DCS

SEP 17 1991

Docket No. 030-20934 License No. 37-23341-01

Interstate Nuclear Services
ATTN: Michael J. Bovino, CHP
Manager, Health Physics and Engineering
295 Parker Street
P.O. Box 201
Springfield, Massachusetts 01151

Dear Mr. Bovino:

This is in response to your letter dated May 21, 1991 regarding discharges made by INS to the Royersford Wastewater Treatment Facility.

Thank for informing us of the actions you plan to take. Please let us know the results of the testing you are doing and which options you plan to implement.

We have no objection to your plans to study the reed bed, as long as permission is given by the Borough of Royersford. We would be interested in reviewing the results of this study.

Thank you for your cooperation in this matter. If you have any further questions, please contact me or Betsy Ullrich.

Sincerely,

**Original Signed By:**
John D. Kinneman

John D. Kinneman, Chief
Nuclear Materials Safety Section B
Division of Radiation Safety
and Safeguards

cc:
Public Document Room (PDR)
Nuclear Safety Information Center (NSIC)
Commonwealth of Pennsylvania

Commonwealth of Pennsylvania
Department of Environmental Resources
ATTN: Ivna Shanbaky
1875 New Hope Street
Norristown, Pennsylvania 19401

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08/06/91



RETURN ORIGINAL TO REGION I

IE:07

cc (cont'd):
Commonwealth of Pennsylvania
Department of Environmental Resources
ATTN: Margaret Reilly
P.O. Box 2063
Harrisburg, Pennsylvania 17120

Interstate Nuclear Services
ATTN: Michael J. Bovino, CHP, Manager
Health Physics and Engineering
295 Parker Street
P.O. Box 201
Springfield, Massachusetts 01151

bcc:
RI Docket Room (w/concurrences)
E. Ullrich, RI
J. Kinneman, RI
M. Miller, RI

RI:DRSS
Ullrich/bj
08/17/91

RI:DRSS
Kinneman
08/16/91

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INTERSTATE NUCLEAR SERVICES
A DIVISION OF UNIFIRST CORPORATION

May 21, 1991

Mr. John D. Kinneman, Chief
Nuclear Materials Safety Section B
Division of Radiation Safety and Safeguards
Nuclear Regulatory Commission, Region I
475 Allendale Road
King of Prussia, PA 19406

Dear Mr. Kinneman,

This letter is in response to your letter of April 8, 1991 in which you requested a statement of INS' plans regarding its limit of discharges to the Royersford Wastewater Treatment Facility.

To date, we have, or are planning to, conduct a significant amount of investigation into developing more efficient wastewater treatment systems. Though we foresee no problems in meeting current or future effluent discharge limits, we are investigating the potential for reducing our effluent where possible. The following is a list of some of the research currently underway:

1) We contracted with an analytical lab, (Scientech) to conduct a solubility study on our post-treated effluent at Royersford (Attachment 1). This was done so that we could characterize the effluent by radionuclide verses particle size. It was our hope that by knowing particle size, we could design a filter system with a pore size somewhat less than the isotopes of interest. However, as the lab data illustrates, our present discharge is essentially soluble. The laboratory processed our effluent down to a 0.1 micron (molecular range) filter size and only affected a 30 percent reduction for Co-60 with no reduction for Cs-137, (for reference, Standard Methods for Wastewater Analysis "defines" solubility at 1.0 micron, EPA at 0.45 micron).

2) We have contracted with Analytical Development Corporation (ADC) to conduct applicability studies in the use of their product, Tru-Clear on our wastewater. Tru-Clear is a proprietary flocculent that the manufacturer claims to be effective on radionuclides, especially transuranics. Even though our wastewater is not comprised of transuranics, we felt that it is worth a try. Phase one of the study is underway. In it, ADC has created a non-radioactive analog of our wastewater. They are conducting tests to develop the ideal application of their product. Phase two is scheduled for late June at Royersford. Actual wastewater will be bench tested against the flocculent. Pending the results of Phase two, we will decide to cancel or go forward to full-scale application of Tru-Clear.



