EPA bulletin

FEBRUARY 1973 • U.S. ENVIRONMENTAL PROTECTION AGENCY • WASHINGTON, D.C. 20460

Solid Wastes Become 2 Useful Products

The conversion of solid wastes into fuel gas and salable slag, with reduced air pollution and projected costs lower than incineration, is being demonstrated on a pilot scale at Orchard Park, N.Y., near Buffalo.

The plant employs pyrolysis—heating without burning—to convert most of the combustible portion of the waste into gas and to melt all metal, glass, and other inorganic portions.

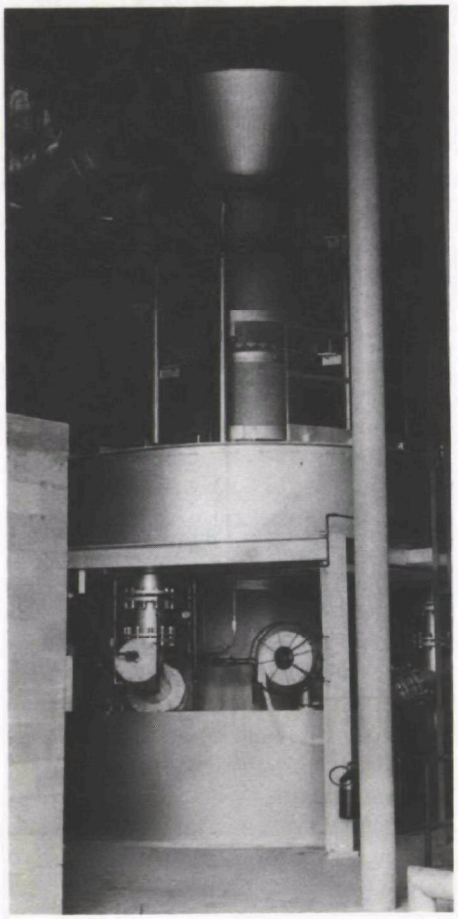
It has been operating for nearly a year as an EPA demonstration project, supported by $1.4 million in EPA grants and $500,000 from other participants: Erie County, New York State, the American Gas Association, the A. E. Anderson Co., and Torrex Systems, Inc.

75 Tons Per Day

The plant was designed by the Torrex Systems, a North Tonawanda, N.Y., firm specializing in refractories —furnaces and reactors that operate at very high temperatures. It can handle 75 tons of solid waste per day in a continuous, round-the-clock process. The waste comes from Orchard Park and a number of other communities in Erie County.

Present operations are not continuous but are interrupted from time to time to make adjustments and to measure outputs and internal conditions in the gasifier, said Edward L. Higgins of EPA's National Environmental Research Center in Cincinnati. Higgins was project engineer for the Orchard Park plant from its design and evaluation stage three years ago until last October. John Bertke now is EPA project officer.

Heart of the system is the gasifier, a vertical cylindrical furnace about 30 feet high, with an inside diameter of four feet.



Orchard Park gasifier turns even bulky items, stumps and stoves, into fuel gas and salable slag.

Wastes of all kinds are dumped into a funnel-like hopper at the top. Even bulky items like tree stumps, tires, auto body parts, and junked household appliances are accepted, as long as one dimension is less than four feet.

Air preheated by natural gas burners to about 2,000 degrees Fahrenheit enters the gasifier from below. The intense heat volatilizes most of the organic material in the waste into a fuel gas of high heation value that is drawn off. The rest of the organic material burns, further raising the temperature at some parts of the gasifier to nearly 3,000 degrees, enough to melt metals and glass. These form a puddle at the base of the retort and are drawn off periodically.

Close control is kept over internal temperatures and hot air intake so the right combination of pyrolysis and combustion is maintained. The layers of refuse at the gasifier's top serve as a seal over the hot reactions taking place below, Higgins said.

The gas produced can be sold as fuel, burned to make steam for electric power generation, or used to help heat the gasifier.

The slag, when quenched with water, forms a granular inert material that can be used in highway construction, and in the manufacture of concrete or insulating fiber. Methods of separating ferrous metals from the slag are being investigated.

Costs Analyzed

Present costs of operating the pilot plant are from $12 to $14 per ton of waste, Higgins said, but it is expected that the cost could be cut in half for a larger municipal system. The sale of byproduct energy (gas or steam) and slag could further reduce costs.

