

June 24, 1994

NOTE FOR: H. L. Thompson, DEDS  
FROM: R. L. Bangart, OSP  
SUBJECT: INFORMATION FROM AGREEMENT STATES ON  
SEWAGE RECONCENTRATION

I have attached background information received from Agreement States on reconcentration of radionuclides in sanitary sewage systems.

The information includes material from the Chairman's briefing book for the recent Glenn/Synar hearing, summaries of information developed through telephone calls to States conducted by OSP and regional RSAO staff on June 15-16, 1994 (a summary sheet has been prepared for each State contacted), and a list of questions which we plan to use to develop additional information about State actions in this area. We plan to complete development of the additional information by July 15, 1994.

If you have any questions, or believe we should address additional areas in our follow-up activities with the Agreement States, please let me know.

Original Signed By  
RICHARD L. BANGART

Richard L. Bangart, OSP

Attachment:  
As stated

Distribution:  
DIR RF  
RBangart  
PLohaus  
A/S File  
Sewer Reconcentration File  
DCD (SP01) PDR YES X NO     

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NME	PLohaus:gd	RBangart				
DTE	06/24/94	06/24/94				

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Question 29: How were the Agreement States informed of the potential problem of reconcentration of radionuclides at sewage treatment plants? How have they responded? What problems have the Agreement States found? Are there likely to be problem plants like NE Ohio's Southerly Plant in the Agreement States?

Answer:

- o The NRC staff sent the Agreement States a letter on September 25, 1984 informing them of the New York incident and asking them to take samples of effluents at licensed facilities using long-lived radionuclides in unsealed form and to sample sludge at sewage treatment plants. The States were asked to report results showing significant contamination to the Regional State Agreements Officers.
- o Based on NRC staff reviews of Agreement State programs over the past 10 years, supplemented by recent discussions with 15 selected Agreement States representing 65% of all Agreement State licensees, the States appear to have responded appropriately to the NRC's 1984 letter and to the 1983 and 1984 incidents in Tennessee and New York.
  - New York and Tennessee set out more restrictive release limits in the licensees for the specific facilities that had caused the reconcentration problems in their states.
  - Some states (e.g., Tennessee and Texas) routinely monitor specific STPs where they have detected activity before or where they suspect potential for activity based on licensee operations that are discharging activity to sewage lines.
  - Some states (e.g., Illinois, Oregon, Washington) carry out periodic sampling of specific STPs where problems might develop.
  - Some states (e.g., New Mexico, Oregon, Alabama, North Carolina) have placed specific license conditions on licensees releasing material to sanitary sewer systems requiring routine sampling of discharges.
- o The States' monitoring, sampling, and inspection efforts after the September 25, 1984 letter identified very few problem sites. Oregon reported contamination problems related to one licensee, Precision Castparts Corp., and Tennessee identified concentrations of U-235 at the Erwin, TN STP attributable to NFS. However, these sites did not have the high contamination levels of the Southerly plant.
- o The NRC staff considers the likelihood of finding other situations similar to the one at the Southerly Plant very low.

## SUMMARY OF OSP ACTIVITY REGARDING RADIOACTIVITY DISCHARGES TO SANITARY SEWERS

Based on NRC staff knowledge and discussion with selected Agreement States, with one exception, staff did not identify any additional sewage treatment plants where concentrations of radioactive material were detected which would require remedial action. Monitoring by the Agreement States contacted, or monitoring carried out by Agreement State licensees under State regulatory control of sewage sludge or discharges, have detected no activity, or when activity was detected, the activity identified was low concentrations of radionuclides principally used in medical procedures (the most frequently cited radionuclide was I-131). The one exception relates to an area in Ames Iowa where an inadvertent discharge of thorium contaminated water from a Department of Energy facility in the 1950's resulted in contaminated sewage sludge. The sludge, at that time, was landfarmed and the area used for landfarming is currently being remediated for release as a public park.

Following the incident at Oak Ridge, Tennessee staff indicated they sampled major municipal STPs and conducted surveys at Erwin, TN, where they identified U-235 contamination attributable to NFS, and also conducted additional surveys at Oak Ridge where they identified U-238 attributable to a State licensee. Tennessee also reported that remedial action was taken at the Oak Ridge sewage treatment plant following the 1984 incident to dispose of sludge from several drying beds and that some manholes servicing the sewer line were decontaminated. Disposal of the sludge took place at DOE's facility at Oak Ridge, TN. (NOTE: This information conflicts with the conclusion stated in the GAO report which indicates that no remedial action was taken at the Oak Ridge facility). Following identification of elevated levels of radioactivity at the Oak Ridge and Erwin, TN STP's, the State of Tennessee amended its regulations to provide more restrictive limits for releases to the sanitary sewer than the limits in NRC regulations. In addition, New York and Tennessee set out more restrictive release limits in licenses for the specific facilities that had led to reconcentration problems.

Staff found that the Agreement States contacted have taken action in response to the 1983 and 1984 events in New York and Tennessee and the Agreement States have continued to be sensitive to the potential for reconcentration of radionuclides at STP. Some States e.g. Tennessee and Texas routinely monitor specific STPs where they have either detected activity before or where they suspect potential for activity based on licensee operations that are discharging activity to sewage lines. Other States, such as Illinois, Oregon and Washington, carry out periodic sampling of specific STPs. A number of States (e.g. New Mexico, Oregon, Alabama, North Carolina) have placed specific license conditions on licensees releasing material to sanitary sewer systems requiring routine sampling of discharges (e.g. nuclear laundry licensees).

With respect to Agreement State regulations, the regulation in § 20.303 (§ 20.2003 in the revised Part 20) which allows discharges to the sanitary sewer system has been categorized as a Division 2 regulation under the 1984 OSP B.7 Procedure. This designation requires the Agreement States to incorporate a similar standard, but allows the Agreement State to adopt more restrictive requirements. As part of the routine review to evaluate an Agreement State, the NRC determines whether the State has compatible regulations.



OSP PROCESS FOR DEVELOPING RESPONSE TO  
SEWER RECONCENTRATION OF RADIOACTIVITY IN  
AGREEMENT STATE FACILITIES

Staff followed a two step process in developing information about Agreement State response to the 1984 sewage treatment plant (STP) incidents. Staff first contacted the current and former RSAO's, and other Regional staff, to determine if any States had responded to the September 25, 1984 All Agreement States letter which had asked the States to perform surveys for licensees using long-lived material in unsealed form and to report to the RSAO's any positive results. Second, based on staff information and discussion with Organization of Agreement State representatives who were meeting with NRC staff on another issue, staff identified a number of specific States where there had been potential for or were known problems with reconcentration of radionuclides at STP. Staff contacted each of these States by phone.

The RSAO's generally reported negative results from the September 25, 1984 letter with the exception of Oregon which reported problems relating to Precision Castparts Corp. Tennessee also reported that based on their follow-up actions in response to the Oak Ridge incident, they had identified concentrations of U-235 at the Erwin, TN STP attributable to NFS.

Staff also contacted the following States: Alabama, Florida, Georgia, Illinois, Iowa, Kentucky, Mississippi, North Carolina, New York, Oregon, South Carolina, Tennessee, Texas and Washington. The details from these contacts are set out in the Summary sheets.