295 Parker Street • P.O. Box 51957 • Springfield, Massachusetts 01151 • (413)543-6911 • FAX: (413)543-6989

3) We have shipped a skid-mounted microfilter to Royersford. Even though the solubility study described in #1 above illustrated that additional filtration may be ineffective, we plan to use the filter for other related work. Mark Perry, our R&D Chemist will be conducting some of the following experiments in late June:

a) Examining loading rates and removal efficiency before and after additions of standard and Tru-Clear flocculents.

b) Experimenting with alteration of pH. By greatly elevating the pH, metal hydroxides are formed which assemble as a gelatinous layer. We believe that this layer may than be filtered. Of course, before discharge to the sanitary sewer, acid will have to be added to lower the pH. This has its drawbacks in terms of balancing pH prior to discharge.

c) Experimenting with halogens to complex Cesium. Cesium is the most soluble and hence the most difficult to remove. Cesium may represent our most limiting nuclide in meeting new Part 20 MPC limits although review of Royersford data indicates that Cesium is not appreciably retained in the sludge.

In addition, we are building a radioanalytical laboratory as part of a major upgrade to our Springfield, Massachusetts facility. The lab is expected to be completed by late fall 1991 and should give us many more analytical tools to conduct research into this area.

I have included graphical depictions of our effluents since 1988 that compare discharge concentration verses MPC values (Attachment 2). One can see that we can expect to make all discharge limits, old and new, to the sewer.

In your letter of April 8, you asked to inform you of the amount of reduction we can expect from our attempts to lower our discharge concentrations. Because we have not completed the experiments described above, it is premature to predict the removal efficiencies. However, we will keep you informed of the progress.

As you know, your office recently wrote a letter ( May 9, 1991) to the Pennsylvania Department of Environmental Resources (DER) describing the present NRC position on disposal of sludge at sanitary landfills. In speaking with personnel from the DER, it is generally agreed that disposal at the landfill is the more scientifically desirable final residence for sludge. However, as we are all acutely aware, there presently does not exist any deminimus levels or even a definition of radioactive materials that fits the sludge disposal scenario. This issue is of primary importance nationwide. It is my understanding that the NRC is undertaking to develop methodologies and specific guidance on allowable levels just as is presently being done for facility decontamination limits.

Your letter also addressed the reed beds recently installed at the Borough of Royersford wastewater treatment facility. It is because of the reed beds, that you feel we need to address the reduction of INS discharges into the future. In light of the fact that we have not yet completed our studies, and that the reed beds are relatively unknown, (expected life, uptake and partitioning of elements, etc.), and because there is expected NRC guidance due on the subject, we ask that we work together on an technically based program to ascertain what additional measures INS may have to take with respect to its discharges.

Based on an anticipated life expectancy of seven years for the reed beds, we propose the following immediate and long range plan:

1) INS will continue all wastewater treatment technology studies and provide your office with written status reports as results become available.

2) INS will collect a sample of the reed bed sludge and reed material every quarter. The materials will be analyzed for all pertinent nuclides. Periodic trend reports will be provided to your office. We will start immediately pending concurrence by your department and permission by the Borough of Royersford.

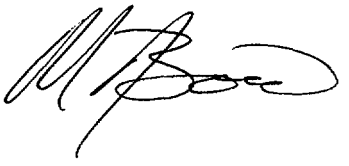
3) Using empirical data collected in #2 above, INS will develop models to trace the potential migration and disposition of nuclides into the various constituents of the reed bed. We will employ those models to examine if and when levels at the reed beds pose a disposal or dose rate problem. We would like to allocate 18 months to two years for data collection. This will afford us cyclic and seasonal data to derive empirical models. Perhaps we can invite the NRC Office of Nuclear Regulatory Research to assist in the modeling. If early trends indicate a more immediate problem, we will take more immediate steps from our end. Hopefully, specific, isotopic concentration rules will be in place by then.

I would like to meet with you and your staff at your earliest convenience to discuss the contents of this letter and to develop a plan that will serve everyone. Please contact me regarding any possible meeting dates.

In closing, I want to assure you that INS believes in developing a prudent, scientifically based conclusion to this issue. I will continue in the proactive investigation of all the factors surrounding this issue and will keep you informed. Lessons that are learned from this case will be applied by INS at our facilities and may prove to be valuable to the NRC in developing future rules.

I look forward to hearing from you soon.