Cost of controlling air pollutants for the pyrolysis-combustion process is expected to be about half that of incineration, since only part of the waste is burned; the rest is gasified. And there are no solid residues to be buried in landfills.

Based on experience so far with the pilot plant, investigators believe the

(Continued on page 5)

EPA Warnings: Go Slow on Shale Oil

EPA has warned the Nation to go slow on plans to develop a shale oil industry in three Western states.

The warning was issued recently in Denver when Regional Administrator John A Green released the agency's 40-page comments on the Interior Department's draft statement on the expected environmental impact of its proposed plan to lease some Federal oil shale lands to private industry.

The Department's program would allow the mining and processing of oil shale on six sites in Colorado, Wyoming, and Utah by prototype plants using various methods of extracting oil from the shale

Gigantic Resource

The potential fuel reserves in shale are many times the total known reserves of crude oil, but little is known about the feasibility and costs of recovery and the environmental side effects

Most of the oil shale is on public lands administered by Interior, and before the Department can lease the tracts for prototype development it must file environmental impact statements under the National Environmental Quality Act

Interior's draft statement was "one of the most comprehensive we have reviewed," the EPA comment said, but nevertheless additional information is needed

Whether or not sufficient water will be available for the oil extraction process was high on the list of deficiencies cited EPA asked the Department to review in greater detail the amount of water that would be needed and compare its projections with the amount of water available in the basin of the upper Colorado River. Department estimates of water needs do not agree with those of Colorado State agencies, EPA pointed out.

Shutdown Provision

EPA also suggested that proposed leases be reworded to provide for the immediate shutdown of prototype plants if they should present "insurmountable environmental hazards." Current provisions, EPA said, appear to assure operators that they can continue under any conditions.

Other potential effects of oil shale development that should be more thoroughly analyzed, EPA said, include:

- Air pollution from oil extraction plants, especially the control or dispersion of sulfur dioxide and particulate matter.
- Disposal of spent shale, the crushed rock and dust left after the kerogen, an oil-bearing, wax-like substance, is extracted.
- Toxic chemicals from processing.
- The potential increase in salinity in the Colorado River.

EPA also would like Interior to require companies leasing public lands to do environmental studies as part of their development plans for the leased area. How an oil shale industry's water use would affect downstream water quality and quantity; whether oil shale development would preclude other development in the high Colorado basin; and whether it would encourage dependence on fossil fuels, reducing interest in alternative energy sources, are other questions EPA would like discussed in the final impact statement.

'Almost Certain'

Regional Administrator Green said, "Some pollution is almost certain to come from an oil shale industry, and we would like Interior to further discuss the effects of that pollution on air and water quality, vegetation, and wildlife in the area."

"We are also asking for evaluation of comparative impacts of alternatives . for oil shale, such as reducing energy demand, increasing domestic oil and gas production, gasifying coal, and generating electricity by coal or nuclear power or both," Green said

"We've asked Interior to investigate the economic feasibility of developing oil shale on private lands alone, versus feasibility of present plans which would see development on public and private lands."

Green said EPA also seeks a definition of the role of the public and the Field Oil Shale Task Force (an interagency body) in reviewing development plans and overseeing lease operations.

Green said EPA's comments do not "represent a position" on the basic question of whether or not to develop the oil shale resource.

"We feel our comments, and the Department of Interior's continued study. . .should help Interior make that ultimate decision concerning the issuance of leases for development," he concluded.

ACID WASTES

The Georgia Water Quality Board has approved a chemical company's plan to neutralize and reuse its sulfuric acid wastes, rather than dump them far out at sea.

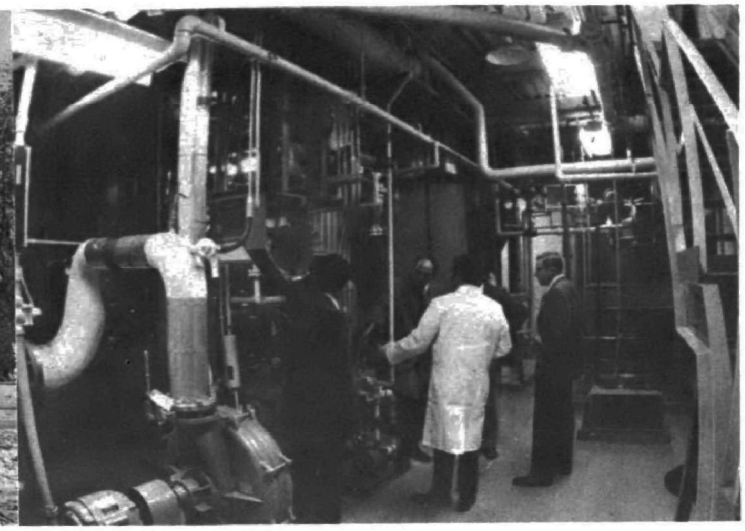
The wastes from the American Cyanamid Co.'s titanium dioxide plant at Savannah contain highly toxic iron sulfate, and are produced at the rate of 7.5 million gallons a month.

