

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

Supplemental Information

Report Period: January 1 to June 30, 1984

Facility Ginna Station

Licensee Rochester Gas & Electric

1. Regulatory Limits

- a. Fission and activation gases: 6.30 E+05 uCi/sec
- b. Iodines: 4.55 E-02 uCi/sec
- c. Particulates, half-lives > 8 days: 1.06 E+00 uCi/sec
- d. Liquid effluents: Identified MPC

2. Maximum Permissible Concentrations

Provide the MPCs used in determining allowable release rates or concentrations.

- a. Fission and activation gases: 10 CFR PART 20
- b. Iodines: 10 CFR PART 20
- c. Particulates, half-lives > 8 days: 10 CFR PART 20
- d. Liquid effluents: 10 CFR PART 20 & 2E-04 uCi/ml for dissolved Noble Gases.

3. Average Energy

Provide the average energy (\bar{E}) of the radionuclide mixture in releases of fission and activation gases, if applicable.

0.189 Mev

4. Measurements and Approximations of Total Radioactivity

Provide the methods used to measure or approximate the total radioactivity in effluents and the methods used to determine radionuclide composition.

- a. Fission and activation gases: Gamma Spectroscopy of Grab Samples and Continuous Gross Activity Monitoring
- b. Iodines: Gamma Spectroscopy of Continuous Samples
- c. Particulates: Gamma Spectroscopy of Continuous Samples
- d. Liquid effluents: Gamma Spectroscopy of Batch Grab Samples or Compositated Samples.

5. Batch Releases

Provide the following information relating to batch releases of radioactive materials in liquid and gaseous effluents.

a. Liquid

- 1. Number of batch releases: 490
- 2. Total time period for batch releases: 46091 min.
- 3. Maximum time period for a batch release: 3326 min.
- 4. Average time period for batch releases: 94 min.
- 5. Minimum time period for a batch release: 10 min.
- 6. Average stream flow during periods of release of effluent into a flowing stream: 2.68 E+05 gpm

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THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY

RESEARCH REPORT NO. 1000

BY
J. H. GOLDSTEIN

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PHYSICAL CHEMISTRY

CHICAGO, ILLINOIS

1954

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b. Gaseous

- | | |
|---|-----------|
| 1. Number of batch releases: | 11 |
| 2. Total time period for batch releases: | 3573 min. |
| 3. Maximum time period for a batch release: | 615 min. |
| 4. Average time period for batch releases: | 325 min. |
| 5. Minimum time period for a batch release: | 76 min. |

6. Abnormal Releases

a. Liquid

- | | |
|-----------------------------|------|
| 1. Number of releases: | NONE |
| 2. Total activity released: | |

b. Gaseous

- | | |
|-----------------------------|------|
| 1. Number of releases: | NONE |
| 2. Total activity released: | |



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TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR)

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

| | Unit | Quarter 1 | Quarter 2 | Est. Total Error % |
|--|------|--------------|--------------|-----------------------|
|--|------|--------------|--------------|-----------------------|

A. Fission & activation gases

| | | | | |
|---|---------|----------|----------|----------|
| 1. Total release | Ci | 2.39E+02 | 3.28E+00 | 1.3 E+01 |
| 2. Average release rate for period | uCi/sec | 3.04E+01 | 4.17E-01 | |
| 3. Percent of technical specification limit | % | 4.83E-03 | 6.62E-05 | |

B. Iodines

| | | | | |
|---|---------|----------|----------|----------|
| 1. Total iodine-131 | Ci | 1.30E-03 | 1.64E-04 | 1.5 E+01 |
| 2. Average release rate for period | uCi/sec | 1.65E-04 | 2.09E-05 | |
| 3. Percent of technical specification limit | % | 3.60E-01 | 4.58E-02 | |

C. Particulates

| | | | | |
|---|---------|----------|----------|----------|
| 1. Particulates with half-lives > 8 days | Ci | 1.91E-06 | 8.71E-07 | 4.8 E+01 |
| 2. Average release rate for period | uCi/sec | 2.43E-07 | 1.11E-07 | |
| 3. Percent of technical specification limit | % | 2.29E-05 | 1.05E-05 | |
| 4. Gross alpha radioactivity | Ci | 8.00E-08 | 1.46E-07 | |

D. Tritium

| | | | | |
|---|---------|----------|----------|----------|
| 1. Total release | Ci | 2.31E+01 | 2.03E+01 | 8.0 E+00 |
| 2. Average release rate for period | uCi/sec | 2.94E+00 | 2.56E+00 | |
| 3. Percent of technical specification limit | % | 3.44E-04 | 2.99E-04 | |