Sincerely,



Michael J. Bovino, CHP
Manager, Health Physics and Engineering

cc: G. Bakevich
J. Badey
H. Barnes
F. Thomas, Esq.
file

ATTACHMENT 1

RESULTS OF SOLUBILITY STUDY OF POST-TREATED ROYERSFORD EFFLUENT

SCIENTECH INC.
ENGINEERING & MANAGEMENT SERVICES
2109 LUNA ROAD, #390, CARROLLTON, TX 75006
(214) 247-1714 FAX (214) 247-0268

April 24,1991

Mr. Mark Perry
Interstate Nuclear Services
295 Parker Street
P.O. Box 51957
413-543-6911

SUBJECT: MLB-033-91: Isotope Filtration Study/

Dear Mr. Perry:

Following are the values reported to you earlier by telephone for the solubility study performed on your wash water sample. The sample was counted for gamma prior to any filtration then counted again after passing through a 20, 10, 1, 0.45 and finally 0.1 micron filter. After each filtration the filtrate was specifically monitored for Zn65, Co60, and Cs137 along with Ni63 and Fe55. The residue at each step was analized for Cs137,
Zn65 and gross beta with the following results.

I Before Filtration

| Isotope | uCi/ml |
|---|---|
| Zn65 | 2.39E-6 |
| Co60 | 1.21E-6 |
| Cs137 | 5.50E-7 |

II After Filtration

| | Dissolved | Suspended |
|---|---|---|
| Isotope | uCi/ml | uCi/ml |
| 20 micron filtration (F-1) | | |
| Zn65 | 1.88E-6 | 3.72E-7 |
| Co60 | 8.70E-7 | 2.48E-7 |
| Cs137 | 6.70E-7 | ND |
| Fe55+Ni63 | 3.36E-6 | 4.38E-7 (gross beta) |
| 10 micron filtration (F-2) | | |
| Zn65 | 2.15E-6 | ND |
| Co60 | 9.58E-7 | ND |
| Cs137 | 6.44E-7 | ND |
| Fe55+Ni63 | 5.12E-6 | 4.70E-9 (gross beta) |

| | | |
|---|---|---|
| 1 micron filtration (F-3) | | |
| Zn65 | 1.90E-6 | ND |
| Co60 | 8.94E-7 | 1.24E-8 |
| Cs137 | 6.82E-7 | ND |
| Fe55+Ni63 | 3.72E-6 | 2.31E-8 (gross beta) |
| | | |
| 0.45 micron filtration (F-3) | | |
| Zn65 | 2.02E-6 | ND |
| Co60 | 8.51E-7 | ND |
| Cs137 | 5.55E-7 | ND |
| Fe55+Ni63 | 3.71E-6 | 5.30E-9 (gross beta) |
| | | |
| 0.10 micron filtration (F-3) | | |
| Zn65 | 1.97E-6 | ND |
| Co60 | 8.45E-7 | ND |
| Cs137 | 5.55E-7 | ND |
| Fe55+Ni63 | 3.79E-6 | 5.75E-9 (gross beta) |

It appears that some activity may have been mechanically removed in the first filtration due to the initial high total suspended solids but all activities remain essentially the same on all successive filters which would lead you to believe that the contaminants are present in solution and not as a suspended solid.

Mark if you should have any questions or like us to go further with this study please do not hesitate to call me at 214-247-1714.

