BY THE U.S. GENERAL ACCOUNTING OFFICE

Report To The Chairman, Subcommittee On Environment, Energy And Natural Resources, Committee On Government Operations, House Of Representatives

Hazardous Waste Management At Tinker Air Force Base-- Problems Noted, Improvements Needed

Tinker Air Force Base, Oklahoma, as a major military industrial installation, is a large generator of hazardous waste. At the request of Chairman Mike Synar, GAO reviewed Tinker's efforts to manage and dispose of its hazardous waste.

GAO found that Tinker:

--sold, transferred, or disposed of waste oils, fuels, and solvents rather than the preferred method of recycling and reusing them;

--underused and poorly managed its industrial waste treatment plant;

--experienced problems with its hazardous waste disposal contractors; and

--was deficient in complying with Environmental Protection Agency regulations implementing the Resource Conservation and Recovery Act of 1976, as amended.

GAO recommends specific actions to correct these problems.

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

NATIONAL SECURITY AND
INTERNATIONAL AFFAIRS DIVISION

-218940

The Honorable Mike Synar
Chairman, Subcommittee on Environment,
Energy and Natural Resources
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

On June 4, 1984, you requested us to review Department of Defense (DOD) efforts to dispose of the hazardous waste being generated at Tinker Air Force Base, Oklahoma. We briefed your staff on our preliminary findings on Tinker's overall management of hazardous waste in August 1984 and then testified on our work before your subcommittee on December 13, 1984. Subsequently, you requested that we summarize the results of our work in a report.

We found that Tinker Air Force Base:

--sold, transferred, or disposed of waste oils, fuels, and solvents rather than the preferred method of recycling and reusing them;

--underused and poorly managed its industrial waste treatment plant;

--experienced problems with its hazardous waste disposal contractors; and

--was deficient in complying with Environmental Protection Agency (EPA) regulations implementing the Resource Conservation and Recovery Act (RCRA) of 1976, as amended.

Additional details are provided in appendix I to this report.

DOD directives require the military services to reduce hazardous waste generation to the maximum extent practical; reuse, reclaim, or recycle resources where practical; and implement EPA's hazardous waste management regulations. In January 1984, DOD initiated a Used Solvent Elimination (USE) program with the goal of eliminating disposal of recyclable solvents as wastes by October 1, 1986. The Director of Environmental Policy, in the Office of the Assistant Secretary of Defense (Manpower, Installations, and Logistics), has requested the military services to take immediate action to prohibit the disposal of waste solvents in landfills.

LIMITED RECYCLING AND REUSE

Tinker has been selling, transferring, or disposing of waste oils, fuels, and solvents rather than recycling and reusing them. Because of the relatively short payback time for the required recycling equipment, DOD policy calls for all bases that generate 400 gallons or more of solvents per month to recycle them, preferably on base. Tinker has just recently initiated an effort to recycle some of its hazardous waste. As part of this effort, it has ordered some recycling equipment, but Tinker officials told us they still lacked the necessary equipment for recycling other hazardous materials. In addition, Tinker does not have any plans to recycle other hazardous wastes covered by the USE program. Even though Tinker does sell some of its wastes, the contractors buying the wastes said that poor segregation of the hazardous wastes reduces their market value. They said they would be willing to buy more and possibly pay a better price if the wastes were segregated. In addition, we believe that not segregating the hazardous wastes will cut down on the effectiveness of Tinker's on-base recycling program.

HAZARDOUS WASTE DISPOSED OF THAT COULD HAVE BEEN TREATED

The industrial waste treatment plant at Tinker was built in the 1960s to treat certain hazardous wastes generated by Tinker's operations. It was upgraded in 1984 at a cost of $7.6 million. However, as of November 1984, Tinker was using only about 800,000 of the plant's 1.5 million gallon daily capacity. We noted additional hazardous wastes being generated by Tinker's operations could be treated by the plant. For example, although the plant could treat the concentrated waste chemicals from the plating shop and engine parts cleaning facility, they have not been treated at the plant since 1981 because the pretreatment facilities are inoperable. Instead of fixing the pretreatment facilities, Tinker officials are having the Defense Property Disposal Office pay a private contractor to dispose of these chemicals off base.

INDUSTRIAL WASTE TREATMENT PLANT POORLY MANAGED

In a June 1981 report, the Air Force Engineering and Services Center--which provides technical assistance and review of hazardous waste activities at Air Force bases--stated that the treatment plant had been poorly managed. Specifically, the report cited a lack of preventive maintenance programs; shortages of essential treatment chemicals; lack of written operating procedures; lost equipment manuals; inoperable equipment; and improper or marginal collection, storage, and analysis of wastewater samples. Tinker officials agreed that many of these problems still exist, but said they are taking corrective actions.