The discussion with the RSAO's and calls to selected Agreement States indicate that the States were responsive to the letter in that subsequent to the 1984 letter, States noted positive results from monitoring efforts at STPs and States required specific licensee facilities where there was potential for problems with reconcentration to routinely sample discharges to sanitary sewer systems (e.g. nuclear laundry facilities). Some States are also periodically or routinely sampling sludge at specific STPs. With the exception of the Ames Iowa facility, which involves an inadvertent release by a DOE facility, the concentrations detected through these sampling efforts were not of sufficient activity or severity to warrant any remedial action and principally involved "medical use" radionuclides, the most frequently referenced radionuclide being I-131.

Staff also identified, based on review of NRC Agreement State review reports, that following the 1984 incidents (in the 1988-1991 timeframe), the questionnaire used for Agreement State radiation control program reviews included two questions on State activities to look at the possibility of reconcentration in sanitary sewers and STPs and to provide details such as licensee and site if problems were identified.

STATE: ALABAMA (based upon telephone discussion with Kirk Whatley)

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

Ans: The state has put a license condition on a Nuclear Laundry licensee.

2. Descriptions of any sewage treatment plant contamination events that have occurred:

Ans: No events have been identified at any STP's.

•date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

•which radioisotopes, how identified, concentrations in sludge and/or liquids?

•remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?

•any offsite contamination?

•source of contamination?

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

Ans: The Nuclear Laundry provides a continuous grab sampler at the plant outfall to the sanitary sewer which is monitored and under the State's control.

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

Ans: None

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

Ans: None

STATE: FLORIDA

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

ANS: None

2. Descriptions of any sewage treatment plant contamination events that have occurred:

ANS: None

•date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

•which radioisotopes, how identified, in sledge and/or liquids

•remedial actions necessary? radiological controls established, contaminated material disposed of -- how, costs impact on sewage treatment facility contamination?

•any offsite contamination

•source of contamination

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

ANS: None

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

ANS: None

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

ANS: The State of Florida has been contracted by DOE to monitor the sewer discharges from the Pinellas Plant. The Environmental Laboratory has a continuous grab sampler to collect effluent from the sanitary sewer, downstream from the DOE facility located near Largo, FL. The sample is analyzed for U and H-3. Negative results thus far.

STATE: GEORGIA

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

Ans: License conditions is place to require monitoring of Nuclear Laundry prior to discharge.

2. Descriptions of any sewage treatment plant contamination events that have occurred:

Ans: No sewage treatment plant events.

\*date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

\*which radioisotopes, how identified, concentrations in sludge and/or liquids?

\*remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?

\*any offsite contamination?

\*source of contamination?

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

Ans: A Nuclear Laundry is required to monitor discharges prior to release into sanitary sewerage system.

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

Ans: None

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

Ans: Effluent samples from Laundry are taken during routine compliance inspections.

STATE: IOWA

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

ANS: None

2. Descriptions of any sewage treatment plant contamination events that have occurred:

ANS: The Iowa Dept. of Public Health is involved with the analysis of sewer sludge from the city sewer plant in Ames, IA. The sludge is resultant from an inadvertent discharge of contaminated water by a DOE facility in the 1950's. It's a hot issue with Iowa congressmen right now.

•date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

•which radioisotopes, how identified, in sludge and/or liquids

•remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?

•any offsite contamination

•source of contamination

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

ANS: None

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

ANS: See answer to 2.

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

ANS: See answer to 2.



**CHRONOLOGY OF  
THE ASSESSMENT OF THE PROPERTY SURROUNDING  
THE OLD WASTE WATER TREATMENT FACILITY (WWTF) IN  
AMES, IOWA**

**INTRODUCTION:**

Operating since the mid 1940's, Ames Laboratory is a research facility under contract to the U.S. Department of Energy (DOE). The lab is situated on the campus of Iowa State University (ISU) in Ames IA. As a result of the events described below, the city of Ames requested the Iowa Department of Public Health (IDPH) to conduct a radiological evaluation of city owned land in Ames. This request was based on the authority transferred to IDPH by the Iowa Code, Chapter 136C, which designates IDPH as the lead state agency in radiation safety and radioactive materials.

**CHRONOLOGY:**

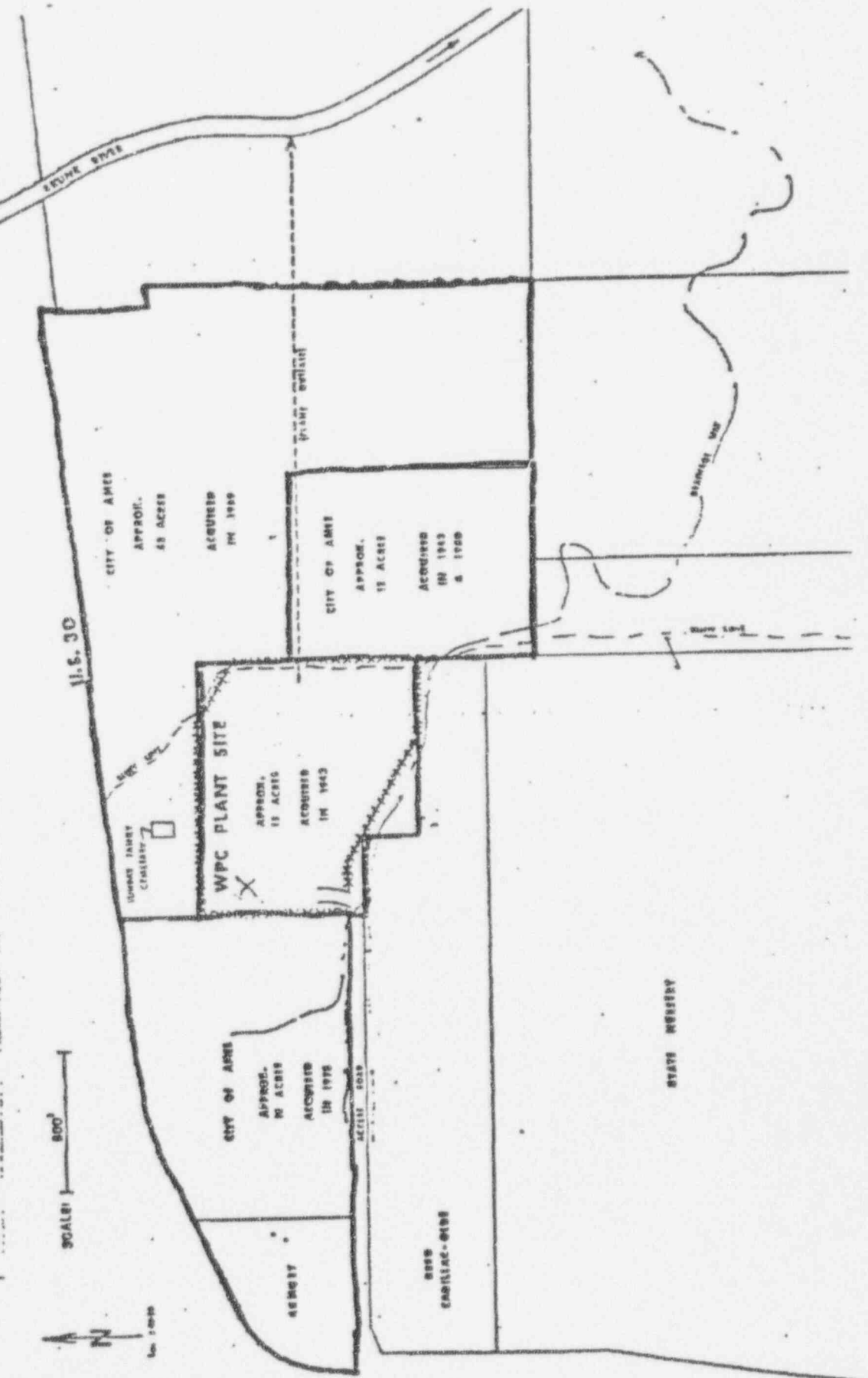
- 1951-52      7/51-8/52 filtrate from metallic thorium production periodically discharged to sanitary sewer system. Ames Laboratory discovered that, because of an unpurified raw material, the filtrate contained radioactive mesothorium (Radium-228) a daughter product of Thorium-232. This material concentrated in the sludge produced at the WWTF.
- 1953      Contaminated sludge stockpiled in an area west of the westernmost drying beds of WWTF and a berm built to prevent its spread. Sludge removed and spread at Ames airport, Grand Avenue underpass and the cemetery.
- 1977      Routine flyover by Department of Energy (DOE) contractor indicated elevated radiation readings at WWTF. Radiation surveys by Ames Laboratory confirm flyover. Ames Laboratory personnel sample potentially contaminated areas of WWTF. Discovered elevated levels of Thorium-232 and daughter products.
- 1988      Contaminated soil removed and shipped to Hanford, WA by Ames Laboratory.
- 1989      Ames Laboratory personnel sampled remediated site using well defined grid system. Some slightly elevated areas.
- 11/89      Ames discontinues water treatment at old WWTF.
- 1991      During a routine review of the programs at Ames Laboratory another flyover indicates no elevated radiation levels.