Sincerely,

Michael L. Buvinghausen
Deputy Lab Director

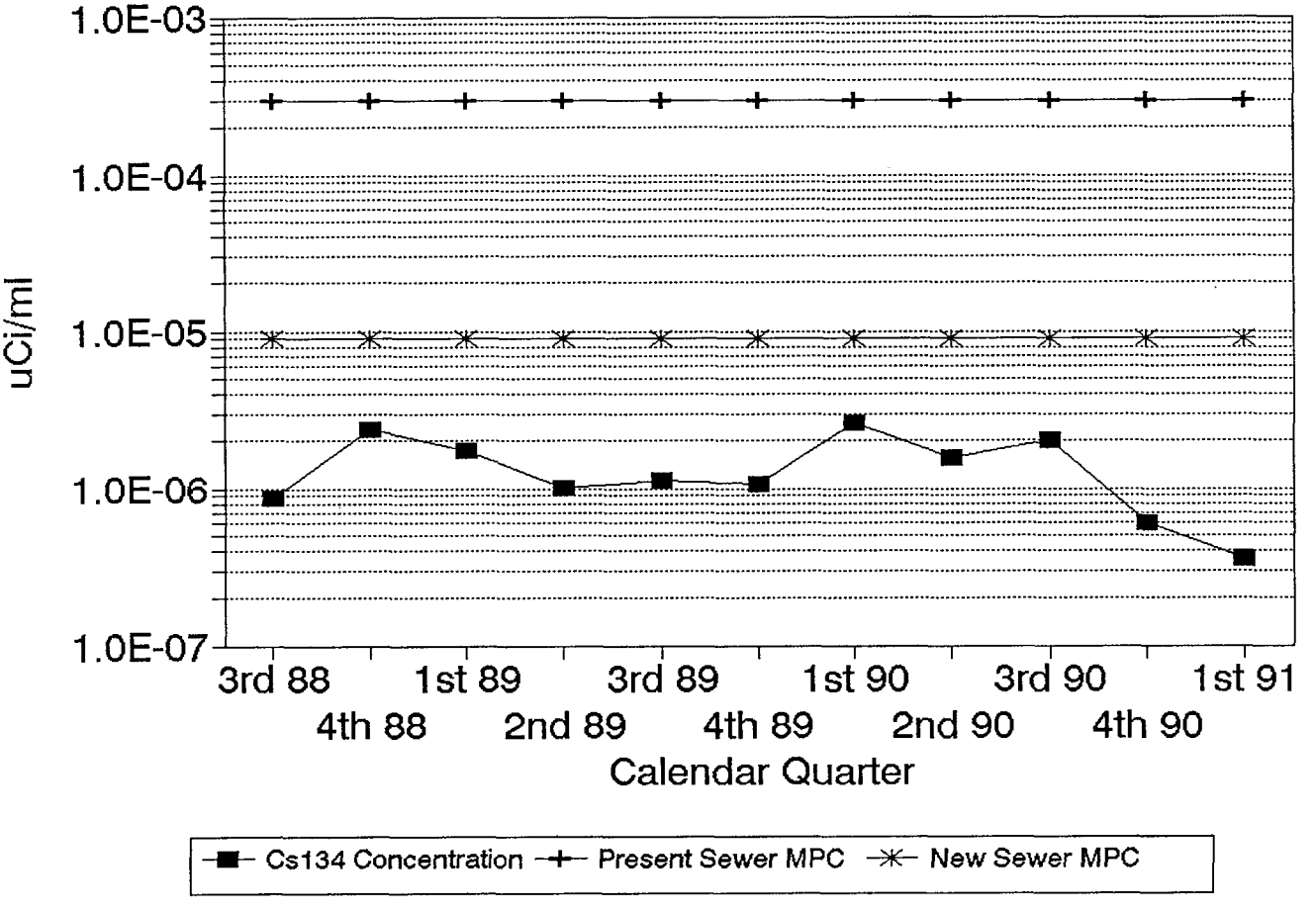
File: C.5

ATTACHMENT 2

ROYERSFORD DISCHARGE CONCENTRATIONS VERSES MPC