One long-standing equipment problem we noted at the treatment plant was that the dewatering unit was frequently inoperable. While it now appears the problem has been corrected, the unit was inoperable for 9 months of the year ending July 31, 1984. This unit condenses liquid sludge to solids and can reduce the amount of waste that must be disposed of by about 60 percent. If the dewatering unit had been operating, we estimate the amount of waste could have been reduced from 3,580 tons of liquid to 1,432 tons of solids, and disposal costs could have been reduced from $258,000 to $93,000 for that year.

POTENTIAL FUTURE COSTS

Because of the limited recycling of hazardous wastes and the underuse and poor management of the industrial waste treatment plant, Tinker pays contractors to dispose of large quantities of hazardous wastes in off-base injection wells and landfills. (See appendix II.) By using commercial disposal sites, particularly sites that have serious compliance problems, instead of using a hazardous waste disposal method with less risk (such as recycling or treatment in the industrial waste treatment plant), DOD may later be liable for the cost of cleanup at these sites. If the sites should cease to operate because of financial problems, they could be covered by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. As a generator who sent hazardous substances to these sites, DOD could be held responsible for paying all or part of the costs of cleaning up these disposal sites. At least two of the five hazardous waste disposal sites Tinker is currently using are having serious compliance problems. As of April 1985, the Oklahoma State Health Department was taking legal and administrative actions to close the Tulsa, Oklahoma, injection well--one of the disposal sites. Two of Tinker's former disposal sites have been identified by EPA as sources of groundwater contamination. EPA officials estimate that Tinker's share of the cleanup costs at these sites could range from $2 million to $4 million.

POSSIBLE RCRA DEFICIENCIES

The RCRA, as amended, and EPA's implementing regulations set the requirements for the containment, management, and control of hazardous waste being generated during the base's current operations. Generally, DOD is required to meet the RCRA requirements and the implementing regulations, but we found deficiencies in Tinker's efforts to comply. These included missing or inaccurate manifests (the record keeping documents for tracking hazardous waste to its ultimate disposal), numerous instances of careless storage and handling of hazardous waste, and the lack of spill containment at many of the hazardous waste storage areas. Since our review, Tinker officials have taken some actions to correct some of these problems.

The three major streams that originate or flow across Tinker have been contaminated according to studies by the U.S. Geological Service and the Oklahoma Water Resources Board. Hazardous waste is reaching the creeks from Tinker because of improper open dumping or the lack of spill containment at numerous storage or generating sites. Also, excessive amounts of oily wastes were reaching the industrial waste treatment plant and the creeks because of improper dumping or the lack of spill containment.

Because of the problems associated with the inadequate monitoring of the manifest system, Tinker officials do not have complete assurance that the hazardous wastes are being properly accounted for and disposed of and are not adversely affecting the environment.

CONTRACTOR PROBLEMS

In addition to possible RCRA deficiencies in Tinker's own operations, we found that Tinker had problems with the hazardous waste disposal contractors who transport its waste to disposal sites. Tinker paid two contractors over $1.1 million during the year ending July 31, 1984, to dispose of its hazardous waste. According to Defense Property Disposal Service officials, one contractor did not have the capability to execute the contract requirements. This contractor's work was terminated at the end of the extended contract period. We found discrepancies and overcharges in our review of the other contractor's activities which Tinker officials had not identified through their own contract review and monitoring. This contractor overcharged Tinker at least $54,000 for hazardous waste disposal in the 11-month period ending June 30, 1984.

CONCLUSIONS

Although DOD policy calls for the military services to reduce hazardous waste generation to the maximum extent practical; reuse, reclaim, or recycle resources when practical; and implement EPA's hazardous waste management regulations, we found that Tinker has been selling, transferring, or disposing of waste oil, fuels, and solvents rather than using DOD's preferred method of recycling, reclaiming, or reusing them. Also, the industrial waste treatment plant has not been used to treat all possible wastes. Because Tinker has been disposing of the hazardous waste in landfills or injection wells, some already in violation of RCRA requirements, it risks potential future costs to clean up these disposal sites if they begin to pollute the environment in the future and the current operators go out of business.

Although DOD is required to abide by RCRA regulations, there are deficiencies in Tinker's efforts to comply. These include problems with the manifest system, storage and handling of hazardous wastes, and spill containment.

Tinker disposes of hazardous waste by contract but Tinker's contract monitoring procedures are not adequate to prevent overcharges and other improper billing practices.