Cyanamid has been under State orders not to dump the wastes in the Savannah River, but it has been unable to get permission from the Army Corps of Engineers to barge them 83 miles out to sea. South Carolina officials protested that costal currents might carry the wastes into fertile fishing areas.

Under the new plan, a building materials manufacturer, Universal Chemicals and Minerals Corp, would use the neutralized wastes to make gypsum wall board and cement The gypsum plant would be built and operating in two years and would create about 70 new jobs for Savannah area residents.

Cyanamid has withdrawn its ocean dumping application

This "Cape Code house" in Freehold, N.J. hides an advanced, automated sewage treatment plant for a housing development.



Inside is a maze of machinery to remove and incinerate solids and treat 50,000 gallons of waste per day.

Self-Contained Waste Plant Concealed in Small Cottage

A self-contained, pollution-free sewage treatment plant that can be built and operated close to the homes it serves is now undergoing its trial run in a suburban area at Freehold, N.J.

The plant was designed and built by AWT Systems, Inc., of Wilmington, Del., for a Levitt and Sons housing development that now has only 20 homes, though it is expected to grow to 145.

EPA is supporting the project with a demonstration grant to Levitt of $250,000 a year and a half ago.

The system is highly automated, requiring only the part-time services of one operator. Advanced physical and chemical processes are used to remove sewage solids and purify the waste water so it is "considerably higher" in quality than the stream into which it discharged, a tributary of the Manasquan River. Solids and sludge are not treated by bacterial action, but are burned completely in an incinerator equipped with advanced air pollution control devices.

The waste water treatment includes adding powdered iron oxide to the water after conventional flocculation and clarifying. When the water then passes through a magnetic filter, the iron oxide is attracted to the magnetized surfaces, entraining suspended solids that managed to get by the clarifer.

Finally the water passes through a column of activated carbon which absorbs the remaining dissolved organic materials, and is chlorinated before discharge.

Screened solids and sludge from all stages of the waste water processing are fed through a sand filter for dewatering. The sand then carries the solids into a fluidized bed incinerator, fired by oil. All combustion gases go through a cyclone dust collector and a wet scrubber before being discharged.

Everything Recycled

The system provides for the recycling of all water, sand, and carbon used in processing. For the carbon used in the final water treatment, recycling involved a different type of burning in the incinerator. Normal incineration is halted about once a month for two days. Spent carbon drawn from the bottom of the absorber column is fed into the incinerator and heated to drive off the absorbed organic materials. The regenerated carbon is then fed back into the top of the column.

Holding tanks for incoming waste water and for screened solids and sludge permit shutting down the process for carbon regeneration, for maintenance work, or simply for adjusting the flow of sewage through the system.

The builders say the Freehold plant demonstrates one solution to the problem of overburdened city sewage treatment systems. Freehold has a moratorium on new connections to the local sewer lines, and Levitt could not otherwise have started its housing development. Similar plants could serve such remote areas as camp grounds, national parks, or rest stops on interstate highways, the company said.

Irwin J. Kugelman, EPA project officer from NERC-Cincinnati, said the Freehold plant has been undergoing "de-bugging" tests and operating intermittently since it was formally dedicated in November. The liquid treatment portion of the system is now in continuous operation and almost fully automatic.

The de-bugging is now concentrated on the solids handling section, after repair of cracked wall in the fluidized-bed incinerator.

The plant has been using some waste from the Freehold municipal system, Dr. Kugelman said, since the number of occupied homes in the development did not produce enough sewage for the shakedown tests.