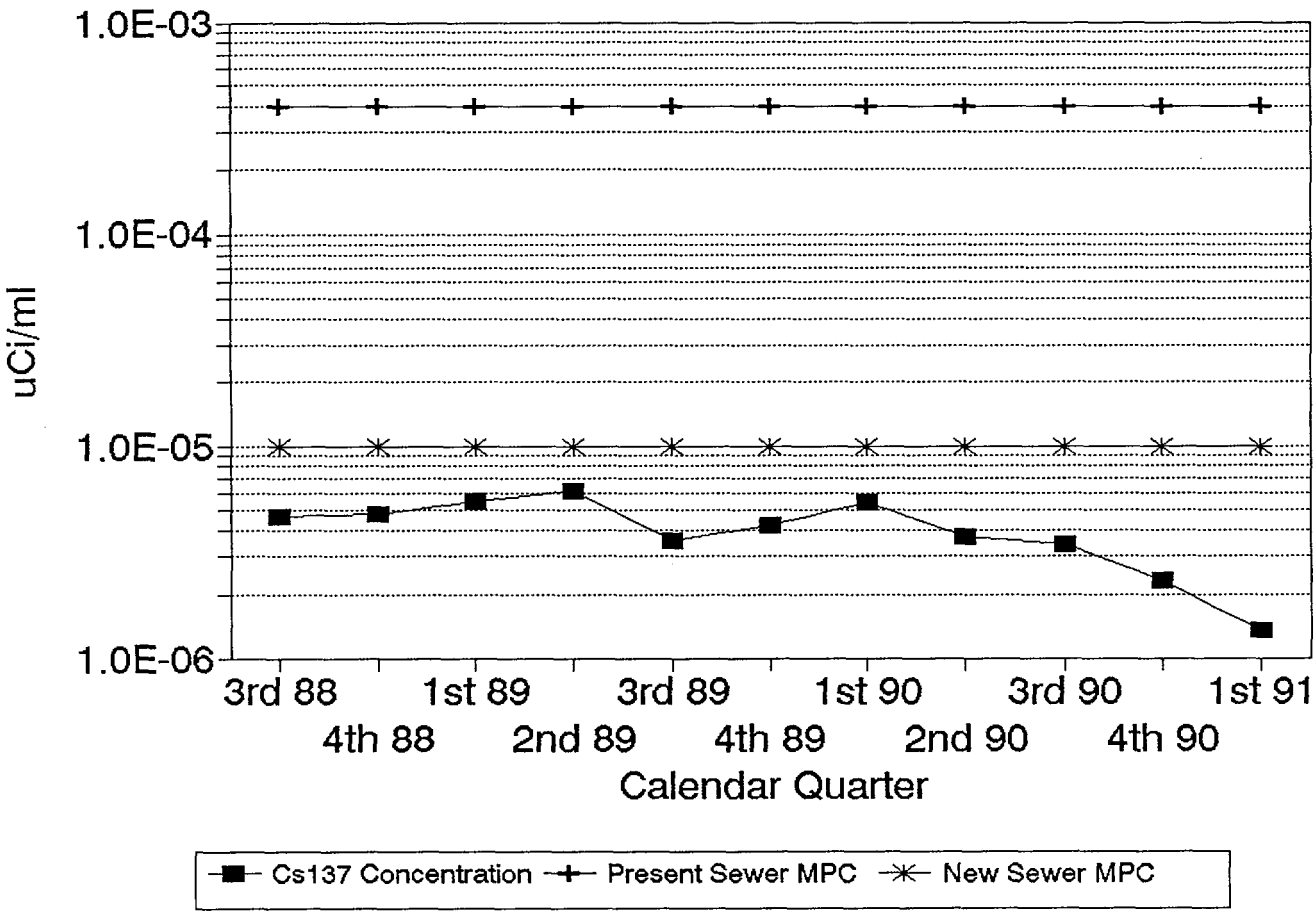
# INS - Royersford

## Wastewater Discharge Conc. Vs. MPC



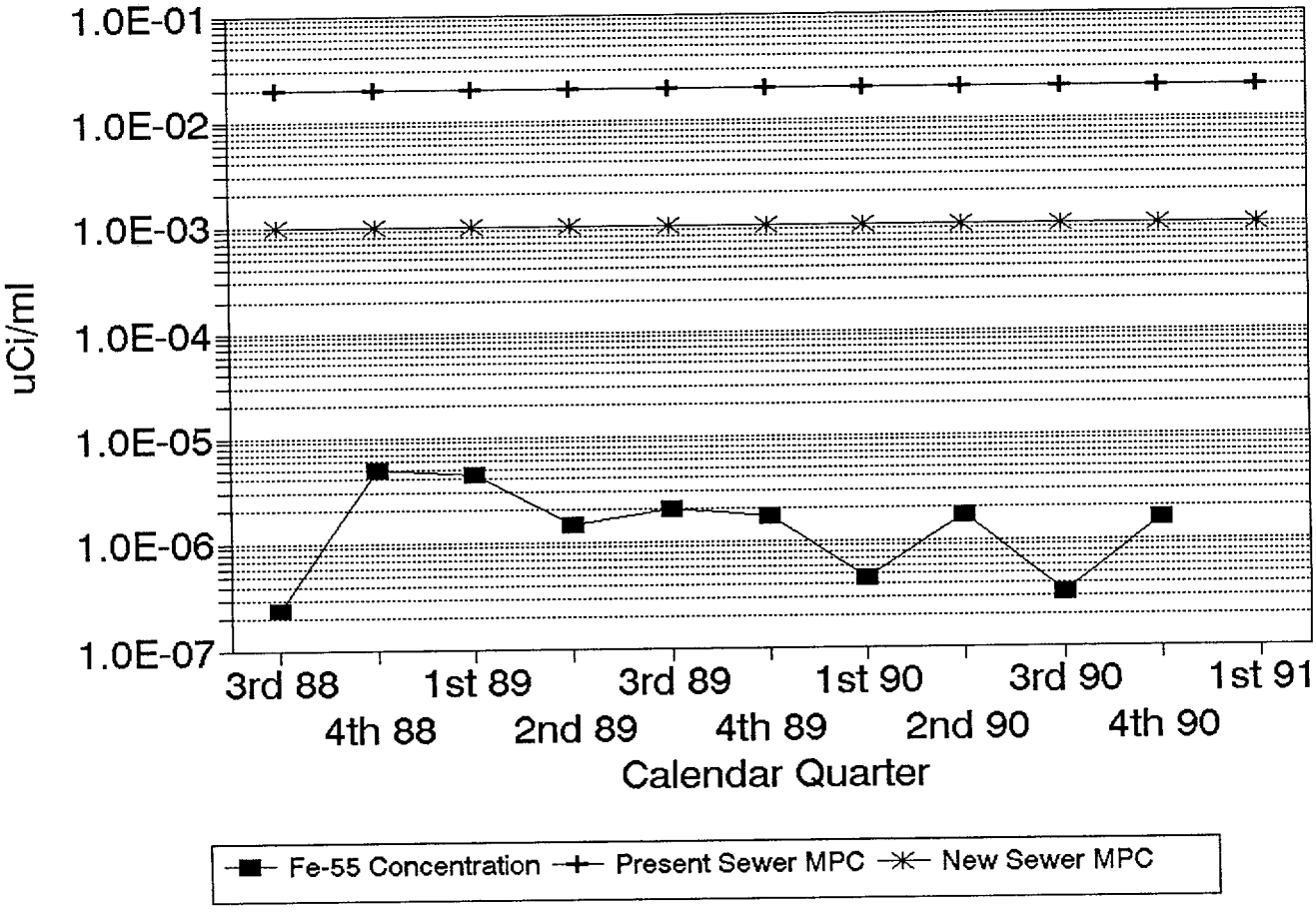