() PUBLIC AFFAIRS OF THE UNITED STATES

OFFICE OF THE SECRETARY OF THE ARMY
WASHINGTON, D.C. 20315

MEMORANDUM FOR THE SECRETARY
SUBJECT: [Illegible]

1. [Illegible]

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TABLE 1B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR)

GASEOUS EFFLUENTS - ELEVATED RELEASE

| Nuclides Released | Unit | CONTINUOUS MODE | | BATCH MODE | |
|----------------------|------|-----------------|----------|------------|----------|
| | | Quarter | Quarter | Quarter | Quarter |
| 1. Fission gases | | 1 | 2 | 1 | 2 |
| krypton-85 | Ci | 6.50E-01 | | 1.64E+00 | 2.22E+00 |
| krypton-85m | Ci | 6.48E-02 | 2.87E-03 | 5.84E-03 | |
| krypton-87 | Ci | 8.97E-03 | 5.88E-03 | | |
| krypton-88 | Ci | 1.06E-02 | 7.67E-03 | | |
| xenon-133 | Ci | 2.25E+02 | 3.74E-02 | 6.05E+00 | 3.57E-01 |
| xenon-135 | Ci | 4.11E+00 | 3.97E-01 | | |
| xenon-135m | Ci | 9.08E-02 | 6.44E-02 | | |
| xenon-138 | Ci | 8.02E-03 | 1.88E-02 | | |
| Others (specify) | Ci | | | | |
| xenon-133m | Ci | 1.10E+00 | | 2.96E-02 | |
| xenon-131m | Ci | 3.48E-01 | 8.37E-02 | 1.31E-01 | 1.95E-01 |
| unidentified | Ci | | | | |
| Total for period | Ci | 2.31E+02 | 6.18E-01 | 7.86E+00 | 2.77E+00 |
| 2. Iodines | | | | | |
| iodine-131 | Ci | 1.30E-03 | 1.64E-04 | | |
| iodine-133 | Ci | 9.79E-05 | 1.80E-05 | | |
| iodine-135 | Ci | | | | |
| Total for period | Ci | 1.40E-03 | 1.82E-04 | | |
| 3. Particulates | | | | | |
| strontium-89 | Ci | * | * | | |
| strontium-90 | Ci | * | * | | |
| cesium-134 | Ci | | | | |
| cesium-137 | Ci | | | | |
| barium-lanthanum-140 | Ci | | | | |
| Others (specify) | Ci | | | | |
| | Ci | | | | |
| | Ci | | | | |
| unidentified | Ci | | | | |

* Samples sent out for analysis but results not yet received. Data to be included with next semiannual report for July - December, 1984.

THE FIRST PART OF THE DOCUMENT IS A SUMMARY OF THE MAIN POINTS OF THE REPORT.

THE SECOND PART OF THE DOCUMENT IS A DETAILED ANALYSIS OF THE DATA COLLECTED DURING THE RESEARCH.

THE THIRD PART OF THE DOCUMENT IS A DISCUSSION OF THE RESULTS OF THE RESEARCH AND THE CONCLUSIONS DRAWN THEREFROM.

THE FOURTH PART OF THE DOCUMENT IS A BIBLIOGRAPHY OF THE RESEARCH.

THE FIFTH PART OF THE DOCUMENT IS A CONCLUDING REMARK.

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR)

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

| | Unit | Quarter 1 | Quarter 2 | Est.Total Error, % |
|--|--------|--------------|--------------|-----------------------|
| A. Fission and activation products | | | | |
| 1. Total release (not including tritium, gases, alpha) | Ci | 8.75E-03 | 9.03E-02 | 8.7 E+00 |
| 2. Average diluted concentration during period | uCi/ml | 5.92E-11 | 7.69E-10 | |
| 3. Percent of applicable limit | % | 3.12E-04 | 4.24E-03 | |
| B. Tritium | | | | |
| 1. Total release | Ci | 1.33E+02 | 8.67E+01 | 8.0 E+00 |
| 2. Average diluted concentration during period | uCi/ml | 8.96E-07 | 7.38E-07 | |
| 3. Percent of applicable limit | % | 2.99E-02 | 2.46E-02 | |
| C. Dissolved and entrained gases | | | | |
| 1. Total release | Ci | 6.22E-04 | 2.19E-05 | 2.2 E+01 |
| 2. Average diluted concentration during period | uCi/ml | 4.20E-12 | 1.86E-13 | |
| 3. Percent of applicable limit | % | 2.10E-06 | 9.28E-08 | |
| D. Gross alpha radioactivity | | | | |
| 1. Total release | Ci | 1.22E-05 | 2.36E-04 | 2.6 E+01 |
| E. Volume of waste released (prior to dilution) | | | | |
| | liters | 3.52E+07 | 2.51E+07 | 5.0 E+00 |
| F. Volume of dilution water used during period | | | | |
| | liters | 1.48E+11 | 1.18E+11 | 5.0 E+00 |