RECOMMENDATIONS

We recommend that the Secretary of Defense direct the Secretary of the Air Force to take the following actions at Tinker Air Force Base:

--procure all of the equipment necessary to recycle and reuse hazardous waste and identify other recycling opportunities to reduce hazardous waste generation,

--change operational procedures to better segregate hazardous wastes to facilitate recycling or reuse,

--make better use of the industrial waste treatment plant to reduce the quantities of hazardous waste requiring disposal off base,

--exercise greater caution in the selection of disposal sites to reduce DOD's potential liability for environmental damage caused by their operations,

--improve monitoring of the manifest system to ensure that hazardous waste is properly accounted for and disposed of, and

--improve monitoring of the disposal activities of its hazardous waste disposal contractors.

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We discussed our findings with agency program officials and have included their comments where appropriate. However, as you requested, we did not obtain the views of responsible agency or contractor officials on our conclusions and recommendations, nor did we request official agency or contractor comments on a draft of this report.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 10 days from the date of the report. At that time we will send copies to interested parties and make copies available to others upon request.

Sincerely yours,

Frank C. Conahan
Director

Contents

ABBREVIATIONS

DOD	Department of Defense
EPA	Environmental Protection Agency
GAO	General Accounting Office
NPDES	National Pollutant Discharge Elimination System
RCRA	Resource Conservation and Recovery Act
USE	Used Solvent Elimination

APPENDIX I

HAZARDOUS WASTE MANAGEMENT AT TINKER AIR FORCE BASE-- PROBLEMS NOTED, IMPROVEMENTS NEEDED

Tinker Air Force Base, Oklahoma, is one of the major military industrial installations in the world, hosting some 40 tenant organizations. The largest industrial activity at Tinker is the Air Logistics Center which manages 4 types of missiles, 6 major kinds of aircraft, 15 kinds of aircraft engines, and approximately 124,000 accessory items. It overhauls and modifies more jet engines than any other facility in the free world. During fiscal year 1984, $623 million was spent on maintenance of Air Force systems and equipment at Tinker. Tinker is also the main operating base of the Airborne Warning and Control aircraft and the 507th Tactical Fighter Group.

Because of its maintenance and overhaul activities, Tinker is a major generator of hazardous waste. Hazardous waste is generally defined in RCRA as solid, liquid, semisolid, or contained gaseous materials, which may cause or significantly contribute to an increase in mortality, or an increase in serious irreversible or incapacitating reversible illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of or otherwise managed. At Tinker, hazardous wastes include solvents such as perchlorethylenes and trichlorethanes; acids and other corrosives; paint strippers and thinners; and oils and heavy metals, such as cadmium, lead, and chromium. Appendix II shows the types and quantities of hazardous waste Tinker disposed of by contract in the year ending July 31, 1984.

DOD directives require the military services to reduce hazardous waste generation to the maximum extent practical; reuse, reclaim, or recycle resources where practical; and implement EPA hazardous waste management regulations. The Department of the Air Force policy requires compliance with federal, state, and local environmental laws and regulations. Air Force policy also requires bases to make all practical efforts to avoid or minimize the creation of wastes and to dispose of wastes by reprocessing, recycling, and reuse. The installation commander is responsible for ensuring compliance with all environmental laws and implementing regulations.

LIMITED RECYCLING AND REUSE OF HAZARDOUS WASTE

In keeping with its policy of requiring the military services to reuse, reclaim, or recycle wastes where practical, DOD in January 1984 established the USE program to eliminate the disposal of recyclable solvents as wastes by October 1986. In February 1985, DOD policy was changed to prohibit the disposal of

waste solvents in landfills. Although Tinker's operations generate large quantities of solvents that are covered by DOD's program, we found that there is no on-base recycling program for these substances. Further, poor segregation of wastes, including solvents, is lowering their recycling potential and resale value.

Rather than initiating an in-house recycling program, Tinker officials have been selling waste oils, fuels, and solvents to private companies that recycle and reuse them. However, poor segregation of the used chemicals that become hazardous wastes has reduced their market value or made recycling impractical. Recycling company officials told us that contamination of these wastes is a major problem at Tinker. They provided us with the following examples.

--Various types of waste oils are commingled which prevents them from being reprocessed and reduces their sales value.

--Waste chloroethylenes are commingled with chloroethanes which makes recycling uneconomical. As a result Tinker had to pay to have them disposed of.

--Waste paint thinner is contaminated with waste paint and thus cannot be recycled or sold. We found that 278 drums of waste thinner were shipped to a landfill at a cost of $16,124 during the year ending July 31, 1984.

