor Risk Comparison*

| CURRENT USE SCENARIO | | | | | | | |
|---------------------------|------------------|----------|-----|----------|-----|-----------|-----|
| LOCATION | PROPERTY UNIT | Employee | | Resident | | Transient | |
| | | Mean | RME | Mean | RME | Mean | RME |
| RESIDENTIAL | UNIT 1 | | | 2.0 | 4.1 | | |
| | UNIT 2 | | | 6.4 | 4.6 | | |
| STEPAN | UNIT 3 | 1.5 | 4.8 | | | 1.85 | 3.6 |
| | UNIT 3H | 1.7 | 4.0 | | | | |
| MUNICIPAL PARKS | UNIT4 | | | | | 1.6 | 1.4 |
| COMMERCIAL/ GOVERNMENT | UNIT 5 | 1.7 | 1.7 | | | | |
| | UNIT 6 (MISS) | 1.8 | 2.4 | | | 1.5 | 1.9 |
| | UNIT 6H | 1.8 | 1.5 | | | 1.7 | 1.8 |
| | UNIT 6B (BALLOD) | | | | | 0.7 | 0.6 |
| | UNIT 7 | 2.1 | 3.3 | | | | |
| | UNIT 7H | 0.5 | 0.9 | | | | |
| | UNIT 8 | | | | | 1.6 | 3.7 |
| FUTURE USE SCENARIO | | | | | | | |
| LOCATION | PROPERTY UNIT | Employee | | Resident | | Transient | |
| | | Mean | RME | Mean | RME | Mean | RME |
| RESIDENTIAL | UNIT 1 | | | 2.0 | 4.1 | | |
| | UNIT 2 | | | 6.4 | 5.6 | | |
| STEPAN | UNIT 3 | 1.5 | 4.8 | | | | |
| | UNIT 3H | 1.8 | 4.0 | | | | |
| MUNICIPAL PARKS | UNIT4 | | | 2.1 | 1.7 | | |
| COMMERCIAL/ GOVERNMENT | UNIT 5 | | | 2.2 | 2.1 | | |
| | UNIT 6 (MISS) | 1.6 | 2.4 | | | 1.5 | 1.9 |
| | UNIT 6H | 2.3 | 1.7 | | | 1.4 | 1.6 |
| | UNIT 6B (BALLOD) | | | 2.2 | 2.0 | | |
| | UNIT 7 | | | 4.9 | 6.3 | | |
| | UNIT 7H | | | 0.9 | 0.8 | | |
| | UNIT 8 | 1.6 | 1.7 | | | | |

* Dose factor risk/slope factor risk

Denotes revision from Final BRA, March '93

D-8. RADIOLOGICAL DOSE FROM ACTUAL MEASURED VALUES*

| RADON (mrem/yr) | | | | | | | |
|---------------------------|------------------|----------|-----|----------|-----|-----------|-----|
| LOCATION | PROPERTY UNIT | Employee | | Resident | | Transient | |
| | | Mean | RME | Mean | RME | Mean | RME |
| RESIDENTIAL | UNIT 1 | | | 22 | 186 | | |
| | UNIT 2 | | | 0 | 0 | | |
| STEPAN | UNIT 3 | 17 | 38 | | | ND | ND |
| | UNIT 3H | ND | ND | | | | |
| MUNICIPAL PARKS | UNIT 4 | | | 0 | 0 | 0 | 0 |
| COMMERCIAL/ GOVERNMENT | UNIT 5 | 0 | 0 | 0 | 0 | | |
| | UNIT 6 (MISS) | 37 | 52 | | | 1 | 1 |
| | UNIT 6H | 0 | 0 | | | 1 | 9 |
| | UNIT 6B (BALLOD) | | | ND | ND | ND | ND |
| | UNIT 7 | 0 | 13 | 0 | 43 | | |
| | UNIT 7H | ND | ND | ND | ND | | |
| | UNIT 8 | ND | ND | | | ND | ND |
| DIRECT GAMMA (mrem/yr) | | | | | | | |
| LOCATION | PROPERTY UNIT | Employee | | Resident | | Transient | |
| | | Mean | RME | Mean | RME | Mean | RME |
| RESIDENTIAL | UNIT 1 | | | 27 | 57 | | |
| | UNIT 2 | | | 1 | 3 | | |
| STEPAN | UNIT 3 | 4 | 4 | | | 0 | 1 |
| | UNIT 3H | 10 | 12 | | | | |
| MUNICIPAL PARKS | UNIT 4 | | | 31 | 51 | 0.3 | 5 |
| COMMERCIAL/ GOVERNMENT | UNIT 5 | 9 | 14 | 28 | 40 | | |
| | UNIT 6 (MISS) | 76 | 87 | | | 2 | 23 |
| | UNIT 6H | | | | | 15 | 180 |
| | UNIT 6B (BALLOD) | | | ND | ND | ND | ND |
| | UNIT 7 | 7 | 10 | 12 | 13 | | |
| | UNIT 7H | 34 | 66 | 32 | 49 | | |
| | UNIT 8 | ND | ND | | | ND | ND |