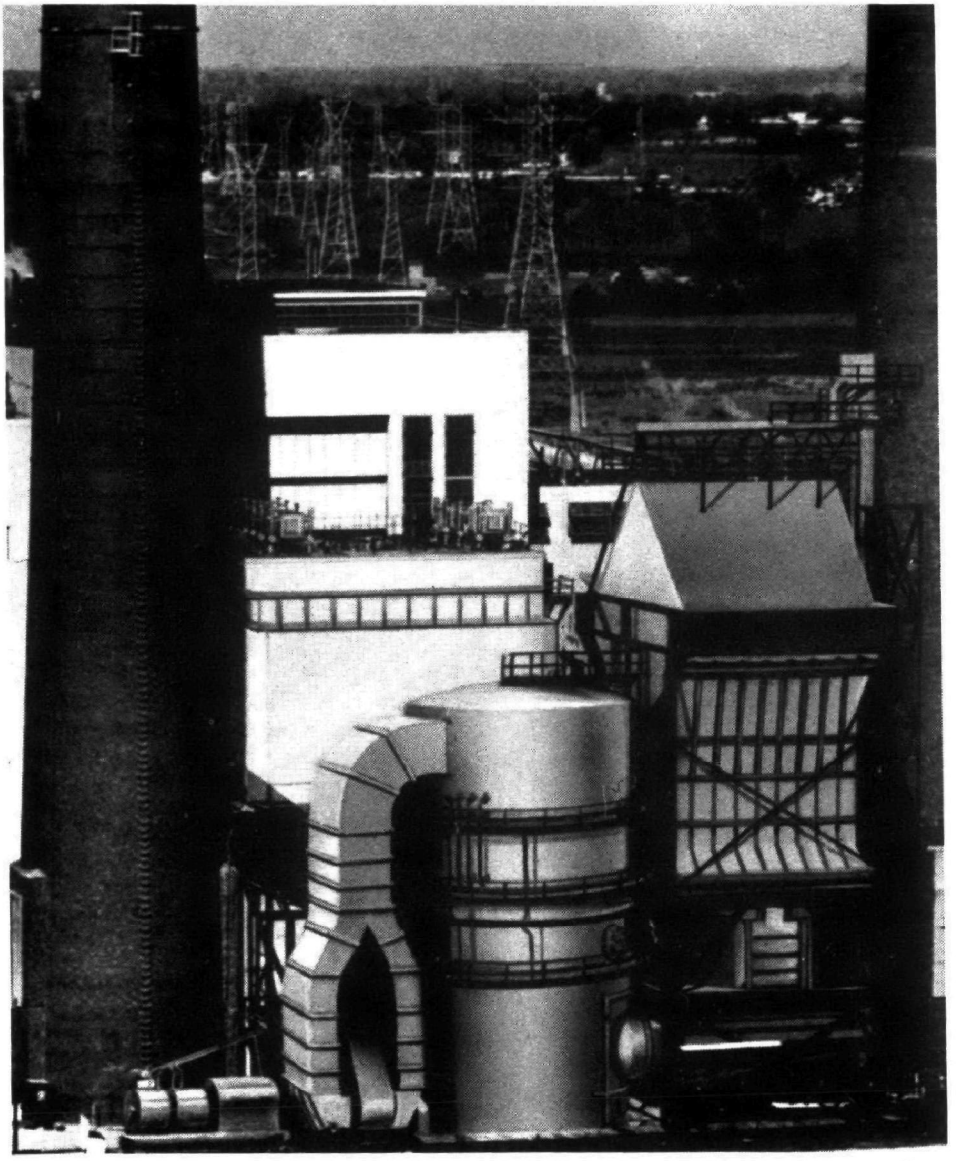
The plant is designed to treat 50,000 gallons of waste water per day, enough to serve a community of 800 people. More than $500,000 has been spent most of which involved one-time costs for research and development. An AWT spokesman said a plant of similar capacity could now be built for "about $200,000."

Sulfur Reclaimed From Utility Staff

Construction is nearly complete on a full-scale demonstration plant to reclaim sulfur dioxide from flue gases at an Illinois Power Co. generating station at East Alton, Ill.

EPA supporting funds of $3.5 million are paying about half of the plant's cost, according to Gilbert Haselberger, project officer, who is with EPA's Control Systems Laboratory at Research Triangle Park, N.C.

The power company is paying the rest.