# INS - Royersford

## Wastewater Discharge Conc. Vs. MPC



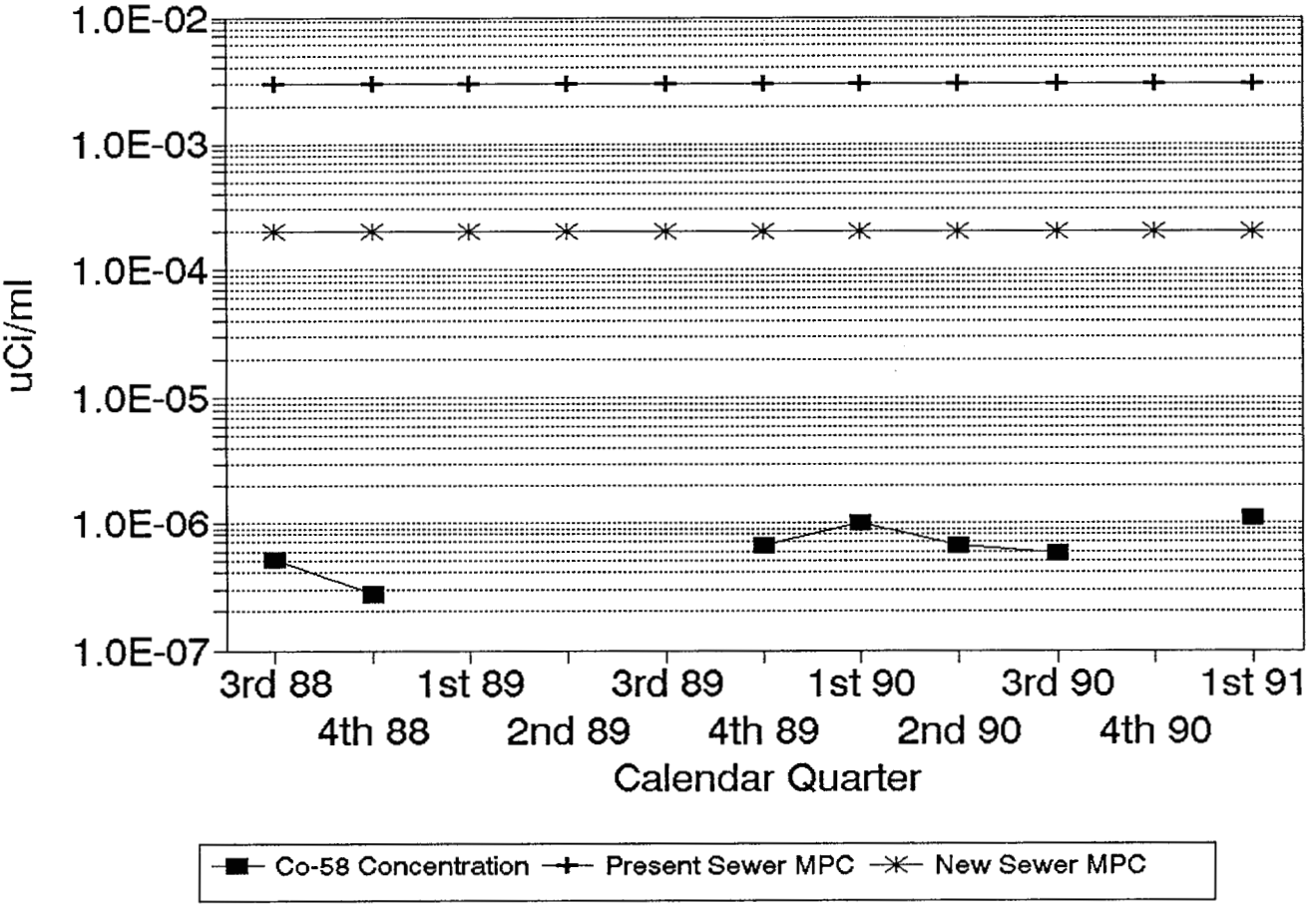
# INS - Royersford

## Wastewater Discharge Conc. Vs. MPC



# INS - Royersford

## Wastewater Discharge Conc. Vs. MPC



# INS - Royersford

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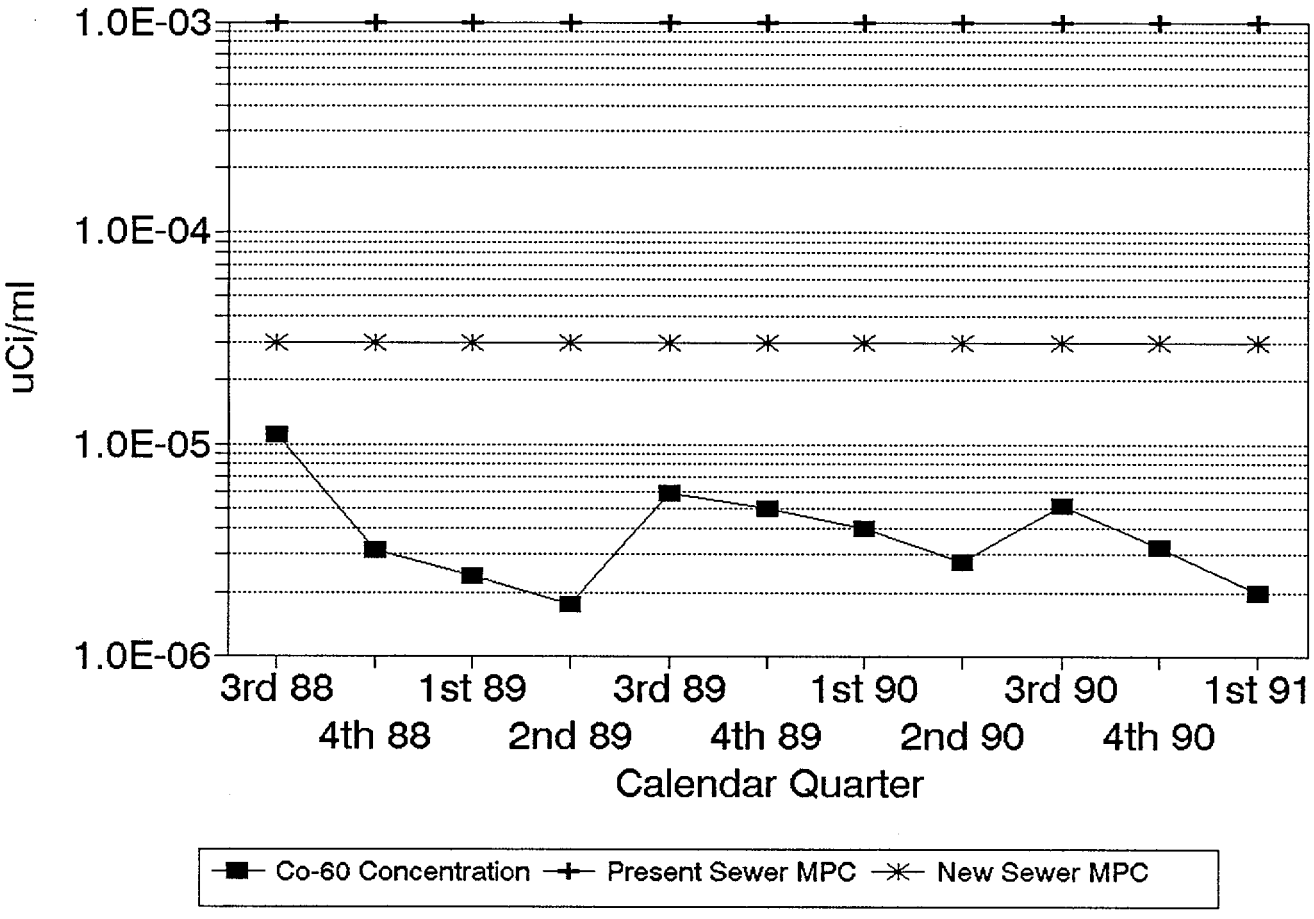