We also found that Tinker officials have been transferring waste calibration fluid to the Department of Energy which uses it for an alternate fuel supply. Tinker officials said that they now plan to recycle over 147,000 gallons of this fluid annually. This will reduce the amount of calibration fluid that Tinker will have to buy at new product prices.

Another example where Tinker officials were not recycling involves JP-5 fuel (a type of jet aircraft fuel) used to purge JP-4 fuel from tanks and fuel controls of aircraft awaiting repairs. Currently, the JP-4 is allowed to evaporate off the resulting JP-4 and JP-5 mixture so the JP-5 can be reused in the purging operation. According to Tinker officials, rather than evaporate the JP-4 from the mixture, one option is to combine the mixture with additional JP-4. In the correct proportions, the resulting mixture can be used as aircraft fuel. However, Tinker officials said that the lack of funds to purchase a transport truck and the inability to obtain additional JP-5 prevented them from doing this. The current production of JP-5 is insufficient to meet the demand, but Tinker could have used another type of purging substance.

We were told by Tinker officials that they lacked the necessary equipment to recycle certain substances. However, they have ordered the equipment needed to recycle the calibration fluid and now plan to purchase equipment needed to recycle the machine

coolant currently being sent to injection wells and the perchloroethylene and trichloroethanes now sold to recyclers. Tinker officials are also considering recycling PD-680 (a type of solvent used for cleaning aircraft parts) which is now being sold.

Tinker officials have no other plans to recycle other hazardous waste chemicals (such as the paint thinner Methyl Ethyl Ketone and acetone) that are covered by the USE program, even though we found large volumes of these hazardous chemicals, generated by Tinker's operations, were being disposed of in off-base landfills and injection wells.

DOD studies have found that if there are sufficient quantities of solvents and other hazardous chemicals, recycling of these hazardous substances on base provides usable materials at less cost than buying them new. In addition, if these hazardous wastes are recycled, then Tinker will not have to pay for their disposal. Because Tinker was not segregating these wastes or was improperly dumping them and the records were not complete, we were unable to determine the total dollar savings that could be realized if recycling was done on base.

TREATMENT PLANT NOT FULLY USED AND POORLY MANAGED

The industrial waste treatment plant at Tinker was constructed in the 1960s to neutralize or reduce the volume of hazardous waste chemicals requiring disposal. These chemicals include concentrated chromic and cyanide acids from the plating shops and concentrated chemicals such as alkaline precleaner, alkaline rust remover, emulsion cleaner, phosphoric acid, and potassium permanganate from the engine parts cleaning facility. In 1984 Tinker completed an upgrade of its plant at a cost of $7.6 million. As of November 1984, we found that Tinker was using about 800,000 of the plant's 1.5 million gallon daily capacity and that Tinker was no longer using the plant to treat the waste concentrated chemicals from the plating shops and engine parts cleaning facility. Instead, the Defense Property Disposal Service was paying about $200,000 annually to a private contractor to dispose of about 500,000 gallons of these chemicals primarily in the Tulsa, Oklahoma, injection well. Further, the Air Force Engineering and Services Center found that the treatment plant has been poorly managed. As a result, the treatment plant has contributed to the water contamination on and around the base.

Treatment plant study

The Engineering and Services Center study was conducted in 1981 to provide recommendations on ways to upgrade the operation of the Tinker industrial waste treatment plant to meet EPA's

National Pollution Discharge Elimination System (NPDES)[1] permit requirements. This study was done after a 1977 EPA letter to Tinker pointing out that Tinker's plant was not meeting permit requirements.

The Engineering and Services Center report issued in June 1981, confirmed that the plant did not meet NPDES standards. The report said that concentrated chromic and cyanide acids from the plating shop were being discharged directly into the treatment plant because the pretreatment facility was no longer operational due to inadequate maintenance. If these wastes are not pretreated before they get to the plant, they will kill the microbes that neutralize the hazardous wastes. If the microbes are killed or damaged, it takes weeks to replace them. During these times contaminated water has been discharged into the streams. Three alternatives were given to Tinker officials regarding the disposal of the waste chromic and cyanide acids: (1) disposing of the chemicals in injection wells, (2) repairing the pretreatment facility, or (3) considering a solidification process.

Tinker officials discontinued treating the waste concentrated chemicals from both the plating shop and the engine parts cleaning facility in 1981. Tinker transferred most of these wastes to the Defense Property Disposal Service which disposed of them by contract primarily at the Tulsa injection well. Tinker officials told us their decision was based on the Air Force Engineering and Services Center report. However, this report did not recommend discontinuing treatment of the waste chemicals generated by the engine parts cleaning facility. The chemicals from the plating shop were the only ones the report addressed in this option. The only reference to the engine parts cleaning facility wastes in the report was a suggestion that the waste potassium permanganate could be used to oxidize the phenolic wastewater from the paint stripping operation.