Equipment for removing particles and sulfur from the stack gas of a 110-megawatt power plant fits beside stack, right, and in from of boiler unit, the tall building in the background. Rectangular unit in mid-background is the electrostatic precipitator. Peaked-roof structure houses converter and heaters; cylinder contains equipment to make sulfuric acid from sulfur trioxide.

Shakedown Tests

The plant builders and designers, Monsanto Enviro-Chem Systems, Inc., are conducting shakedown tests of the equipment and will turn it over to the power company when it is operating at its guaranteed levels of performance: better than 99 percent particle removal and 85 percent removal of sulfur oxides. This stage is expected to be reached this summer, Haselberger said.

The complex structure is 137 feet long, 126 feet wide, and 110 feet high, nearly equal to an 11-story building occupying half of a football field. It is designed to take all the combustion gases from boiler no. 4 of the Illinois Power Company's Wood River Plant. This coal-fired boiler supplies steam for 110-megawatt generator.

The sulfur extracted from the stack gases is recovered as sulfuric acid, a widely used industrial chemical that can be sold to help offset the cost of the treatment process.

Haselberger said the plant is attracting much attention from the electric utility industry as a demonstration of one method of curbing sulfur oxide air pollution from existing power plants.

Other methods are also being investigated, as EPA and the electric power industry strive to develop control technology. These include both precombustion methods – switching to low-sulfur fuels, desulfurizing coal and oil, or gasifying such fuels – and post-combustion methods – scrubbing flue gases with slurries or solutions of calcium, sodium, or magnesium compounds.

Relative costs can only be estimated by laboratory experiments, he said. Full-scale demonstrations are needed before costs and practical feasibility can be established.

A Chemical Factory

The Wood River demonstration in effect adds a specialized chemical factory at the downstream end of the coal-fired boiler. Flue gases from the boiler first pass through a high-efficiency electrostatic precipitator to collect and remove particulates–smoke and dust particles.

The flue gas leaving the boiler at 325 degrees Fahrenheit contains sulfur in the form of sulfur dioxide. It must be raised in temperature to 850 degrees before conversion to sulfur trioxide can take place, in a process called catalytic oxidation.

The heating is accomplished in three stages, using reheat burners and heat exchanger. To increase efficiency,

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New Booklet Series Outlines Successful Control Methods

First of a series of reports on successful techniques of pollution control has been issued by EPA's Technology Transfer program

Called "Capsule Reports," the attractively printed booklets are designed to show industrial managers how a new process works, its estimated costs, its effects on productivity, and its possible applications to a variety of industries different from the one for which it was developed.

Each Capsule Report will be backed by detailed technical reports for engineering personnel, said Robert Crowe, head of the Technology Transfer program

The reports will be issued as fast as the pollution control processes are proven effective, Crowe said. Publication of seven more are expected this year, and "about ten" next year All will deal with industrial techniques for reducing pollution, saving and reusing resources, improving efficiency, or various combinations of these goals

The first report describes a saving zinc method of recycling zinc in the manufacture of rayon yarns. It was developed under a $283,000 EPA demonstration grant by the American Enka Co. at Enka, N.C.

More than 50 million pounds of zinc sulfate are used annually in the United States as a retardant in the acid bath in which cellulose is "spun" into viscose rayon fibers Since none of the zinc enters into the fiber formation, the zinc consumed represents losses zinc sulfate which clings to the emerging fibers and is later washed away, backwash from filters, splashes, and leaks.

No practical method of recovering this zinc existed until the new process of two-stage precipitation was developed In the first stage, the rayon waste waters are treated to precipitate iron and calcium compounds and other impurities A second precipitation produces a dense sludge containing 4 to 7 percent zinc which is converted back to zinc sulfate and returned to the spinning bath

Costs Reduced

The process offers production cost savings as well as pollution reduction, the report says, and it could help preserve the world's limited resources of metallic zinc Known reserves are sufficient to last about 23 years at present rates of usage

Although only 10 U S firms manufacture viscose rayon, zinc-rich wastes are produced by many others industries, e.g , ground-wood pulp making, metal palting, zinc refining, and recirculating water systems EPA specialists believe the new process may be adapted to them

The Technology Transfer program was initiated two years ago by EPA's Office of Research and Monitoring after Agency officials noticed that many applications for waste treatment construction grants were not up-to-date technically The program seeks to promote new technology aggressively, and across categorical barriers

Technology Seminars

The program's early emphasis was on municipal sewage treatment problems, but it has been broadened to include industrial waste treatment, air pollution control, and solid waste management More than 20 Technology Transfer seminars have been held for some 2,500 engineers and managers from States, cities, and private industry The seminars are organized and conducted by the Technology Transfer staff of seven professional engineers, supported by specialists from EPA's National Environmental Research Centers, Regional Offices, and private consultants

Copies of the Capsule Reports and other more technical publications are available from Technology Transfer, EPA, Washington, D.C 20460 The program's offices are in Rosslyn, Va., telephone (703) 552-0851.