- 10/93 RUST Environment and Infrastructure publish final report on assessment of all inactive waste sites in Ames. This report was a result of a contract by DOE to catalogue and categorize the environmental impact of these sites. The Iowa Bureau of Radiological Health (BRH) approached by Department of Natural Resources (DNR) personnel to assist in evaluating the situation at WWTF. Ames City Council proposes to move forward in construction of a youth sports complex on city property to east of old plant.
- 12/3/93 Pat Brown of Ames City Council requests from DNR the date which that agency will grant approval for use of proposed sports complex site. (Letter attached)
- 12/9/93 Meeting between Ames City Manager, water treatment personnel, BRH personnel, Ames Laboratory and Iowa State University to discuss options regarding proposed site. Insufficient information available in report by RUST to say anything about property adjacent to WWTF.
- 12/14/93 Joseph Obr of DNR responds to Ms. Brown saying IDPH has the lead in radioactive materials. Ames City Council passes resolution to defer action on the proposed sports complex and a proposed animal shelter to west of old WWTF until further sampling supervised by IDPH can be accomplished. (Letter attached)
- 12/15/93 Ms. Brown asks D. Flater for information about radiation hazards at proposed site. (Letter attached)
- 12/21/93 Mr. Flater responds to Ms. Brown and commits to written report. Larry Wilson of DNR responds to a 12/7/93 letter from the mayor of Ames. He states that IDPH has lead in radioactive materials. (Letters attached.)
- 1/4/94 Meeting between Ames City Manager, DNR, IDPH, Ames Laboratory and ISU. City manager transmitted City Council request to IDPH. Decision to have independent contractor conduct additional sampling adjacent to old WWTF. Ames Laboratory will finance through IDPH. Plan includes back-up analysis by EPA Laboratory in Montgomery AL.
- 1/14/94 BRH requested technical assistance from NRC to procure the sampling and analysis services of Oak Ridge Institute for Science and Education (ORISE). Because of an inability to directly bill IDPH, this request was refused.
- 2/14/94 Request from BRH to DOE Operations, Oak Ridge, TN for sampling by ORISE.
- 3/3/94 Site walk over by ORISE, IDPH and Ames water treatment personnel. Sampling scheduled 4/5-7.

- 3/22/94 IDPH received sampling plan from ORISE. EPA Region VII commits to analyze a statistically significant number of samples for quality control.
- 3/25/94 DOE Operations, Chicago object to estimated cost of survey. Stated that report by RUST contains all information needed to describe old WWTF. Wanted EPA to comment on RUST report. (Letter attached)
- 3/29/94 Meeting between Ames Laboratory, ISU, City of Ames and IDPH. Conclusion was to delay sampling and elicit funds from DOE, Chicago.
- 3/30/94 In a telephone conversation, DOE indicated that EPA had been requested to comment on the adequacy of the RUST report for assessment of the proposed development sites.
- 4/5/94 DOE requested to provide funds. (Letter attached) Funding questions resolved in private meeting between DOE, EPA and IDPH. Public meeting in Ames to provide information on all DOE sites in Ames. No questions directed to IDPH.
- 4/6/94 ORISE scheduled to sample 4/19-22.
- 4/19-22 ORISE obtained samples in accordance with their plan. Back-up samples sent to EPA laboratory.
- 5/19/94 Second public meeting in Ames. No questions about old WWTF or sampling.
- 6/2/94 IDPH received draft copy of sample results.

Post-it® brand fax transmittal memo 7571

From	Tom Neumann	# of pages	2
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AMES ELCC ADMIN

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STATE: Illinois (Steve Collins, IDNS and B.J. Holt, RIII)

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

Ans: Illinois, an Agreement State since 1987, has regulations identical to those of NRC and has a periodic sampling program.

2. Descriptions of any sewage treatment plant contamination events that have occurred:

Ans: None.

•date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

•which radioisotopes, how identified, in sludge and/or liquids

•remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?

•any offsite contamination

•source of contamination

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

Ans: Suspect licensees include Interstate Nuclear Services (INS), Amersham, and Abbots. Nothing was found. Amersham no longer has sanitary sewer effluents. Abbots eliminated underground storage tanks a few years ago to avoid problems. INS was monitored at its treatment plant and the sewer treatment plant.

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

Ans: Chicago monitored its own sewer treatment plant because of hospitals being a problem. Also, EPA found a few radionuclides when it studied Chicago, but well below any compliance level. Collins is not sure whether Chicago monitors routinely, or just when there was interest about two years ago. Also, Morris treatment facilities and sewerage were checked because of the number of nuclear facilities in the area.

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

Ans: The Illinois approach is to check sewage sludge and sediments rather than the liquids because an IDNS literature search



conducted before undertaking the measurements a few years ago showed that most radionuclides precipitate out into the sediments and sludge. With regard to licensees, the liquid effluent is usually monitored and sampled. There has been no monitoring within the last year because of higher priority issues, e.g., Kerr McGee and two decommissioning projects.

STATE: KENTUCKY (based upon telephone discussions with John Volpe and Vicki Jeffs)

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

Ans: License condition for United Catalyst Facility in Louisville, KY.

2. Descriptions of any sewage treatment plant contamination events that have occurred:

Ans: No events were reported for sewerage treatment plants.

\*date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

\*which radioisotopes, how identified, concentrations in sludge and/or liquids?

\*remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?

\*any offsite contamination?

\*source of contamination?