Hazardous waste disposed of that could have been treated

Tinker and the Defense Property Disposal Office paid about $200,000 to dispose of about 500,000 gallons of hazardous waste that could have been treated at little or no additional cost in

[1] NPDES provides the first major direct enforcement procedure against polluters. It is illegal for point sources to discharge pollutants into the nation's navigable waters without an NPDES permit. An NPDES permit specifies (1) discharge limitations for specific pollutants or substances, (2) schedules setting forth the types of actions required and time frames necessary to comply with the discharge limitations, (3) requirements for self-monitoring of wastewater flows and of specified pollutants, and (4) periodic reporting of compliance.

Tinker's industrial waste treatment plant. Some of the wastes disposed of could reduce the cost of treatment because they could be used to neutralize other wastes, thus reducing the amount of chemicals Tinker has to buy to accomplish the same function.

Engineering and Services Center officials told us these chemicals can be treated at the plant, but the waste chromic acid and cyanide from the plating shops must first be pretreated. Plant personnel agreed that these chemicals can be treated at the plant. During the 12-month period ending July 31, 1984, they shipped about 346,000 gallons of these chemicals from the plating shop and cleaning facility primarily to the Tulsa, Oklahoma, injection well at a cost of $147,000. According to Tinker officials, they did not evaluate the alternatives before their decision to dispose of the concentrated waste chemicals from the plating shop in the injection wells.

Phenol contaminated wastewater frequently collects in clogged drains leading from the washrack and painting shop to the treatment plant. (See picture on p. 6.) This backed up wastewater is disposed of in an off-base injection well. Tinker's civil engineers were unaware of this practice before we brought it to their attention. They agreed to begin treatment of this hazardous waste in the treatment plant. Tinker officials paid a contractor $45,393 for the year ending July 31, 1984, to haul about 140,000 gallons of this liquid to injection wells.