RME=REASONABLE MAXIMUM EXPOSURE

ND=NO MEASURED DATA AVAILABLE FOR SCENARIO

*BACKGROUND SUBTRACTED

ZERO EXPOSURE VALUES ARE BELOW BACKGROUND

Denotes revision from Final BRA, March '93

TABLE D-7. ACTUAL MEASURED DATA FOR THE MAYWOOD SITE*

| LOCATION | PROPERTY UNIT | INDOOR RADON (pCi/l) | | | | OUTDOOR RADON (pCi/l) | | | |
|---------------------------|------------------|-------------------------|------|--------|-----|--------------------------|------|--------|-----|
| | | n | mean | UCL 95 | max | n | mean | UCL 95 | max |
| RESIDENTIAL | UNIT 1 | 25 | 0.1 | 1.2 | 12 | | | | |
| | UNIT 2 | 8 | 0 | 0 | 0 | | | | |
| STEPAN | UNIT 3 | 7 | 0.4 | 0.8 | 1 | | | | |
| | UNIT 3H | | | | | | | | |
| MUNICIPAL PARKS | UNIT 4 | 2 | 0 | 0 | 0 | | | | |
| | UNIT 5 | 7 | 0 | 0 | 0 | | | | |
| COMMERCIAL/ GOVERNMENT | UNIT 6 (MISS) | | | | | 11 | 1 | 1 | 3 |
| | UNIT 6H | 1 | 0 | 0 | 0 | 2 | 1 | 1 | 1 |
| | UNIT 6B (BALLOD) | | | | | | | | |
| | UNIT 7 | 5 | 0 | 0.3 | 1 | | | | |
| | UNIT 7H | | | | | | | | |
| | UNIT 8 | | | | | | | | |

| LOCATION | PROPERTY UNIT | INDOOR GAMMA (uR/hour) | | | | OUTDOOR GAMMA (uR/hour) | | | |
|---------------------------|------------------|---------------------------|------|--------|-----|----------------------------|------|--------|------|
| | | n | mean | UCL 95 | max | n | mean | UCL 95 | max |
| RESIDENTIAL | UNIT 1 | 19 | 5 | 10 | 56 | 232 | 5 | 5 | 43 |
| | UNIT 2 | 6 | 0 | 0.3 | 1 | 62 | 6 | 7 | 41 |
| STEPAN | UNIT 3 | 81 | 2 | 2 | 11 | 157 | 1 | 2 | 31 |
| | UNIT 3H | 189 | 2 | 3 | 27 | 341 | 14 | 16 | 142 |
| MUNICIPAL PARKS | UNIT 4 | | 5 | 9 | 59 | 30 | 7 | 11 | 74 |
| | UNIT 5 | 2 | 5 | 7 | 7 | 66 | 2 | 4 | 68 |
| COMMERCIAL/ GOVERNMENT | UNIT 6 (MISS) | | 33 | 38 | 362 | 242 | 41 | 47 | 452 |
| | UNIT 6H | 1 | 79 | 85 | 79 | 85 | 310 | 368 | 1392 |
| | UNIT 6B (BALLOD) | | | | | | | | |
| | UNIT 7 | 2 | 2 | 2 | 2 | 15 | 8 | 16 | 68 |
| | UNIT 7H | 2 | 4 | 5 | 5 | 4 | 61 | 130 | 140 |
| | UNIT 8 | | | | | | | | |

MAX VALUES USED FOR UCL95- when $n < 3$ or $UCL95 > \text{max}$

= .8*OUTDOOR WHEN NO INDOOR GAMMA AVAILABLE

*BACKGROUND SUBTRACTED

ZERO EXPOSURE VALUES ARE BELOW BACKGROUND

Denotes revision from Final BRA, March '93

Table C-7. Estimated Exposure Dosage - Future Resident (Child)