TO : SAC, NEW YORK (100-100000)

FROM : SAC, NEW YORK (100-100000)

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TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR)

LIQUID EFFLUENTS

| Nuclides Released | Unit | CONTINUOUS MODE | | BATCH MODE | |
|--------------------------|------|-----------------|---------|------------|----------|
| | | Quarter | Quarter | Quarter | Quarter |
| strontium-89 | Ci | | | | * |
| strontium-90 | Ci | | | 2.00E-06 | * |
| cesium-134 | Ci | | | 1.68E-03 | 2.18E-02 |
| cesium-137 | Ci | | | 2.71E-03 | 3.40E-02 |
| iodine-131 | Ci | | | 5.37E-06 | |
| cobalt-58 | Ci | | | 2.17E-04 | 5.08E-03 |
| cobalt-60 | Ci | | | 3.24E-03 | 2.01E-02 |
| iron-59 | Ci | | | | 2.10E-04 |
| zinc-65 | Ci | | | | |
| manganese-54 | Ci | | | 6.71E-04 | 1.76E-03 |
| chromium-51 | Ci | | | 9.65E-05 | 3.85E-03 |
| zirconium-niobium-95 | Ci | | | 2.05E-05 | 5.40E-04 |
| molybdenum-99 | Ci | | | | |
| technetium-99m | Ci | | | | |
| barium-lanthanum-140 | Ci | | | 3.35E-07 | 1.06E-05 |
| cerium-141 | Ci | | | | |
| Other (specify) | Ci | | | | |
| ruthenium-103 | Ci | | | 6.86E-06 | 3.00E-04 |
| silver-110m | Ci | | | 8.11E-05 | 2.14E-03 |
| cerium-144 | Ci | | | 1.46E-05 | 2.20E-04 |
| iron-55 | Ci | | | 5.20E-03 | * |
| unidentified | Ci | | | | |
| Total for period (above) | Ci | | | 8.75E-03 | 9.03E-02 |
| xenon-133 | Ci | | | 6.22E-04 | 2.19E-05 |
| xenon-135 | Ci | | | | |

* Samples sent out for analysis but results not yet received. Data to be included with next semiannual report for July - December, 1984.

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RELEASE PERMITS NOT MEETING LLD VALUE