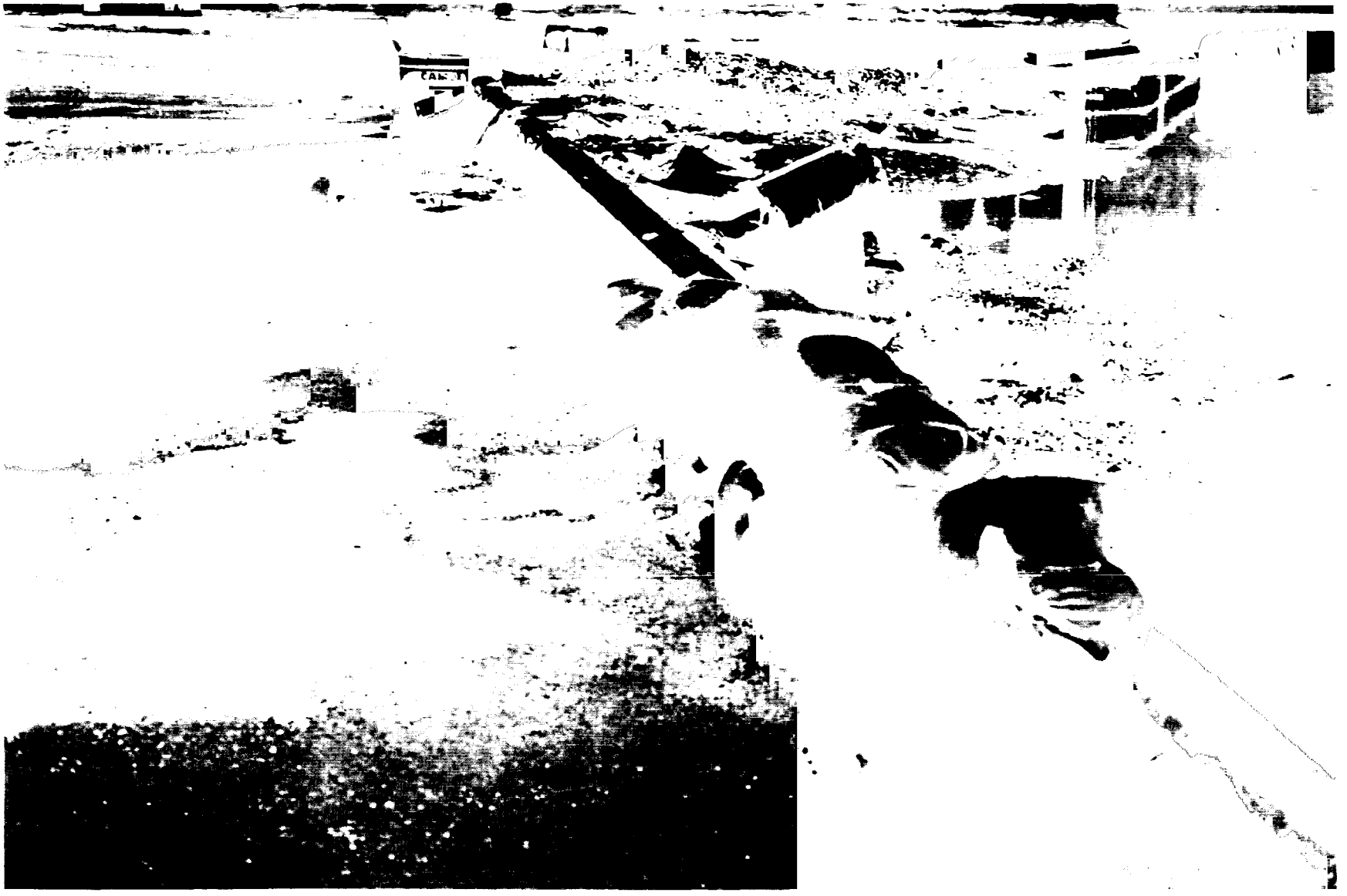
Treatment plant poorly managed

The Air Force Engineering and Services Center study found that the industrial waste treatment plant was poorly managed. Specifically, the report cited the lack of preventive maintenance programs; shortages of essential treatment chemicals; lack of written operating procedures; lost equipment manuals; inoperable equipment; and improper or marginal collection, storage, and analysis of wastewater samples. The lack of a maintenance program resulted in the significant deterioration of the plant whereby entire systems and essential equipment were inoperable for extended periods of time. These problems resulted in violations of the EPA discharge permit.

Poor maintenance of the plant has resulted in pollution of the stream next to the plant. As shown in the picture on page 7, the walls of the drying beds were allowed to deteriorate and the plant personnel have used sandbags to patch the walls. Even with these, the hazardous wastes are leaking out and draining into the nearby stream.

Tinker subsequently spent about $7.6 million on the plant to convert it from a trickling filter to an activated sludge treatment plant. This modification was intended to upgrade its treatment processes to meet the permit discharge standards. After

Phenol contaminated wastewater frequently collects in drains clogged with gloves and other debris (see arrow). Tinker has had DOD pay to have this backed up wastewater disposed of off-base rather than treat it in its hazardous waste treatment plant.



The walls of the drying beds at the industrial waste treatment plant have been allowed to deteriorate, and plant personnel have used sandbags to patch the walls. Despite these measures, hazardous wastes (see arrow) are leaking out and draining into the nearby stream.

completion of the modification, the Oklahoma Water Resources Board, in its September 1984 discharge permit compliance report, pointed out that the industrial waste treatment plant still did not comply with permit discharge standards and had operational and maintenance problems.

During our review, we observed many of the problems identified in the 1981 Engineering and Services Center report. One problem was that the dewatering unit was inoperable. While this problem now appears to have been corrected, during the year ending July 31, 1984, the unit was inoperable for 9 months. This unit condenses liquid sludge to solids and can reduce the amount of waste that must be disposed of by about 60 percent. If this unit had been operating, we estimate that the amount of waste could have been reduced from 3,580 tons of liquid to 1,432 tons of solids, and the disposal costs could have been reduced from $258,000 to $93,000, over the 12-month period ending July 31, 1984.

The Engineering and Services Center report made several recommendations for correcting the problems. Tinker officials agreed that many of the problems at the treatment plant still exist, but say they have begun to take specific actions to resolve the problems. These actions include establishing preventive maintenance schedules, writing contracts to ensure a sufficient supply of treatment chemicals, contracting for the development and documentation of operating procedures, obtaining manuals for new equipment, and hiring a qualified chemist.

Workers at the treatment plant told us that the lack of qualified and trained personnel is the primary reason for the plant's equipment being inoperable. According to treatment plant supervisors, plant employees who are young servicemen without prior training are reassigned by the time they are familiar with the plant's operations and procedures.