mrem/yr

| LOCATION | PROPERTY UNIT | SOIL | | WATER | | INHALATION | | DIRECT RAD. | | PLANT ING. | | TOTAL W/O Rn | | RADON | | TOTAL DOSE | |
|---------------------------|------------------|--------|--------|--------|--------|------------|--------|-------------|------|------------|--------|--------------|--------|-------|--------|------------|--------|
| | | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME |
| RESIDENTIAL | UNIT 1 | 0.2017 | 0.4738 | 0 | 0 | 0.2 | 0.6507 | 27 | 57 | 1.4066 | 2.6659 | 28.808 | 60.79 | 22 | 186 | 50.808 | 246.79 |
| | UNIT 2 | 0.5582 | 1.385 | 0 | 0 | 0.5785 | 2.001 | 1 | 3 | 3.5353 | 6.777 | 5.672 | 13.163 | 0 | 0 | 5.672 | 13.163 |
| STEPAN | UNIT 3 | | | | | | | | | | | | | | | | |
| | UNIT 3H | | | | | | | | | | | | | | | | |
| MUNICIPAL PARKS | UNIT 4 | 0.118 | 0.3344 | 0.0084 | 0.1317 | 0.111 | 0.4389 | 31 | 51 | 0.8533 | 1.8918 | 32.089 | 53.797 | 0 | 0 | 32.089 | 53.797 |
| COMMERCIAL/ GOVERNMENT | UNIT 5 | 0.1648 | 0.3909 | 0 | 0 | 0.1452 | 0.4731 | 28 | 40 | 1.0513 | 2.0347 | 29.361 | 42.899 | 0 | 0 | 29.361 | 42.899 |
| | UNIT 6 (MISS) | | | | | | | | | | | | | | | | |
| | UNIT 6H | | | | | | | | | | | | | | | | |
| | UNIT 6B (BALLOD) | 4.76 | 25.35 | 1.826 | 7.243 | 4.024 | 29.57 | 934.7 | 2482 | 104.08 | 284.63 | 1049.4 | 2828.8 | 14.4 | 30.79 | 1063.8 | 2859.6 |
| | UNIT 7 | 1.523 | 4.929 | 2.381 | 4.5409 | 1.246 | 5.797 | 12 | 13 | 23.15 | 55.419 | 40.3 | 83.686 | 0 | 43 | 40.3 | 126.69 |
| | UNIT 7H | 3.167 | 8.383 | 0 | 0 | 2.863 | 10.51 | 52 | 49 | 20.57 | 55.786 | 58.6 | 123.68 | 181.2 | 226.97 | 239.8 | 350.65 |
| | UNIT 8 | | | | | | | | | | | | | | | | |

Bold cells indicate doses from actual measured values

X = Mean

RME = Reasonable Maximum Exposure

NP = No Pathway

 Denotes revision from Final BRA, March '93

Table C-8. Estimated Exposure Dosage - Future Resident (Adult)

mrem/yr

| LOCATION | PROPERTY UNIT | SOIL | | WATER | | INHALATION | | DIRECT RAD. | | PLANT ING. | | TOTAL W/O Rn | | RADON | | TOTAL DOSE | |
|---------------------------|------------------|-----------|--------|-----------|--------|------------|--------|-------------|------|------------|--------|--------------|--------|-----------|-----|------------|--------|
| | | INGESTION | | INGESTION | | INGESTION | | INGESTION | | INGESTION | | INGESTION | | INGESTION | | INGESTION | |
| | | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME |
| RESIDENTIAL | UNIT 1 | 0.121 | 0.2369 | 0 | 0 | 0.1823 | 0.5769 | 27 | 57 | 2.2501 | 2.3809 | 29.553 | 60.195 | 22 | 188 | 51.553 | 248.19 |
| | UNIT 2 | 0.3349 | 0.6928 | 0 | 0 | 0.5273 | 1.744 | 1 | 3 | 5.655 | 6.031 | 7.5172 | 11.468 | 0 | 0 | 7.5172 | 11.468 |
| STEPAN | UNIT 3 | | | | | | | | | | | | | | | | |
| | UNIT 3H | | | | | | | | | | | | | | | | |
| MUNICIPAL PARKS | UNIT4 | 0.0708 | 0.1692 | 0.1637 | 0.3292 | 0.1012 | 0.3891 | 31 | 51 | 1.355 | 1.6219 | 32.69 | 53.509 | 0 | 0 | 32.69 | 53.509 |
| COMMERCIAL/ GOVERNMENT | UNIT 5 | 0.0989 | 0.1955 | 0 | 0 | 0.1323 | 0.4194 | 28 | 40 | 1.6823 | 1.8207 | 29.913 | 42.436 | 0 | 0 | 29.913 | 42.436 |
| | UNIT 6 (MISS) | | | | | | | | | | | | | | | | |
| | UNIT 6H | | | | | | | | | | | | | | | | |
| | UNIT 6B (BALLOD) | 2.855 | 12.88 | 4.46 | 18.81 | 3.657 | 26.22 | 935.8 | 2482 | 104.89 | 244.07 | 1051.7 | 2783.8 | 0 | 0 | 1051.7 | 2783.8 |
| | UNIT 7 | 0.8504 | 2.465 | 3.5005 | 11.35 | 1.027 | 5.14 | 12 | 13 | 38.167 | 47.847 | 55.545 | 79.602 | 0 | 43 | 55.545 | 122.6 |
| | UNIT 7H | 1.9 | 4.192 | 0 | 0 | 2.81 | 9.322 | 32 | 49 | 23.38 | 49.216 | 59.89 | 111.73 | 0 | 0 | 59.89 | 111.73 |
| | UNIT 8 | | | | | | | | | | | | | | | | |