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

Ans: None

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

Ans: None

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

Ans: The United Catalyst facility outfall was sampled and monitored on a one time basis following a compliance inspection during the mid-1980's. Negative results.

STATE: MISSISSIPPI (based upon telephone discussions with Bob Golf and Bob Bell)

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

Ans: License conditions require monitoring of discharge at Nuclear Laundry.

2. Descriptions of any sewage treatment plant contamination events that have occurred:

Ans: No events reported at sewerage treatment plants.

•date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

•which radioisotopes, how identified, concentrations in sludge and/or liquids?

•remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?

•any offsite contamination?

•source of contamination?

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

Ans: The Nuclear Laundry is required to monitor discharge into sanitary sewer system.

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

Ans: None

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

Ans: The RCP collects, splits, and analyzes water and sludge in Vicksburg, MS treatment plant, downstream from the Nuclear Laundry and the Grand Gulf Nuclear Station.

STATE: NORTH CAROLINA (based upon telephone discussion with Mel Fry)

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

Ans: License conditions require monitoring of effluent streams into sanitary sewer systems for selected licensees.

2. Descriptions of any sewage treatment plant contamination events that have occurred:

Ans: No events at sewerage treatment plants were noted.

•date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

•which radioisotopes, how identified, concentrations in sludge and/or liquids?

•remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?

•any offsite contamination?

•source of contamination?

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

Ans: Duke University is required to keep discharges below drinking water standards at outfall to licensed facilities.

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

Ans: None

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

Ans: None

STATE: NEW MEXICO

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

Ans: Yes, Part 4-320 of the New Mexico Radiation Protection Regulations, also by license conditions for 3 licensees.

2. Descriptions of any sewage treatment plant contamination events that have occurred:

Ans: None.

•date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

•which radioisotopes, how identified, in sledge and/or liquids

•remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?

•any offsite contamination

•source of contamination

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

Ans: Yes - 3 licensees:

- a. one nuclear laundry
- b. one academic institution
- c. one research & development

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

Ans: No, all were monitored in the past for specific nuclides but this was not routine, it was a one time measurement.

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

Ans: No, not at sewer treatment plant- monitor at the discharge point from facility to sewer system.



STATE: New York

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

Ans: First of all, Paul indicated that he thought the revised Part 20 would take care of a lot of this. He also indicated that his Department was probably going to be issuing a consent order to Grand Island because they were in violation of the new Part 20.

2. Descriptions of any sewage treatment plant contamination events that have occurred:

Ans: Besides the Tonawanda and Grand Island cases, which Paul indicated were by far the most significant, he recalled several others.

Bard College: Was releasing research waste into the school's private sewer system because they thought they had an exemption which they didn't. Paul said they nailed them for that. One thing Paul mentioned was that people holding general licenses sometimes think they are exempt from other requirements (e.g. waste disposal) which they are not. His solution was to get rid of general licenses.

Queens, NY: Evidently there were sewers contaminated with radium from DOE work in Queens. This has been cleaned up.

Mount Cisco (sp?) Contamination found in sewers. The town removed the sewers.

LILCO identified iodine reconcentration in seaweed of Long Island 150 times background which LILCO determined was discharged from hospitals from Long Island.

KODAK, Rochester, NY: Pat Larkins gave me a 1991 report indicating thorium oxide found in sewer system. Paul tells me that KODAK uses thorium to grind lenses, but KODAK was disposing into the Genesee River, not a sewer. He says they run into industrial disposal into rivers every once in a while.

Tri-States Laundry: Paul says this was closed out before his time, but he bets if they took a look at the sewers around this laundry, they may find something.

•date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

•which radioisotopes, how identified, concentrations in sludge and/or liquids?

•remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?

•any offsite contamination?

•source of contamination?

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

Ans: Nothing in addition to the above discussion.

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

Ans: New York has pretty strict landfill laws which require solid waste to be separated from sewers and sent to landfills within a short time frame. Many landfills have radiation detection monitoring systems which could detect serious contamination. The system isn't perfect for detecting contamination in sewers, but there are checks. The State does not require monitoring or surveys. They have adopted NRC's new Part 20.

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

Ans: No, see 4 above.

STATE: OREGON

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

ANS: The state may use license conditions.

2. Descriptions of any sewage treatment plant contamination events that have occurred:

ANS: Precision Castparts Corp (as shown in NMSS background book)

- date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)
- which radioisotopes, how identified, in sledge and/or liquids
- remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?
- any offsite contamination
- source of contamination

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

ANS: No other

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

ANS: City of Portland only

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

ANS: Portland only

STATE: SOUTH CAROLINA (based upon telephone discussions with Jim Peterson and Burt Craft)

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

Ans: License conditions are used if there is a potential for release into the sanitary sewer system.

2. Descriptions of any sewage treatment plant contamination events that have occurred:

Ans: No contamination events were reported.

•date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

•which radioisotopes, how identified, concentrations in sludge and/or liquids?

•remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?

•any offsite contamination?

•source of contamination?

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

Ans: Nuclear Laundries are required to monitor effluents prior to discharge. The Westinghouse Decontamination facility near Spartanburg, SC is required to monitor the plant outfall into the sewer system.

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

Ans: None

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

Ans: The Columbia, SC waste treatment facility is routinely sampled (weekly) for contamination in the water and the sludge. The sludge samples have been negative; however, the water samples have shown iodine-131 contamination up to 20 picocuries per liter.

STATE: TENNESSEE

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

Ans: Following the identification of elevated levels of radioactivity in the Oak Ridge and Erwin sewage treatment plants (STP) (in the 1984-86 time frame), Tennessee took action to monitor other sewage treatment plants (see discussion below), amended regulations to limit discharges to the unrestricted area MPC's, and established license conditions for certain industrial facilities releasing to the sewage systems which limited their releases. The limits were developed in coordination with the local municipality responsible for operation of each respective STP. Tennessee required the industrial facility licensees to monitor to confirm that releases were meeting the reduced release levels. Since that time, Tennessee has also carried out routine monthly monitoring of STP sludge at both treatment facilities, and the Oak Ridge STP Operator also conducts daily monitoring of sludge being landfarmed.

2. Descriptions of any sewage treatment plant contamination events that have occurred:

\*date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

Ans: Following the initial identification of elevated concentration levels at the Oak Ridge STP, Tennessee inspectors monitored STP's in all major metropolitan areas, at Erwin, TN and also further at Oak Ridge. Inspectors found low concentrations of "medical use" radionuclides were present in STP samples at the STPs sampled and in two cases, Knoxville and Oak Ridge, higher concentrations (levels approaching unrestricted area MPC's) of I-131 were identified. Further sampling and investigation by Tennessee staff concluded that the elevated levels of I-131 were due to patient excreta from patients undergoing medical testing with some contribution from routine releases from medical facilities.

Tennessee inspectors also identified concentrations of U-238 in samples taken at the Oak Ridge, TN STP and concentrations of U-235 in samples taken at the Erwin, TN STP. Further investigation by State staff identified that the releases were attributed to Manufacturing Sciences and Oak Ridge National Laboratory in Oak Ridge, TN and NFS in Erwin, TN. Actions taken by the State included a change to State regulations to limit discharges to sanitary sewer systems to the unrestricted release concentration levels, imposition of license conditions to limit individual facility releases, and establishment of monitoring by the Tennessee radiation control program at the two sewage treatment plants which is continued today on a monthly basis.



