

Pilot Program for C-14 Sampling at V. C. Summer Nuclear Station.



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Sample Points

- Main Plant Vent – effluent monitor
- Reactor Building – process monitor
- Waste Gas System
- Control Location

Main Plant Vent



Main Plan Vent Results

- Total C-14 = $1.39\text{E-}09$ uCi/ml.
- C-14 as CO_2 = < MDA of $3.78\text{E-}11$ uCi/ml.

Reactor Building



Reactor Building Results

- Total C-14 = $7.32\text{E-}07$ uCi/ml.
- C-14 as CO² = $4.65\text{E-}08$ uCi/ml.
- CO² accounts for ~ 6% of C-14.

Assumptions – Minimal impact of HEPA and Charcoal Exhaust on C-14 effluent levels.

Waste Gas



Waste Gas Results

- Total C-14 = $5.11\text{E-}03$ uCi/ml.
- C-14 as CO² = $3.02\text{E-}04$ uCi/ml.
- CO² accounts for ~ 6% of C-14.

Control Location

- Sample collected at Environmental Laboratory.
- Approximately 2.6 miles from the site.
- C-14 less than MDA of $7.64 \text{ E-}11 \text{ uCi/ml}$.
(one hour sample)

Estimated 2009 C-14 Releases

Release Point	Curies
Main Plant Vent	4.32
Waste Gas Releases	0.40
Reactor Building Purges	0.06
Total Curies	4.78

Slightly less than the 5 to 7.3 Curies estimated in Regulatory Guide 1.21.

Comparison with 2009 Annual Radiological Effluent Release Report

	Without C-14	With C-14
Total Curies – All Isotopes For All Gaseous Releases	3.08 Curies	7.86 Curies
Annual Organ Dose	1.14E-03 mrem	1.50E+00 mrem

Dose Calculations Using Regulatory Guide 1.109 Methodology.

Questions

- Are C-14 release rates consistent throughout core life? How frequent should we sample?
- Impact of plant operations? Waste Gas System Ops, Frequency of Purges, Liquid Waste Evaporators.....
- How does C-14 trend during refueling outage? Burp or continuous release?
- Can C-14 be effectively scaled to another isotope?