Bold cells indicate doses from actual measured values

X = Mean

RME = Reasonable Maximum Exposure

NP = No Pathway

Denotes revision from Final BRA, March '93

Table C-1. Estimated Exposure Dosage - Current Employee

| LOCATION | PROPERTY UNIT | mrem/yr | | | | | | | | | | | | | |
|---------------------------|------------------|----------------|--------|-----------------|-----|------------|--------|-------------|-----|--------------|--------|-------|-------|------------|--------|
| | | SOIL INGESTION | | WATER INGESTION | | INHALATION | | DIRECT RAD. | | TOTAL w/o Rn | | RADON | | TOTAL DOSE | |
| | | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME |
| RESIDENTIAL | UNIT 1 | | | | | | | | | | | | | | |
| | UNIT 2 | | | | | | | | | | | | | | |
| STEPAN | UNIT 3 | 0.0244 | 0.0588 | NP | NP | 0.2613 | 1.029 | 4 | 4 | 4.2857 | 5.0878 | 17 | 38 | 21.286 | 43.088 |
| | UNIT 3H | 0.1145 | 0.2381 | NP | NP | 1.13 | 3.665 | 10 | 12 | 11.245 | 15.903 | 41.28 | 61.86 | 52.525 | 77.763 |
| MUNICIPAL PARKS | UNIT4 | | | | | | | | | | | | | | |
| COMMERCIAL/ GOVERNMENT | UNIT 5 | 0.0164 | 0.0324 | NP | NP | 0.1859 | 0.5842 | 9 | 14 | 9.2023 | 14.617 | 0 | 0 | 9.2023 | 14.617 |
| | UNIT 6 (MISS) | 0.0766 | 0.172 | NP | NP | 0.8747 | 3.158 | 76 | 87 | 76.951 | 90.33 | 37 | 52 | 113.95 | 142.33 |
| | UNIT 6H | | | | | | | 138 | 149 | 138 | 149 | 32.95 | 57.7 | 170.95 | 206.7 |
| | UNIT 6B (BALLOD) | | | | | | | | | | | | | | |
| | UNIT 7 | 0.1538 | 0.332 | NP | NP | 1.854 | 6.363 | 7 | 10 | 9.0078 | 16.695 | 0 | 13 | 9.0078 | 29.695 |
| | UNIT 7H | 0.3151 | 0.6959 | NP | NP | 3.666 | 12.99 | 34 | 66 | 37.981 | 79.686 | 28.82 | 37.17 | 66.801 | 116.86 |
| | UNIT 8 | | | | | | | | | | | | | | |

Bold cells indicate doses from actual measured values

X = Mean

RME = Reasonable Maximum Exposure

NP = No Pathway

ND = No Data

 Denotes revision from Final BRA, March '93

Table C-9. Estimated Exposure Dosage - Future Resident (Adult and Child)

| LOCATION | PROPERTY UNIT | mrem/yr | | | | | | | | | | | | | | | |
|---------------------------|------------------|----------------|--------|-----------------|--------|------------|--------|-------------|------|------------|--------|--------------|--------|--------|--------|------------|--------|
| | | SOIL INGESTION | | WATER INGESTION | | INHALATION | | DIRECT RAD. | | PLANT ING. | | TOTAL W/O Rn | | RADON | | TOTAL DOSE | |
| | | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME |
| RESIDENTIAL | UNIT 1 | 0.1748 | 0.2843 | 0 | 0 | 0.1941 | 0.5917 | 27 | 57 | 1.6878 | 2.4379 | 29.057 | 60.314 | 18.69 | 21.41 | 51.057 | 246.31 |
| | UNIT 2 | 0.4838 | 0.8311 | 0 | 0 | 0.5614 | 1.7954 | 1 | 3 | 4.2419 | 6.1802 | 6.2871 | 11.807 | 39.73 | 44.75 | 6.2871 | 11.807 |
| STEPAN | UNIT 3 | | | | | | | | | | | | | | | | |
| | UNIT 3H | | | | | | | | | | | | | | | | |
| MUNICIPAL PARKS | UNIT 4 | 0.1022 | 0.2022 | 0.0588 | 0.2897 | 0.1077 | 0.3991 | 31 | 51 | 1.0205 | 1.6759 | 32.289 | 53.567 | 6.4 | 8.67 | 32.289 | 53.567 |
| COMMERCIAL/ GOVERNMENT | UNIT 5 | 0.1428 | 0.2346 | 0 | 0 | 0.1409 | 0.4301 | 28 | 40 | 1.2616 | 1.8635 | 29.545 | 42.528 | 11.56 | 13.5 | 29.545 | 42.528 |
| | UNIT 6 (MISS) | | | | | | | | | | | | | | | | |
| | UNIT 6H | | | | | | | | | | | | | | | | |
| | UNIT 6B (BALLOD) | 4.125 | 15.214 | 2.704 | 16.497 | 3.9017 | 26.89 | 935.07 | 2482 | 104.35 | 252.19 | 1050.1 | 2792.8 | 14.4 | 30.79 | 1059.7 | 2798.9 |
| | UNIT 7 | 1.2988 | 2.9578 | 2.7542 | 9.988 | 1.173 | 5.2714 | 12 | 13 | 28.156 | 49.202 | 45.382 | 80.419 | 157.61 | 258.76 | 45.382 | 123.42 |
| | UNIT 7H | 2.7447 | 5.0302 | 0 | 0 | 2.7787 | 9.5596 | 32 | 49 | 21.507 | 50.53 | 59.03 | 114.12 | 181.2 | 226.97 | 240.23 | 341.00 |
| | UNIT 8 | | | | | | | | | | | | | | | | |