The State also required Quadrex and NFS to take actions to remove and dispose of existing sludge present at the STPs. The State does not believe the radioactivity levels presented a significant hazard to public health and safety but the actions to remove and dispose of the sludge were considered prudent. In the case of Quadrex, sludge was removed from several drying beds for disposal and manholes were decontaminated. The sludge was disposed of at Oak Ridge National Laboratory. In the case of NFS, sludge from one holding area was used as backfill around a new waste treatment facility being constructed on site. Remedial action for sludge present in an older holding area has been approved but has not yet been implemented by the operator. Tennessee staff indicated that NFS has made a commitment to provide \$168k to the STP operator for purchase of equipment to process these sludges.

•which radioisotopes, how identified, in sludge and/or liquids

Ans: See Discussion above

•remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?

Ans: See Discussion above

•any offsite contamination

Ans: Tennessee inspectors have periodically sampled STP landfill sites for the presence of radionuclides. Medical use radionuclides are generally detected through such sampling but at low concentration levels presenting no public health and safety hazard.

•source of contamination

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

Ans: Tennessee has, in the past, required licensee monitoring of STP lines but monitoring was discontinued. Tennessee continues to monitor sludge monthly at both the Oak Ridge and Erwin, TN STPs.

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

Ans: The Oak Ridge, TN STP routinely monitors sludge for radioactive materials.

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

Ans: Yes. See response to Questions 1 and 3 for details.

STATE: TEXAS

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

Ans: We have no regulation that specifically requires a licensee to monitor releases to the sanitary sewerage. We do have the general requirement that surveys be conducted that are necessary to comply with Part 21 and evaluate... concentrations and quantities of radioactive material...(TRCR 21.501). These can be calculations based on process knowledge and a few initial measurements. The regulations also specify concentration limits and total limits allowed to be released (TRCR 21.1003). As far as I know we have no license conditions which require licensees to monitor releases into the sanitary sewerage.

2. Descriptions of any sewage treatment plant contamination events that have occurred:

Ans: We have periodically taken samples of sludge from various waste water treatment plants which serve hospitals. We routinely see concentrations of I-131 at  $10^{-5}$  to  $10^{-4}$   $\mu\text{Ci/gm}$  (resulting from patient excreta) and I-125 at about the same levels for wwtp's serving facilities which are licensed to manufacture radioimmunoassay kits. There has been one incident in Texas of which I am aware when contamination of sludge at a wwtp was attributed to an incident. However, the incident precipitated the first survey at the wwtp and during the investigation it was determined that certain practices were routinely in use by the licensee during normal operations which could have resulted in a long term release of the isotope involved to the sanitary sewerage.

•date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

Ans: Date: February 8, 1982,

Facility: Gulf Nuclear, Inc.,

Location: Webster, Texas,

Extent of Contamination:

- 1) Sink trap in Americium Lab-Am-241  $3.57\text{E}-2$   $\mu\text{Ci}$  and Cs-137,  $1.3\text{E}-2$   $\mu\text{Ci}$ .
- 2) Sanitary Sewer near facility- Am-241( $3.23\text{E}-3$   $\mu\text{Ci/gm}$ ), Cs-137( $4.77\text{E}-3$   $\mu\text{Ci/gm}$ ), Ir-192( $1.03\text{E}-3$   $\mu\text{Ci/gm}$ ), Ra-226( $3.7\text{E}-4$   $\mu\text{Ci/gm}$ ), Co-60( $3.4\text{E}-5$   $\mu\text{Ci/gm}$ ), Ag-110m ( $3.8\text{E}-5$   $\mu\text{Ci/gm}$ ).
- 3) Sewer further downstream, passed hospital- Am-241( $4.5\text{E}-5$   $\mu\text{Ci/gm}$ ), Cs-137( $7.8\text{E}-5$   $\mu\text{Ci/gm}$ ), Tc-99m( $4.7\text{E}-6$   $\mu\text{Ci/gm}$ ).
- 4) Sludge from filter press in Webster WWTP on 3/22/83 Am-241 ( $1.95\text{E}-5$   $\mu\text{Ci/gm}$ ), Cs-137 ( $5.25\text{E}-5$   $\mu\text{Ci/gm}$ ), Ir-192( $3.23\text{E}-5$   $\mu\text{Ci/gm}$ ).
- 5) Sludge from filter press in Webster WWTP on 4/5/83 Am-241( $1.38\text{E}-5$   $\mu\text{Ci/gm}$ ), Cs-137 ( $5.36\text{E}-5$   $\mu\text{Ci/gm}$ ).
- 6) Sludge Disposal: Due to the low concentrations the contaminated sludge was allowed to be disposed in the

municipal land fill.

•which radioisotopes, how identified, in sludge and/or liquids

- Ans: 1) Which isotopes: Am-241, Cs-137, Co-60, Ir-192, Ag110m, Ra-226, Tc-99m  
2) How Identified: gamma spectroscopy using Lithium drifted Germanium detectors.  
3) In sludge

•remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?

- Ans: 1) Remedial Actions: None for Webster WWTP  
2) Rad Controls: None for Webster WWTP  
3) Contam. mat. disp.: None for Webster WWTP  
4) Cost impact: None on Webster WWTP

•any offsite contamination

Ans: Not determined for Webster WWTP.

•source of contamination

Ans: N/A.

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

Ans: Several facilities have been required by license condition to use hold up tanks in order to monitor releases either to the sanitary sewerage or to septic tanks.

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

Ans: Not to our knowledge, although some special monitoring has been conducted by the City of Houston recently.

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

Ans: Routine monitoring has been conducted at two locations, The Simms Bayou WWTP in Houston and the Webster WWTP at least since the date of the incident at Gulf Nuclear. Occasional samples have been taken at other WWTP's such as Galveston to confirm suspicions about releases from nearby large medical complexes. Currently the Bureau is initiating monitoring on a long term basis at Galveston and at the Almeda-Simms WWTP in Houston. Depending on what is observed, releases to the sanitary sewerage from other large medical complexes may be monitored in the future. We are at this time mainly interested in radioiodine releases and will also take air samples in the sludge dewatering areas.

TEXAS DEPARTMENT OF HEALTH  
Bureau of Radiation Control

## 1990 ENVIRONMENTAL MONITORING REPORT

For monitoring of radioactivity in the Texas environment  
conducted from January, 1990 through December, 1990,

by

Special Inspections and Facility Monitoring Program  
Charles R. Meyer, C.H.P., Chief

Radioactive Material Inspection and Enforcement Branch  
John R. Haygood, Administrator