Sulfur Reclaimed From Stack

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waste heat from the hotter stages is passed down to the cooler ones.

After the third stage the hot gas passes through a catalytic-bed converter where almost all the sulfur is oxidized to sulfur trioxide. It then goes to an absorbing tower where water is added to convert the sulfur trioxide to sulfuric acid.

A mist eliminator section filters out any remaining particles of acid before the cleaned gas goes to the stack.

The sulfuric acid product is rated "weak"—about 77 percent acid—but it can be used "as is" in many industrial processes, or further concentrated in a separate operation.

The Wood River project has been almost three years in the making A contract for preliminary design and evaluation was let in June, 1970, by EPA's predecessor agency, the National Air Pollution Control Administration. The construction contract was awarded in October of that year.

After the plant is completed and accepted, EPA will conduct a year-long program of testing and evaluation The plant will be operated under a wide range of conditions, Haselberger said, to provide data useful to the industry and helpful to EPA in establishing emission standards for coal-fired utility boilers.

Pyrolysis Plant

(Continued from page 1)

system could be operated at 25 to 50 percent less than the cost of operating a conventional, municipal incinerator, depending on byproduct revenues. Incinerators now cost from $10 to $12 per ton to operate

Capital costs, they estimate, would also be lower, about 30 percent, since the pyrolysis-combustion system is much smaller than an incinerator of similar capacity.

EPA's participation in the Orchard Park demonstration will end June 30, when the plant will be Erie County's responsibility.

The Agency is sponsoring two other demonstrations of pyrolysis systems for solid waste disposal, one in Baltimore, Md., and one in San Diego County, Calif

New-Plant Standards To Be Set For 27 Industries This Yr.

Effluent regulations for new plants in 27 high-pollution industries will be established by EPA before Jan 16, 1974.

This deadline was set last month when the Agency published in the Federal Register the industry list suggested in the Federal Water Pollution Control Act Amendments of 1972, which became law last October.

Under the law, EPA must issue standards of performance requiring the "best available demonstrated control technology. . . including, where practicable, a standard permitting no discharge of pollutants" within one year of announcing the list.

The standards will apply only to new plants and production facilities in those industries.

The list covers a wide range of raw material and primary project industries, all known to have major pollution problems It includes

Steam-electric power plants.

Four metal industries iron and steel manufacturing, ferroalloys, nonferrous metals, and electroplation.

Six chemical industries: organic chemicals, inorganic chemicals, plastics and synthetics, soaps and detergents, fertilizers, and phosphates.

Eight agricultural and food industries meat products and rendering, live stock feedlots, leather tanning and finishing, dairy product processing, grain mills, canned and preserved fruits and vegetables, canned and preserved seafood, and sugar processing

Three wood-related industries timber products, pulp and paper mills, and paperboard and builders paper mills.

Five other raw material industries. petroleum refining, cement manufacturing, glass and asbestos manufacturing, rubber processing, and textile mills.

Additional categories are expected to be published later by EPA, and standards for them must be established within a year of publication.

EPA Checks Radiation Effects Of Nuclear Testing In China

Small temporary increases in airborne radioactivity in the western States from a nuclear test in China last year are reported by EPA's Office of Radiation Programs in the February issue of Radiation Data and Reports.

Detonation of a nuclear device having an estimated yield of less than 20 kilotons (TNT equivalent) was announced by the Atomic Energy Commission shortly after its occurrence on Jan 7, 1972

During the following three weeks the progress and intensity of the radioactivity were monitored by EPA's Airborne Surveillance Network, based at the National Environmental Research Center at Las Vegas, Nev.

From data obtained at 103 routine ASN sampling stations in 21 western States, plus 10 standby stations, EPA scientists calculated the increase in different kinds of radiation dose to people in the area.