Bold cells indicate doses from actual measured values

X = Mean

RME = Reasonable Maximum Exposure

NP = No Pathway

Denotes revision from Final BRA, March '93

Table G-1. Slope Factor Risk - Current Employee

| LOCATION | PROPERTY UNIT | SOIL | | WATER | | INHALATION | | DIRECT RAD. | | TOTAL w/o Rn | | RADON | | TOTAL DOSE | |
|---------------------------|------------------|-----------|-------|-----------|-------|------------|-------|-------------|-------|--------------|-------|-----------|-------|------------|-------|
| | | INGESTION | | INGESTION | | INGESTION | | INGESTION | | INGESTION | | INGESTION | | INGESTION | |
| | | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME |
| RESIDENTIAL | UNIT 1 | | | | | | | | | | | | | | |
| | UNIT 2 | | | | | | | | | | | | | | |
| STEPAN | UNIT 3 | 8E-09 | 7E-08 | NP | NP | 1E-07 | 2E-06 | 1E-05 | 3E-05 | 1E-05 | 3E-05 | 5E-05 | 1E-04 | 6E-05 | 1E-04 |
| | UNIT 3H | 4E-08 | 3E-07 | NP | NP | 5E-07 | 6E-06 | 3E-05 | 9E-05 | 3E-05 | 1E-04 | 1E-04 | 2E-04 | 1E-04 | 3E-04 |
| MUNICIPAL PARKS | UNIT 4 | | | | | | | | | | | | | | |
| COMMERCIAL/ GOVERNMENT | UNIT 5 | 5E-09 | 4E-08 | NP | NP | 1E-07 | 1E-06 | 2E-05 | 1E-04 | 2E-05 | 1E-04 | 0E+00 | 0E+00 | 2E-05 | 1E-04 |
| | UNIT 6 (MISS) | 2E-08 | 2E-07 | NP | NP | 5E-07 | 6E-06 | 2E-04 | 8E-04 | 2E-04 | 8E-04 | 1E-04 | 1E-04 | 3E-04 | 9E-04 |
| | UNIT 6H | 0E+00 | 0E+00 | 0E+00 | 0E+00 | 0E+00 | 0E+00 | 4E-04 | 1E-03 | 4E-04 | 1E-03 | 7E-05 | 6E-04 | 4E-04 | 2E-03 |
| | UNIT 6B (BALLOD) | | | | | | | | | | | | | | |
| | UNIT 7 | 4E-08 | 3E-07 | NP | NP | 1E-06 | 1E-05 | 2E-05 | 8E-05 | 2E-05 | 9E-05 | 0E+00 | 4E-05 | 2E-05 | 1E-04 |
| | UNIT 7H | 9E-08 | 7E-07 | NP | NP | 2E-06 | 2E-05 | 9E-05 | 6E-04 | 9E-05 | 7E-04 | 8E-05 | 1E-04 | 2E-04 | 8E-04 |
| | UNIT 8 | | | | | | | | | | | | | | |