Division of Compliance and Inspection  
Richard A. Ratliff, P.E., Director

Bureau of Radiation Control  
David K. Lacker, Chief

Texas Department of Health  
David R. Smith, M.D., Commissioner

Austin, Texas

Third Annual Report

**SIMS BAYOU WASTEWATER TREATMENT PLANT**

**Harris County**

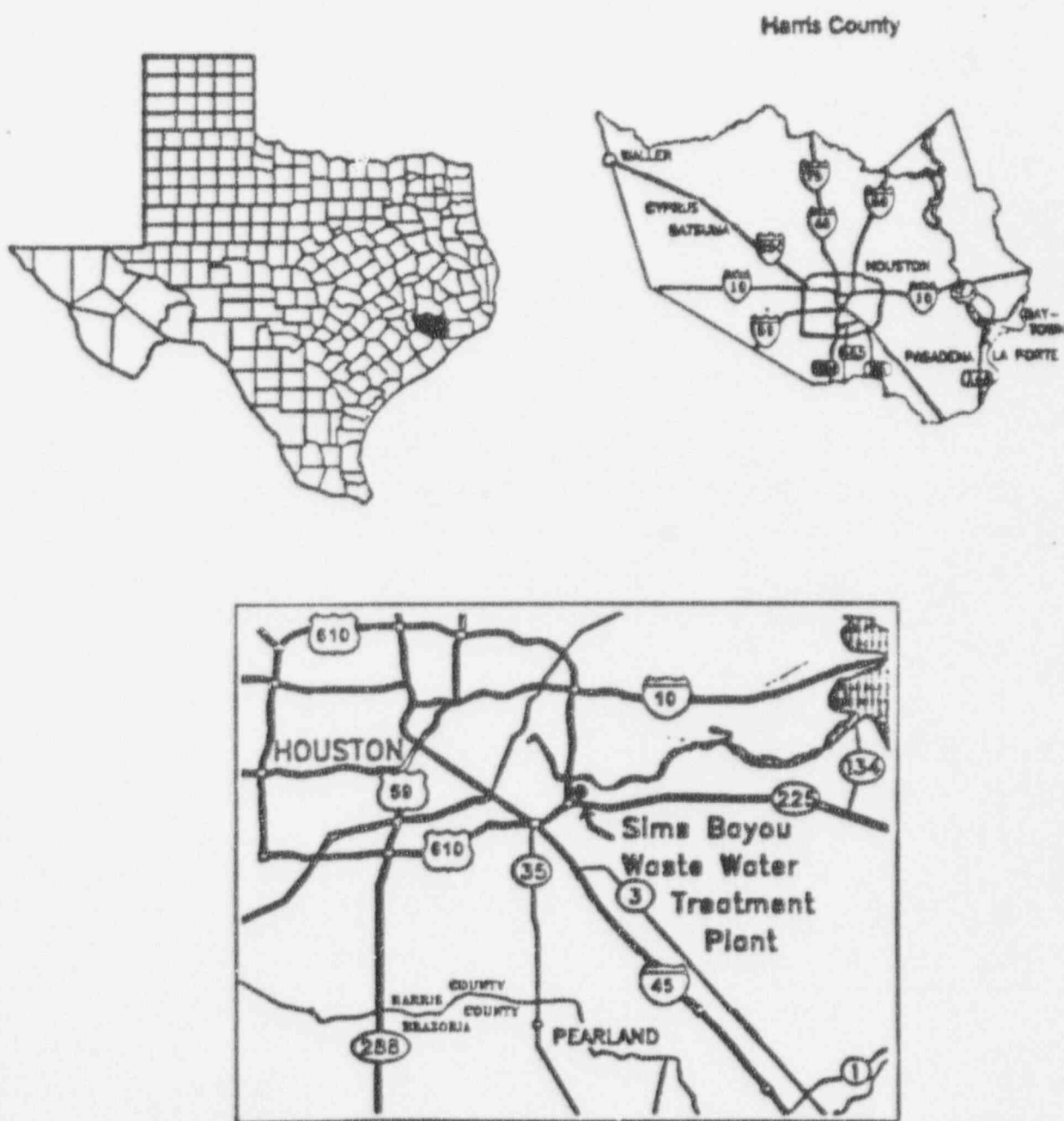
**1990 Environmental Monitoring Results**

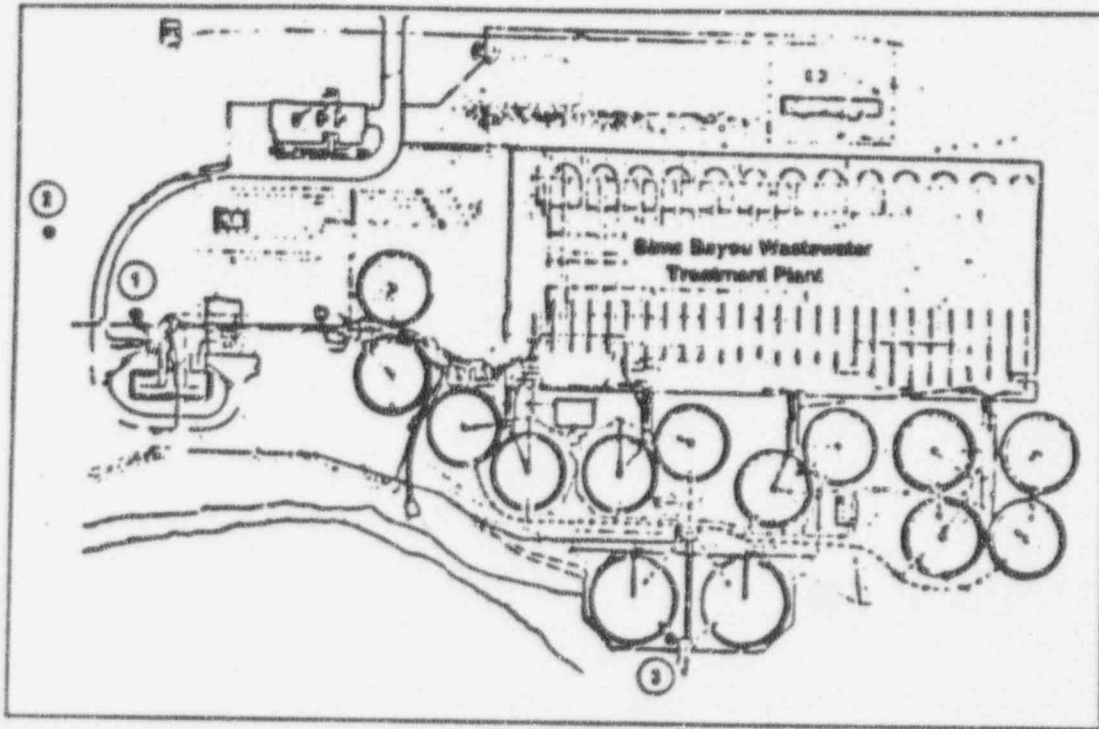
**Houston, Texas**

*II.E.6 Sims Bayou Wastewater Treatment Plant*

In January of 1989, the BRC initiated a program of monitoring influent, effluent, and sludge at the Sims Bayou Wastewater Treatment Facility. This was conceived as an extension of the monitoring programs for the two source manufacturing companies of Nuclear Sources and Services (NSSI) and Gammatron, whose normal waste streams are served by this treatment plant. However, the treatment facility also serves the Houston Medical Center. Since large amounts of Iodine-131 routinely make their way to this type of plant from medical facilities, the BRC does not presume that

positive results are necessarily from either of the two manufacturing facilities. Other radionuclides such as Iridium-192, Silver-110m, Cesium-137, etc., are not used routinely in a medical facility in a form that would disperse in water. Since they are used by NSSI, the treatment plant is monitored for these and other gamma emitting radionuclides. To date, no radionuclides originating from NSSI or Gammatron have been detected in samples obtained from the wastewater treatment facility.