The highest "hypothetical infant thyroid dose equivalent" resulting from inhalation was about 1.2 millirems at Pueblo, Colo This dose is about two-tenths of one percent of the Federal Radiation Council standard. Highest hypothetical infant thyroid "ingestion dose," from increased radioactivity in milk, was about 10 millirems at Laramie. Wyo., 2 percent of the standard.

The eastward movement of the radioactivity is illustrated with maps like those used by weather forecasters.

R B. Evans, R. N. Snelling, and F N. Buck are authors of the article

The same three men, all associated with NERC-Las Vegas, had an article in last month's issue of Radiation Data and Reports giving a similar dose assessment from a Chinese nuclear test on Nov. 18, 1971.

4 COMPANIES IN RANKLINE ENGINE RACE

Four companies are now in the race to demonstrate a Rankine-cycle engine that might provide low-pollution power for future automobiles.

EPA announced last month that Lear Motors Corp., Leareno, Nev., has been awarded a $900,000, fixed-fee contract to demonstrate a 100- horsepower steam-and-turbine engine.

The Lear engine is to be completed within nine months. It will then be compared with three other Rankine engines, being developed under other EPA contracts, to see which type could be picked for further development and construction of a prototype.

A vehicle powered by a prototype of the winning design is expected to be operating by the end of 1975.

On Rankine engines, fuel is burned outside the engine itself, and the fluid which does the work (by expanding and contracting and causing some mechanical parts to move) flows continually in a closed loop. Some early steam-powered automobiles used Rankine-cycle engines.

The four competitor's designs employ two different working fluids (water and a synthetic organic fluid like that used in refrigeration systems) and two ways of convertion fluid pressure to mechanical energy (the reciprocation piston and the rotating turbine)

The Lear engine will use a water and a turbine. Steam Engine Systems Co., Watertown, Mass., is working on a water-and-piston engine, Thermo Electron Corp., Waltham, Mass , on an organic-fluid-reciprocating engine, and AeroJet Liquid Rocket Co., Sacramento, Calif, on an organic-fluid-turbine engine.

Outfalls, Deep Wells Ok'd For Florida Waste Projects

Clearing the way for release of about $20 million in Federal funds for sewage plant construction in three Florida counties, EPA recently approved of ocean outfalls and deep well injection of treated wastes as "environmentally compatible."

Region IV Administrator Jack E Ravan issued the decision in the form of environmental impact statements for sewage plant construction and improvement projects in Dade, Broward, and Palm Beach Counties in southern Florida.

Public hearings scheduled late in January in West Palm Beach, Fort Lauderdale, and Miami were the last hurdles required by the National Environmental Quality Act before the funds—appropriated for the fiscal year ending last June—can be released to the State and local governments involved

"Ocean outfalls are considered as an interim solution," Ravan said, until better methods of reuse and reclamation are developed

Outfalls are long underwater pipes extending far enough into the ocean so that discharges are carried into deeper water Injection wells are deep holes reaching to porous strata geologically isolated from water-bearing sands and gravels.

Both methods were approved as "environmentally sound" according to the "best thinking of EPA on the status of disposal methods" at the present time.

Specifically ruled out for southern Florida were a number of other disposal methods

- On-land disposal and septic tanks
- Shallow injection wells.
- Discharge into canals or the Intercoastal Waterway
- Discharge into Great Cypress Swamp or the Everglades

The impact statements issued by Ravan did not deal with specific projects in the three counties except for a proposed sewage plant in West Palm Beach This proposal calls for substantially complete removal of grit and solids, 90 percent removal of organic materials, 99 percent disinfection of bacteria, 90 percent destruction of viruses, and provision for future addition of facilities for more advanced waste water treatment.

The EPA Bulletin is published monthly by the Office of Public Affairs to inform State and local environmental officials of EPA's research, standard-setting, and enforcement activities.

The Bulletin will welcome letters, contributed articles, and photos suitable to its purpose and audience.

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N.J. Drivers Get Free Exhaust Tests

New Jersey car owners can get their car's exhaust tested free at one oil company's service stations as well as at the official state inspection stations

Other major gasoline dealers are expected to follow the example of the Atlantic Richfield Company, which recently installed the inspection devices in 60 of its stations which are located near the official state inspection points

Richard J. Sullivan, State Commissioner of Environmental Protection, commended the firm for its free test service, designed to help car owners pass the State test for carbon monoxide and hydrocarbons.