Bold cells indicate risk from actual measured values

X = Mean

RME = Reasonable Maximum Exposure

NP = No Pathway

ND = No Data

 Denotes revision from Final BRA, March '93

Table 5-1. Radiological Risk Summary

| CURRENT USE SCENARIO | | | | | | | |
|---------------------------|------------------|----------|-------|----------|-------|-----------|-------|
| LOCATION | PROPERTY UNIT | Employee | | Resident | | Transient | |
| | | Mean | RME | Mean | RME | Mean | RME |
| RESIDENTIAL | UNIT 1 | | | 3E-04 | 4E-03 | | |
| | UNIT 2 | | | 3E-05 | 2E-04 | | |
| STEPAN | UNIT 3 | 9E-05 | 6E-04 | | | 2E-07 | 9E-05 |
| | UNIT 3H | 2E-04 | 1E-03 | | | | |
| MUNICIPAL PARKS | UNIT4 | | | | | 2E-06 | 9E-05 |
| COMMERCIAL/ GOVERNMENT | UNIT 5 | 4E-05 | 2E-04 | | | | |
| | UNIT 6 (MISS) | 5E-04 | 2E-03 | | | 2E-05 | 4E-04 |
| | UNIT 6H | 7E-04 | 3E-03 | | | 9E-05 | 3E-03 |
| | UNIT 6B (BALLOD) | | | | | 1E-05 | 2E-04 |
| | UNIT 7 | 4E-05 | 4E-04 | | | | |
| | UNIT 7H | 3E-04 | 2E-03 | | | | |
| | UNIT 8 | | | | | 2E-05 | 3E-04 |
| FUTURE USE SCENARIO | | | | | | | |
| LOCATION | PROPERTY UNIT | Employee | | Resident | | Transient | |
| | | Mean | RME | Mean | RME | Mean | RME |
| RESIDENTIAL | UNIT 1 | | | 3E-04 | 4E-03 | | |
| | UNIT 2 | | | 3E-05 | 2E-04 | | |
| STEPAN | UNIT 3 | 9E-05 | 6E-04 | | | | |
| | UNIT 3H | 2E-04 | 1E-03 | | | | |
| MUNICIPAL PARKS | UNIT4 | | | 2E-04 | 1E-03 | | |
| COMMERCIAL/ GOVERNMENT | UNIT 5 | | | 2E-04 | 8E-04 | | |
| | UNIT 6 (MISS) | 5E-04 | 2E-03 | | | 2E-05 | 9E-05 |
| | UNIT 6H | 9E-04 | 5E-03 | | | 9E-05 | 3E-03 |
| | UNIT 6B (BALLOD) | | | 6E-03 | 5E-02 | | |
| | UNIT 7 | | | 2E-04 | 2E-03 | | |
| | UNIT 7H | | | 1E-03 | 6E-03 | | |
| | UNIT 8 | 8E-04 | 7E-03 | | | | |

RME = Reasonable Maximum Exposure

Denotes revision from Final BRA, March '93

Table 3-6. Total Exposure Dose Summary

| CURRENT USE SCENARIO (mrem/yr) | | | | | | | |
|-----------------------------------|------------------|----------|-----|----------|------|-----------|-----|
| LOCATION | PROPERTY UNIT | Employee | | Resident | | Transient | |
| | | Mean | RME | Mean | RME | Mean | RME |
| RESIDENTIAL | UNIT 1 | | | 51 | 246 | | |
| | UNIT 2 | | | 6 | 12 | | |
| STEPAN | UNIT 3 | 21 | 43 | | | 0.04 | 5 |
| | UNIT 3H | 53 | 78 | | | | |
| MUNICIPAL PARKS | UNIT 4 | | | | | 0.3 | 5 |
| | UNIT 5 | 9 | 15 | | | | |
| COMMERCIAL/ GOVERNMENT | UNIT 6 (MISS) | 114 | 142 | | | 3 | 24 |
| | UNIT 6H | 171 | 207 | | | 16 | 189 |
| | UNIT 6B (BALLOD) | | | | | 2 | 10 |
| | UNIT 7 | 9 | 30 | | | | |
| | UNIT 7H | 67 | 117 | | | | |
| UNIT 8 | | | | | 3 | 18 | |
| FUTURE USE SCENARIO (mrem/yr) | | | | | | | |
| LOCATION | PROPERTY UNIT | Employee | | Resident | | Transient | |
| | | Mean | RME | Mean | RME | Mean | RME |
| RESIDENTIAL | UNIT 1 | | | 51 | 246 | | |
| | UNIT 2 | | | 6 | 12 | | |
| STEPAN | UNIT 3 | 21 | 43 | | | | |
| | UNIT 3H | 55 | 85 | | | | |
| MUNICIPAL PARKS | UNIT 4 | | | 32 | 54 | | |
| | UNIT 5 | | | 30 | 43 | | |
| COMMERCIAL/ GOVERNMENT | UNIT 6 (MISS) | 116 | 146 | | | 3 | 24 |
| | UNIT 6H | 210 | 331 | | | 17 | 191 |
| | UNIT 6B (BALLOD) | | | 1060 | 2799 | | |
| | UNIT 7 | | | 45 | 123 | | |
| | UNIT 7H | | | 240 | 341 | | |
| UNIT 8 | 193 | 475 | | | | | |