The inability to control the chemical composition of wastewater at various points in the plant is a major problem cited by treatment plant workers. The microbe population, which breaks down the wastes into nonpolluting substances, has been killed on numerous occasions because large amounts of concentrated chemicals, such as phenols and chromium, have been poured or spilled down the drains leading to the treatment plant without notification to plant personnel. With proper notification, plant personnel can better control the entry of the concentrated chemicals into the plant and thus prevent microbe damage. The plant must have an adequate microbe population to meet discharge permit standards. Plant personnel said they plan to resolve this problem by metering the concentrated waste chemicals from the paint stripping and corrosion control operations.

According to Tinker officials, they plan to have the Engineering and Services Center restudy the plant to determine if additional quantities of hazardous wastes can be treated and what needs to be done to make the plant operate in compliance with permit requirements.

We believe that the poor management of Tinker's industrial waste treatment plant has contributed to the water contamination problems in and around the base. The treatment plant has been cited several times as a source of pollution, as early as 1977 by EPA and as recently as 1984 by the Oklahoma Water Resources Board.

POTENTIAL FUTURE CLEANUP COSTS

Just as DOD is paying to clean up old on-base hazardous waste disposal sites used in the past, DOD risks being held liable for environmental harm by using commercial disposal sites, particularly sites that have serious compliance problems, instead of using a hazardous waste disposal method with less risk, such as recycling or treating them in the industrial waste treatment plant. In fact, Tinker is being held liable for a portion of the cleanup cost of two off-base commercial sites used in the past that have gone out of business. In addition, at least two of the five hazardous waste sites currently receiving Tinker's hazardous waste are having major compliance problems.

Industrial wastes, petroleum sludges, and refuse generated by Tinker operations from 1942 through 1979 were disposed of on base in six landfills, two industrial pits, and four radioactive waste disposal sites. A study completed in April 1982 concluded that these sites contained hazardous wastes and have the potential for contaminating surface and groundwater around the base. Further studies of these conditions are being made under DOD's Installation Restoration Program (DOD's program for identifying inactive hazardous waste sites that are contaminating the environment) to establish the cleanup required to eliminate and/or control these potential health hazards. DOD has allocated $1.6 million in fiscal year 1985 to begin cleanup of these sites.

Tinker is being held liable for environmental damage at two former off-base waste disposal sites it used which have gone out of business. These sites in Criner, Oklahoma, and Grand Prairie, Texas, have been identified by EPA as sources for groundwater contamination. EPA is now determining who else disposed of the wastes at these sites and how much cleanup cost each will bear under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. EPA officials estimate that Tinker's share of the cleanup costs could range from $2 million to $4 million.

The five disposal sites currently receiving most of Tinker's hazardous waste are now operating under interim status as provided by RCRA because they were operating or under construction at the time RCRA was enacted. Interim status allows the sites to operate under less detailed requirements than required for final permits. The facilities must comply with interim status regulations until final administrative disposition of their permit application is made, at which time the facilities must be brought into compliance with the terms of the final permit applications.

At least two of Tinker's present hazardous waste disposal sites are having serious problems complying with RCRA requirements. One of these sites--an injection well in Tulsa, Oklahoma--received over 893,000 gallons of Tinker's hazardous waste for the 11-month period ending June 30, 1984. According to Oklahoma State Department of Health officials, the site has a long history of negligence and "sloppy" toxic waste handling and has repeatedly failed to meet environmental protection requirements. EPA officials determined as early as 1977 and still believe that potential hazards exist for human health; worker injury; contamination of groundwater, surface water, air, and soil; fire or explosion; and spills from leaking containers or runoff.

As early as 1977 EPA recommended to the State Department of Health that the site's permit not be renewed. State officials said that because this was the only commercially operated injection well in the state, the Federal District Courts have allowed it to continue operating under several succeeding consent orders with the understanding that the deficiencies would be corrected. Many of the deficiencies that have existed for years still exist, according to EPA and Oklahoma State Department of Health officials.

The second hazardous waste disposal site having serious problems--a landfill in Port Arthur, Texas--received 393 tons, 248 cubic yards, 41 drums, and 10,000 gallons of Tinker's hazardous waste during the 11 months ending June 30, 1984. Because major deficiencies at this site were causing groundwater contamination, the Texas State Water Resources Board was seeking a court order to close the site.

According to EPA and Oklahoma officials, hazardous waste generators should make their own evaluations of a hazardous waste site before using it, including an on-site visit and a review of EPA and state records. These officials referred to the wide variance in the quality of disposal sites operating under interim status agreements and generators' potential liability for cleanup costs associated with these sites.