# WEBSTER WASTEWATER TREATMENT PLANT

Harris County

1990 Environmental Monitoring Results

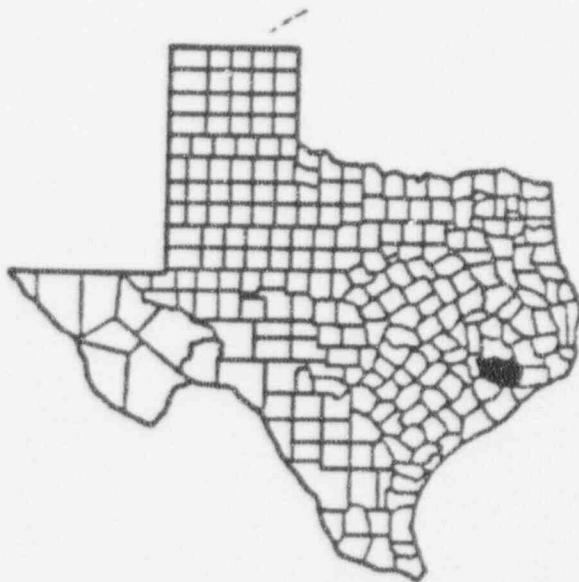
Webster, Texas

*E.E. 18. Webster Wastewater Treatment Plant*

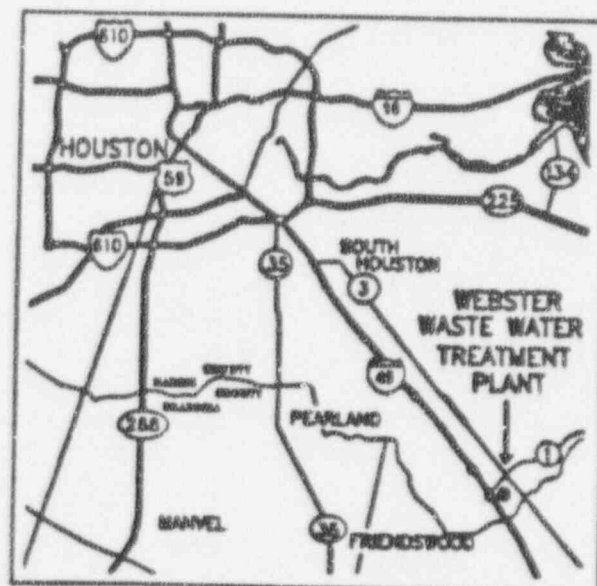
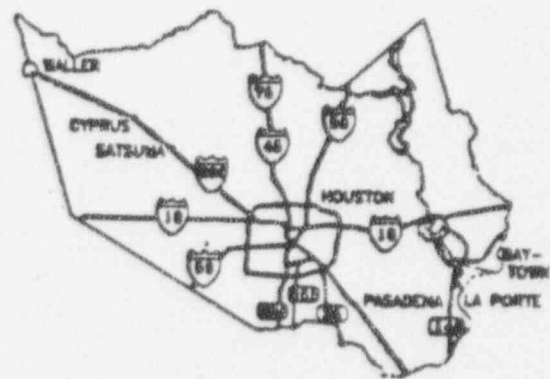
The BRC established a routine monitoring program at the Webster Wastewater Treatment Plant, located in Webster, during January of 1986. In previous annual reports, the site was included as part of the Gulf Nuclear monitoring program. However, since a number of facilities may contribute to the content of radioactive substances in the system, this and subsequent reports will carry it as a "stand-alone" site. The BRC will continue to monitor for the radionuclides that are specific to Gulf Nuclear, but will also monitor for those of any potential contributor.

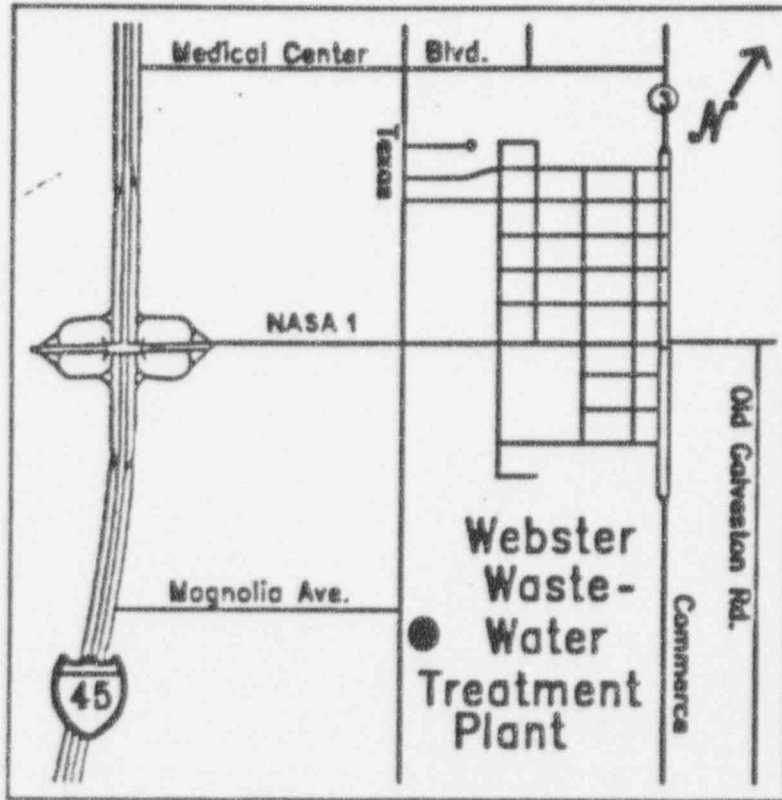
The monitoring program consists of obtaining quarterly samples of liquid influent, liquid effluent, and dried sludge. Radioactive materials have been detected only in the dried sludge.

During 1990, with the exception of iodine-131, no radionuclides above the lower limit of detection were observed in the samples.



Harris County





STATE: WASHINGTON

1. Regulations or license conditions require monitoring or sampling of planned discharges to sanitary sewer?

Ans: None

2. Descriptions of any sewage treatment plant contamination events that have occurred:

- date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

Ans: 1988 or 1989 - Richland, WA - treatment plant sludge

- which radioisotopes, how identified, in sludge and/or liquids

Ans: Uranium - slightly elevated levels found in sludge during decommissioning of old STP. NRC and DOE were notified at the time.

- remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?

Ans: Disposal at landfill

- any offsite contamination

Ans: None

- source of contamination

Ans: Undetermined, but the Siemens plant was suspected

3. Any licensees, currently or in past, required/monitor sewer discharge lines?

Ans: Not on a continuing basis, but some are required to conduct periodic sampling

4. Do any sewage treatment facilities routinely monitor/sample for radiation/radioactive materials?

Ans: None

5. Does, or has, the Agreement RCP monitored/sampled sludge at sewage treatment facilities?

Ans: RCP has selected a group of STP's statewide for sampling/monitoring to start this year, has previously monitored specific STP's with estimated significant potential for contamination

STATE: WASHINGTON (continued)

2. Descriptions of any sewage treatment plant contamination events that have occurred:

- date, facility, location, extent of contamination (piping, sludge, incineration, sludge disposal, vehicles?)

Ans: 1992 or 1993 - Seattle - contamination in sludge

- which radioisotopes, how identified, in sludge and/or liquids

Ans: I-131, and other medical materials - STP was monitored because it serves a large Naval base

- remedial actions necessary? radiological controls established, contaminated material disposed of - how, costs impact on sewage treatment facility contamination?