RME = Reasonable Maximum Exposure

Denotes revision from Final BRA, March '93

Table G-7. Slope Factor Risk - Future Resident (Child)

| | PROPERTY UNIT | SOIL | | WATER | | INHALATION | | DIRECT RAD. | | PLANT ING. | | TOTAL W/O Rn | | RADON | | TOTAL DOSE | |
|---------------------------|------------------|-----------|-------|-----------|-------|------------|-------|-------------|-------|------------|-------|--------------|-------|-------|-------|------------|-------|
| | | INGESTION | | INGESTION | | X | | RME | | X | | RME | | X | | RME | |
| | | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME |
| RESIDENTIAL | UNIT 1 | 5E-08 | 1E-07 | 0E+00 | 0E+00 | 9E-08 | 3E-07 | 6E-05 | 1E-04 | 7E-07 | 1E-06 | 6E-05 | 1E-04 | 7E-05 | 5E-04 | 1E-04 | 6E-04 |
| | UNIT 2 | 1E-07 | 3E-07 | 0E+00 | 0E+00 | 3E-07 | 9E-07 | 2E-06 | 8E-06 | 2E-06 | 3E-06 | 4E-06 | 1E-05 | 0E+00 | 0E+00 | 4E-06 | 1E-05 |
| STEPAN | UNIT 3 | | | | | | | | | | | | | | | | |
| | UNIT 3H | | | | | | | | | | | | | | | | |
| MUNICIPAL PARKS | UNIT 4 | 3E-08 | 8E-08 | 2E-08 | 4E-08 | 4E-08 | 2E-07 | 7E-05 | 1E-04 | 4E-07 | 8E-07 | 7E-05 | 1E-04 | 0E+00 | 0E+00 | 7E-05 | 1E-04 |
| COMMERCIAL/ GOVERNMENT | UNIT 5 | 4E-08 | 1E-07 | 0E+00 | 0E+00 | 7E-08 | 2E-07 | 6E-05 | 9E-05 | 5E-07 | 1E-08 | 6E-05 | 9E-05 | 0E+00 | 0E+00 | 6E-05 | 9E-05 |
| | UNIT 6 (MISS) | | | | | | | | | | | | | | | | |
| | UNIT 6H | | | | | | | | | | | | | | | | |
| | UNIT 6B (BALLOD) | 1E-06 | 7E-06 | 9E-07 | 4E-06 | 2E-06 | 1E-05 | 2E-03 | 6E-03 | 5E-05 | 1E-04 | 2E-03 | 6E-03 | 4E-05 | 9E-05 | 2E-03 | 6E-03 |
| | UNIT 7 | 5E-07 | 1E-06 | 8E-07 | 2E-06 | 6E-07 | 2E-06 | 3E-05 | 3E-05 | 1E-05 | 3E-05 | 4E-05 | 6E-05 | 0E+00 | 1E-04 | 4E-05 | 2E-04 |
| | UNIT 7H | 8E-07 | 2E-08 | 0E+00 | 0E+00 | 1E-06 | 4E-06 | 7E-05 | 1E-04 | 1E-05 | 3E-05 | 9E-05 | 1E-04 | 5E-04 | 7E-04 | 6E-04 | 3E-04 |
| | UNIT 8 | | | | | | | | | | | | | | | | |

Bold cells indicate risk from actual measured values

X = Mean

RME = Reasonable Maximum Exposure

NP = No Pathway

 Denotes revision from Final BRA, March '93

Table G-8. Slope Factor Risk - Future Resident (Adult)

| | PROPERTY UNIT | SOIL INGESTION | | WATER INGESTION | | INHALATION | | DIRECT RAD. | | PLANT ING. | | TOTAL W/O Rn | | RADON | | TOTAL DOSE | |
|---------------------------|------------------|----------------|-------|-----------------|-------|------------|-------|-------------|-------|------------|-------|--------------|-------|-------|-------|------------|-------|
| | | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME |
| | | | | | | | | | | | | | | | | | |
| RESIDENTIAL | UNIT 1 | 5E-08 | 3E-07 | 0E+00 | 0E+00 | 1E-07 | 1E-06 | 9E-05 | 7E-04 | 2E-06 | 6E-06 | 9E-05 | 7E-04 | 7E-05 | 5E-04 | 2E-04 | 1E-03 |
| | UNIT 2 | 1E-07 | 9E-07 | 0E+00 | 0E+00 | 4E-07 | 4E-06 | 3E-06 | 3E-05 | 4E-06 | 1E-05 | 8E-06 | 4E-05 | 0E+00 | 0E+00 | 8E-06 | 4E-05 |
| STEPAN | UNIT 3 | | | | | | | | | | | | | | | | |
| | UNIT 3H | | | | | | | | | | | | | | | | |
| MUNICIPAL PARKS | UNIT 4 | 3E-08 | 4E-07 | 8E-08 | 5E-07 | 6E-08 | 1E-06 | 1E-04 | 7E-04 | 8E-07 | 4E-06 | 1E-04 | 7E-04 | 0E+00 | 0E+00 | 1E-04 | 7E-04 |
| COMMERCIAL/ GOVERNMENT | UNIT 5 | 4E-08 | 3E-07 | 0E+00 | 0E+00 | 9E-08 | 9E-07 | 1E-04 | 4E-04 | 1E-06 | 5E-06 | 1E-04 | 4E-04 | 0E+00 | 0E+00 | 1E-04 | 4E-04 |
| | UNIT 6 (MISS) | | | | | | | | | | | | | | | | |
| | UNIT 6H | | | | | | | | | | | | | | | | |
| | UNIT 6B (BALLOD) | 1E-06 | 2E-05 | 5E-06 | 4E-05 | 3E-06 | 5E-05 | 3E-03 | 3E-02 | 5E-05 | 6E-04 | 3E-03 | 3E-02 | 4E-05 | 9E-05 | 3E-03 | 3E-02 |
| | UNIT 7 | 4E-07 | 4E-06 | 3E-06 | 2E-05 | 8E-07 | 1E-05 | 4E-05 | 1E-04 | 3E-05 | 1E-04 | 7E-05 | 3E-04 | 0E+00 | 1E-04 | 7E-05 | 4E-04 |
| | UNIT 7H | 7E-07 | 5E-06 | 0E+00 | 0E+00 | 2E-06 | 2E-05 | 1E-04 | 6E-04 | 2E-05 | 1E-04 | 1E-04 | 7E-04 | 5E-04 | 7E-04 | 6E-04 | 1E-03 |
| UNIT 8 | | | | | | | | | | | | | | | | | |