Until next July, owners of cars which fail the test are not required to return for reinspection, although they are encouraged to do so Beginning July 1, reinspection will be mandatory for all cars that fail the test

Recent EPA Publications

Control Strategies for In-Use Vehicles, 203 p, December, 1972 Summarizes available information on reducing pollutant emissions by engine inspection and maintenance, conversion to low-polluting fuels, and retrofit of control devices Mobile Source Pollution Control Office, EPA, Washington, D.C. 20460

Transportation Controls – Urban Strategies for Clean Air, 16 p, December, 1972. This "briefing document for citizens" discusses various proposals for reducing automotive air pollution in cities by limiting vehicle use. Benefits and drawbacks of each proposal are outlined. Mobile Source Pollution Control Office, EPA, Washington, D C. 20460.

Inventory of Interstate Carrier Water Supply Systems, 84 p, July, 1972. List all water systems fully or provisionally approved for use by interstate public carriers buses, trains, airlines, and ships Provisional approvals are classified by type of deficiency found Limited copies available from Water Supply Division, Office of Air and Water Programs, EPA, Washington, D C 20460

Aircraft Emissions Impact on Air Quality and Feasibility of Control, 99 + viii p, n d Summarizes recent studies of air pollution levels at several major U.S. airports and assesses the technical feasibility of various proposed methods of reducing aircraft emissions Office of Air Programs, EPA, Research Triangle Park, N C 27711

Concept Evaluation Recovery of Floating Oil Using Polyurethane Foam Sorbent, 97 + viii p, September, 1972. A study under an EPA contract by Battelle Memorial Institute, Richland, Wash, of an oil spill clean-up system using shredded plastic foam that is spread on the slick, collected and squeezed to remove the oil, and rebroadcast to use again Office of Research and Monitoring, EPA, Washington, D C 20460.

Toxicology of Atmospheric Sulfur Dioxide Decay Products, 42 + vi p, July, 1972 Summarizes current research on health effects on animals

(Continued on back page)

EPA Publications

(Continued from page 7)

Fuel Economy and Emission Control, 24 p., November, 1972. Fuel economy tests on 2,087 autos, of model years 1957 through 1973 in 11 different weight classes, were analyzed to determine cause of reduced miles-per-gallon. Conclusions vehicle weight increases (common in American cars of same model from one year to the next) cut most heavily into fuel economy, up to 30 percent Air conditioning is next, 9 to 20 percent, emission controls, about 7 percent, and automatic transmissions, about 6 percent Mobile Source Pollution Control Office, EPA, Washington, D C 20460.

Full Scale Parallel Activated Sludge Process Evaluation, 203 + xii p., November, 1972 Compares performance of sewage sludge treatment systems operating in parallel under completely -mixed and plug-flow modes at Freeport, Ill The former mode performed better under shock load conditions Office of Research and Monitoring, EPA, Washington, D.C 20460

The Role of Sludge Worms in Eutrophication, 67 + viii p., August, 1972. A study under an EPA contract by zoologists at the University of Toronto showed that sludge worms in a grossly polluted harbor feed selectively on bacteria and other organic pollutants, efficient assimilation of pollutants depends less on their carbon content than on having a mix of worm species to feed on them Office of Research and Monitoring, EPA, Washington, D C. 20460

Summaries of Foreign Government Environmental Reports, No 3, 27 p, November, 1972 One of a new series listing documents of foreign governments and international organizations received at EPA's Headquarters Library under exchange agreements The series concentrates on legislative, economic, and social aspects, supplementing the scientific and technical abstracts available from other EPA information services Library Systems Branch, EPA, Washington, D.C. 20460.

EPA Publishes Grants Register

A register listing all EPA grants for fiscal 1972 was published recently by the Grants Administration Division, Office of Planning and Management.

The 327-page looseleaf document lists, alphabetically by State, every grant issued by the Agency during the year ending June 30, 1972, for research, training, construction, and demonstration. Each entry includes the project's title, grantee's name, location, date of award, dollar amount, and whether the grant is for a new or continuing project

A limited number of copies are available from the Government Printion Office, Washington, D.C. 20460.

Starting this month quarterly compilations of fiscal 1973 grants will be issued. The first quarterly EPA grants register, for July through September, 1972, can be obtained from the National Technical Information Service, Springfield, Va., 22151.

Use of funds for printing this publication approved by the Director of the Office of Management and Budget (Dec 6, 1971).

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