Ans: No action required taken yet - RCP continues to study the extent of the problem

- any offsite contamination

Ans: YES - there is apparently some I-131 contamination in effluent being released to the sound; the level of this contamination is very low

- source of contamination

Ans: Multiple medical facilities

SELECTED STATE RESPONSES TO SPECIAL QUESTIONS ON  
RECONCENTRATION OF RADIONUCLIDES IN SANITARY SEWER SYSTEMS

Following the 1984 letter and 1987 Temporary Instruction, the Office of State Programs added a question to its questionnaire sent to the state prior to a routine review. The question read as follows:

- 3.a. Is the State mounting any special effort to look at the possibility of reconcentration of radionuclides in sanitary sewers and sewerage treatment plants as part of the regular inspection program? If so, please describe.
- b. If reconcentration of radionuclides in sanitary sewers or sewerage treatment plants has been found, please identify the site and licensee.

The responses for certain States during the 1988 - 1990 review period is described below:

State	Question 3.a.	Question 3.b.
Alabama	Not at this time, although if we license a nuclear laundry we will evaluate the situation.	N/A
Florida	No.	N/A
Georgia	Samples have been collected from sewers, treatment plant sludge and oxidation ponds.	Though build up over 20 years, radionuclides have been found in a sanitary sewer in Macon, GA. The licensee is Interstate Nuclear Services Corp.
Illinois	No change since 1987 review.	N/A
Kentucky	A survey was performed of a sewerage treatment plant in conjunction with activities of a licensee using radioactive material (natural or depleted uranium). No activity was detected.	None found.

Mississippi	No regular inspection program is currently in place. However, at the request of STP operators or the Bureau of Pollution Control, samples are collected and analyzed. Such a request was received from Vicksburg Water Treatment Plant. Analysis indicated no significant concentrations of radionuclides.	
New Mexico	No, however, inspectors monitor effluent streams and holding tanks.	N/A
New York	NYSH monitoring of the Grand Island and Tonowanda sewage treatment plants is carried out by the State to check for reconcentration of Am-241 discharged by NRD (Grand Island) and the former EAD (Tonowanda) facility.	
North Carolina	No.	N/A
Oregon	The State RCP has been active in requiring a licensee to decontaminate a sewer system and sewage treatment plant and compost facility and design and build a pretreatment plant which effectively eliminates finely divided source material contamination from concentrating in public sewers and the sewage treatment plant.	Precision Castparts Corporation
South Carolina	The RCP is sampling sanitary treatment plants to determine the possibility of reconcentration of radionuclides.	Columbia Treatment Plant for releases from INS nuclear laundry; Spartanburg TP for releases from Westinghouse Decon Facility.
Texas	The BRC monitors city sewers, sewage and waste water treatment plants, and septic systems which service licensees who are authorized to process loose radioactive material or radioactive waste. These locations are included in the environmental monitoring program.	Reconcentration of radionuclides, particularly I-131, has been noted in dried sludge collected at the Webster Waste Water Treatment Plant.



Has the State of Florida complied with the NRC standards?

We understand the question to mean: Has the State of Florida conducted its Agreement State program in accordance with the guidelines established by the NRC?

The State of Florida has been conducting its program in accordance with the NRC guideline as indicated by the last two reviews conducted of the program. Both reviews found the Florida program to be adequate to protect the public health and safety and compatible with NRC's program for the same materials.

Florida has adopted the revised Part 20 equivalent regulations which impose new limits and requirements on the disposal of radioactive material into a sanitary sewer system.

#### Grand Island STP New York

The State used the NRC supplied value of 30 pCi/g for the decision criteria. After the first year the concentration in the sludge was at or below this level. The sludge was being disposed of in the local sanitary landfill. The State assessed the potential pathways for exposure to the workers at the STP and the public and all doses were very low. The only action taken was to limit the licensee's effluent to lower concentration release levels. This action has reduced the sludge concentrations to less than 20 pCi/g. The current NRC unrestricted release value for Am-241 in soils remains at 30 pCi/g. NRC dose estimates from soil with 30 pCi/g concentrations of Am-241 range from 19 to 325 mrem/yr, depending on the number of pathways considered and the degree of conservatism used in the dose pathway scenario. The licensee continues to evaluate ways to lower the effluent concentration.

#### Tonawanda STP, New York

The State has cleaned up the STP and associated sewer lines back to the licensee's property line. The wastes from the clean up have been solidified and disposed of at the Barnwell LLW disposal site. The licensee's facility and the disposal area for some of the ash from the licensee's incinerator require additional clean up or remedial action. The licensee's facility will likely be cleaned up through the Superfund program and the disposal area remediated through the FUSRAP program since DOE wastes were also in the disposal area.

## Regulation

The regulation at § 20.303 (§ 20.2003 in the revised Part 20) which allows discharges to the sanitary sewer system has been categorized as a Division 2 regulation under the 1984 OSP B.7 procedure. This designation would require the Agreement States to incorporate a similar standard, but would allow the Agreement State to adopt more restrictive requirements. As part of the routine review to evaluate an Agreement State, the NRC determines whether the State has compatible regulations.

Following identification of elevated levels of radioactivity at the Oak Ridge and Erwin, TN STP's, the State of Tennessee amended its regulations to restrict releases to the sanitary sewer to the unrestricted MPC values under the old Part 20. Tennessee has continued that practice in adopting the revised Part 20 by limiting the release to the sanitary sewer to the effluent concentrations in Table 2, Appendix B to Part 20 instead of the Table 3, Release to Sewers, concentrations.

G:\REGSEWER.DMS

REQUEST FOR ADDITIONAL INFORMATION ON THE STATES' RESPONSE TO  
THE 1984 LETTER AND 1987 TI ON  
RECONCENTRATION OF RADIONUCLIDES IN SANITARY SEWER SYSTEMS

Q1. Identify any written responses from the Agreement States to the September 25, 1984 letter. The letter asked that the States take two actions.

a) Ensure that the State staff has a working knowledge of its equivalent to § 20.303.

b) In cases where licensees are utilizing long-lived unsealed radioactive materials and discharging liquid wastes to the sanitary sewer system, have surveys performed of the sewer lines (e.g., at man-holes), and collect and analyze sludge samples from the sewage treatment plant for radioactivity.

The States were requested to report any positive results from the surveys performed. Do you have any written record of the response and results of actions taken by the State? If so, please provide a copy of the response to OSP-HQ (P. Lohaus). This should include phone conversation records or any other written documents.

Ans1.

Q2. If there was no response to NRC as a result of the letter, did the State take any action which is documented? This could include special study reports which were negative, results of monitoring conducted by the State of licensee facilities or sewage treatment facilities, inspection reports which indicate that special surveys were performed, or any other documentation of the State addressing this issue.

Ans2.

Q3. Please identify any written documentation describing actions taken by the State in response to Temporary Instruction 2800/9, "Reconcentration of Radionuclides in Sanitary Sewage Systems," provide to you by letter dated April 24, 1987. Please provide a copy to OSP-HQ (P. Lohaus).

Ans3.

Q4. Please identify all licensed Nuclear Laundries in your State. The name and location of operation should be specified.

Ans4.