Bold cells indicate risk from actual measured values

X = Mean

RME = Reasonable Maximum Exposure

NP = No Pathway

Denotes revision from Final BRA, March '93

Table G-9. Slope Factor Risk - Future Resident (Adult and Child)

| | PROPERTY UNIT | SOIL | | WATER | | INHALATION | | DIRECT RAD. | | PLANT ING. | | TOTAL W/O Rn | | RADON | | TOTAL DOSE | |
|---------------------------|------------------|-----------|-------|-----------|-------|------------|-------|-------------|-------|------------|-------|--------------|-------|-------|-------|------------|-------|
| | | INGESTION | | INGESTION | | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME |
| | | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME | X | RME |
| RESIDENTIAL | UNIT 1 | 5E-08 | 3E-07 | 0E+00 | 0E+00 | 1E-07 | 1E-06 | 7E-05 | 6E-04 | 1E-06 | 5E-06 | 7E-05 | 6E-04 | 7E-05 | 5E-04 | 1E-04 | 1E-03 |
| | UNIT 2 | 1E-07 | 8E-07 | 0E+00 | 0E+00 | 3E-07 | 3E-06 | 2E-06 | 2E-05 | 2E-06 | 1E-05 | 5E-06 | 4E-05 | 0E+00 | 0E+00 | 5E-06 | 4E-05 |
| STEPAN | UNIT 3 | | | | | | | | | | | | | | | | |
| | UNIT 3H | | | | | | | | | | | | | | | | |
| MUNICIPAL PARKS | UNIT 4 | 3E-08 | 3E-07 | 4E-08 | 4E-07 | 5E-08 | 1E-06 | 8E-05 | 6E-04 | 5E-07 | 3E-06 | 8E-05 | 6E-04 | 0E+00 | 0E+00 | 8E-05 | 6E-04 |
| COMMERCIAL/ GOVERNMENT | UNIT 5 | 4E-08 | 2E-07 | 0E+00 | 0E+00 | 7E-08 | 8E-07 | 7E-05 | 4E-04 | 8E-07 | 4E-06 | 7E-05 | 4E-04 | 0E+00 | 0E+00 | 7E-05 | 4E-04 |
| | UNIT 6 (MISS) | | | | | | | | | | | | | | | | |
| | UNIT 6H | | | | | | | | | | | | | | | | |
| | UNIT 6B (BALLOD) | 1E-06 | 2E-05 | 2E-06 | 4E-05 | 2E-06 | 4E-05 | 2E-03 | 2E-02 | 5E-05 | 5E-04 | 3E-03 | 2E-02 | 4E-05 | 9E-05 | 3E-03 | 2E-02 |
| | UNIT 7 | 4E-07 | 3E-06 | 1E-06 | 2E-05 | 6E-07 | 9E-06 | 3E-05 | 1E-04 | 2E-05 | 1E-04 | 5E-05 | 3E-04 | 0E+00 | 1E-04 | 5E-05 | 4E-04 |
| | UNIT 7H | 8E-07 | 5E-06 | 0E+00 | 0E+00 | 1E-06 | 2E-05 | 9E-05 | 5E-04 | 1E-05 | 1E-04 | 1E-04 | 6E-04 | 5E-04 | 7E-04 | 8E-04 | 1E-03 |
| | UNIT 8 | | | | | | | | | | | | | | | | |

Bold cells indicate risk from actual measured values

X = Mean

RME = Reasonable Maximum Exposure

NP = No Pathway

Denotes revision from Final BRA, March '93

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