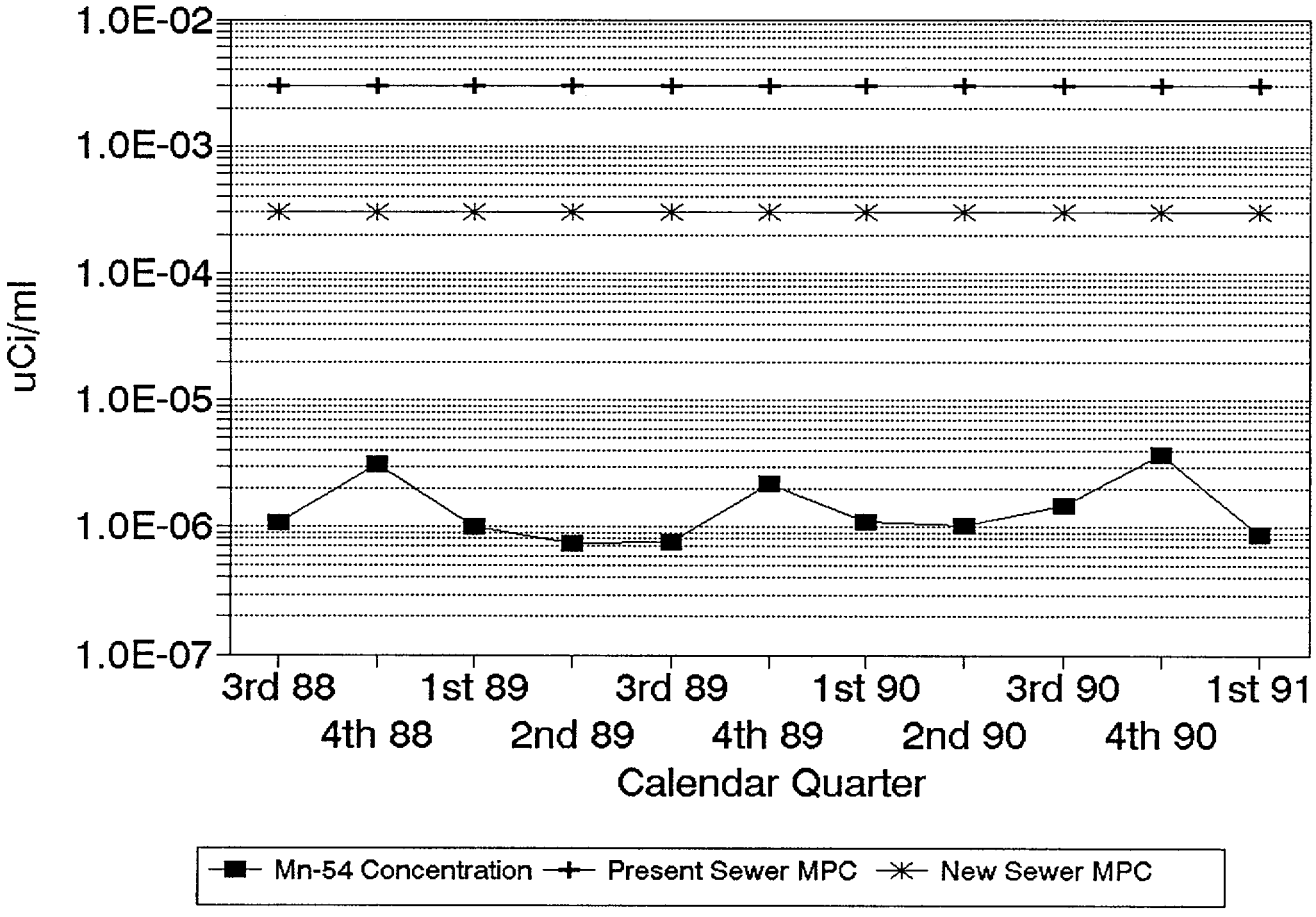


# INS - Royersford

## Wastewater Discharge Conc. Vs. MPC



# INS - Royersford

## Wastewater Discharge Conc. Vs. MPC