| No. | Date | Isotopes | Cause |
|-----|---------|---|-------|
| 203 | 3/14/84 | Co-60 | a. |
| 204 | 3/15/84 | Fe-59, Zn-65, Cs-137, Ce-141 | b. |
| 205 | 3/16/84 | Fe-59, Zn-65, Cs-137, Ce-141 | b. |
| 206 | 3/16/84 | Fe-59, Zn-65 | b. |
| 221 | 3/27/84 | Fe-59, Zn-65, Cs-137, Ce-141 | b. |
| 223 | 3/28/84 | Zn-65, Cs-137, Ce-141 | b. |
| 224 | 3/28/84 | Fe-59, Zn-65, Cs-137, Ce-141 | b. |
| 225 | 3/29/84 | Fe-59, Zn-65, Cs-137, Ce-141 | b. |
| 230 | 4/01/84 | Fe-59, Zn-65, Cs-137, Ce-141 | b. |
| 234 | 4/03/84 | Co-60 | a. |
| 235 | 4/03/84 | Zn-65, Cs-137, Ce-141 | b. |
| 238 | 4/05/84 | Fe-59, Zn-65, Ce-141 | b. |
| 239 | 4/05/84 | Fe-59, Zn-65, Cs-137, Ce-141 | b. |
| 240 | 4/05/84 | Zn-65, Ce-141 | b. |
| 241 | 4/06/84 | Zn-65, Cs-137, Ce-141 | b. |
| 243 | 4/07/84 | Fe-59, Zn-65, Ce-141 | b. |
| 247 | 4/08/84 | Fe-59, Zn-65 | b. |
| 255 | 4/11/84 | Zn-65, Ce-141 | b. |
| 256 | 4/12/84 | Fe-59, Zn-65, Cs-134, Cs-137, Ce-141 | b. |
| 257 | 4/12/84 | Ce-141 | b. |
| 258 | 4/13/84 | Mn-54, Fe-59, Zn-65, Cs-137, Cs-134, Ce-141 | b. |
| 259 | 4/13/84 | Fe-59, Zn-65, Ce-141 | b. |
| 272 | 4/18/84 | Fe-59, Zn-65, Cs-137, Ce-141 | b. |
| 274 | 4/18/84 | Zn-65, Cs-134, Cs-137, Ce-141, I-131 | b. |
| 276 | 4/18/84 | Fe-59, Zn-65, Cs-137, Ce-141 | b. |
| 278 | 4/19/84 | Zn-65 | b. |
| 280 | 4/20/84 | Fe-59, Zn-65, Cs-137, Cs-134, Ce-141 | b. |
| 289 | 4/22/84 | Fe-59, Zn-65, Cs-134, Ce-141 | b. |
| 290 | 4/22/84 | Fe-59, Zn-65, Ce-141 | b. |
| 355 | 5/15/84 | Co-60 | a. |
| 411 | 5/30/84 | Fe-59, Zn-65 | b. |
| 424 | 6/02/84 | Co-60 | a. |
| 446 | 6/12/84 | Fe-59, Zn-65, Cs-137, Ce-141 | b. |
| 447 | 6/12/84 | Zn-65, Cs-134, Cs-137, Ce-141 | b. |
| 449 | 6/13/84 | Zn-65, Cs-134, Cs-137, Ce-141 | b. |
| 470 | 6/23/84 | Ce-141 | b. |
| 471 | 6/23/84 | Fe-59, Zn-65, Cs-134, Cs-137, Ce-141 | b. |
| 472 | 6/24/84 | Fe-59, Zn-65, Cs-137, Ce-141 | b. |
| 473 | 6/24/84 | Fe-59, Zn-65 | b. |
| 483 | 6/28/84 | Co-60 | a. |



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A vertical column of small, faint characters or symbols, possibly a list or index, located on the left side of the page.

Main body of faint text, possibly a list or index, located in the center and right side of the page. The text is arranged in several columns and is mostly illegible due to low contrast.

- a. Co-60 is normally found as a background activity in all samples. When poor peak resolution is obtained from the detector and/or electronics on samples with no detectable activity, a high LLD calculation may result after the background correction in the Co-60 peak area.
- b. Activity from other isotopes caused an increased background resulting in the LLD calculation exceeding $5E-07$ for the listed isotopes.

2/26/84

Retention tank composite of continuous release.

Sampler was disconnected from sample point for majority of sample period. Sample obtained was small and not representative of compositing period. Releases through this sample point normally have no identifiable isotopes.



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TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR)

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. Solid Waste Shipped Offsite for Burial or Disposal (Not irradiated fuel)

| 1. Type of Waste | Unit | 6-month Period | Est. Total Error, % |
|---|----------------------|--------------------|---------------------|
| a. Spent resins, filter sludges, evaporator bottoms, etc. | m ³ Ci | 6.14E 1 2.02E 2 | 5.0 E 0 |
| b. Dry compressible waste, contaminated equip., etc. | m ³ Ci | 4.34E 1 6.25E 0 | 1.4 E 1 |
| c. Irradiated components, control rods, etc. | N/A | | |
| d. Other (describe) | | | |

2. Estimate of major nuclide compositing (by type of waste)

| | | | |
|----|--------|---|--------|
| a. | H-3 | % | 2.0E 1 |
| | Co-58 | % | 1.6E 0 |
| | Co-60 | % | 4.0E 1 |
| | Ni-63 | % | 8.0E 0 |
| | Cs-134 | % | 8.4E 1 |
| | Cs-137 | % | 4.0E 1 |
| b. | Co-58 | % | 2.9E 0 |
| | Co-60 | % | 3.2E 1 |
| | Cs-134 | % | 1.7E 1 |
| | Cs-137 | % | 3.2E 1 |
| | H-3 | % | 4.8E 0 |
| | Ni-63 | % | 7.1E 0 |

3. Solid Waste Disposition

| <u>Number of Shipments</u> | <u>Mode of Transportation</u> | <u>Destination</u> |
|----------------------------|-------------------------------|--------------------|
| 5 | Highway Transport | Barnwell, SC |
| 3 | Highway Transport | Richland, WA |

B. Irradiated Fuel Shipments (Disposition)

| <u>Number of Shipments</u> | <u>Mode of Transportation</u> | <u>Destination</u> |
|----------------------------|-------------------------------|--------------------|
| None Shipped | | |

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