EPA officials said that the Oklahoma State Department of Health has been delegated responsibility for monitoring, permitting, and closure for noncompliance of hazardous waste disposal sites in Oklahoma. A state official said that closure of a site has to be obtained through the courts by initiating a lawsuit and obtaining a court order, which the official described as a time-consuming process. The state's recent actions have resulted not in closures but in the courts issuing consent agreements to the site operators requiring them to bring the site into compliance within a specified time. Sites may continue to operate during this period.

The Congress in November 1984 amended RCRA by adding new requirements for the safe management of hazardous wastes. These amendments require that landfill owners or operators certify compliance with groundwater and financial requirements. Those landfills not certified as in compliance by November 1985 are to be closed.

POSSIBLE RCRA DEFICIENCIES

RCRA was enacted primarily to regulate the management of hazardous wastes and hazardous waste disposal. Under RCRA, EPA has established reporting, record keeping, performance and operating standards for generators, transporters, and facilities that treat, store, or dispose of hazardous waste. Responsibility for administering RCRA regulations may be delegated to a state if the state program is at least as stringent as the federal program. The Oklahoma State Department of Health was designated the state agency responsible for inspecting facilities in Oklahoma for RCRA compliance and for granting final permits to owners and operators that treat, store, or dispose of hazardous waste.

Tinker was given its final permit on September 20, 1984. Facilities operating under final permit regulations must meet not only interim status requirements but also additional technical, design, construction, and operating requirements. Among other things, interim status requirements include a manifest system for tracking waste; record keeping and reporting; and contingency planning. We found that copies of manifests in Tinker's files were missing or inaccurate. We also found numerous instances of improper storage and handling of hazardous waste.

The base commander is responsible for seeing that hazardous waste is managed in accordance with RCRA requirements. However, state regulatory authorities have expressed their concern that no single group or person has direct authority to correct or eliminate practices causing environmental problems at Tinker. This results from several autonomous activities on base that generate the waste. Some are commanded by officers that have a higher rank than the base commander and they usually are also under different chains of command. In some cases, the base commander has

to use his chain of command to get the other activities through their chains of command to take corrective action. This often results in slow responses to the regulatory agencies.

Open dumping and lack of spill containment

The three major streams--Crutcho, Khulman, and Soldier--that originate or flow across Tinker have been contaminated according to studies by the U.S. Geological Service and the Oklahoma Water Resources Board. Hazardous waste is reaching the creeks because of improper open dumping or the lack of spill containment at numerous storage or generating sites. Also, excessive amounts of oily wastes were reaching the industrial waste treatment plant and the creeks because of improper dumping or the lack of spill containment. There is also evidence that the aquifer under Tinker which is used by Tinker and several nearby cities for drinking water is partially contaminated.

The sources of this pollution appear to be chemicals, heavy metals, and oil products that reach the streams via storm sewer drains and run off from hazardous material and waste storage locations without adequate spill containment features. (See picture on p. 13.) We observed the following examples during our on-site inspections[2] of Tinker's facilities and operations.

--Hazardous waste collection drums containing waste paint and paint stripper were located near a drain which appeared to lead to the storm sewer lines. There was clear evidence that some of these chemicals had drained into the storm sewer lines. We were told by the building supervisor that these drains led to the industrial waste treatment plant. The base civil engineer that accompanied us said the drains were indeed storm drains and that they emptied into Soldiers Creek.[3]

--Hazardous waste collection drums and torn bags of chemicals were located on a hillside near Soldier Creek with no spill containment. The drums were in poor condition and their labels did not indicate the specific hazardous waste contained in them.

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[2] We were accompanied on one of our on-site inspections by Water Resources Board inspectors and a civil engineer from Tinker.

[3] A study by Tinker's civil engineers found 116 drains that led to this tributary and not to the industrial waste treatment plant as originally believed. Oklahoma Water Resources Board officials told us that they found Tinker's drainage system blueprints were generally out of date and erroneous.

Inadequate hazardous waste storage site located near storm sewer lines.

We also noted instances where hazardous wastes spilled out of the containers. Some examples include:

--An oil and grease trap near the 507th Tactical Fighter Group's maintenance area had visible oil on top and ran over its containment from the previous night's rain. There was fresh oil on the ground. The fresh stain was surrounded by dead grass indicating similar spills may have occurred in the past. This situation had been cited in a June 1984 Oklahoma Water Resources Board report.

--Tank trailers containing JP-4 (see picture on p. 15) and other oil products have leaked leaving trails of dead grass and oil stains. Some of these tank trailers were parked next to storm drains and near the creeks.

--Hazardous waste in the industrial waste treatment plant's drying beds contained oil and hazardous chemicals which were running into the creek from sandbagged holes in the drying bed dikes. (See picture on p. 7.)

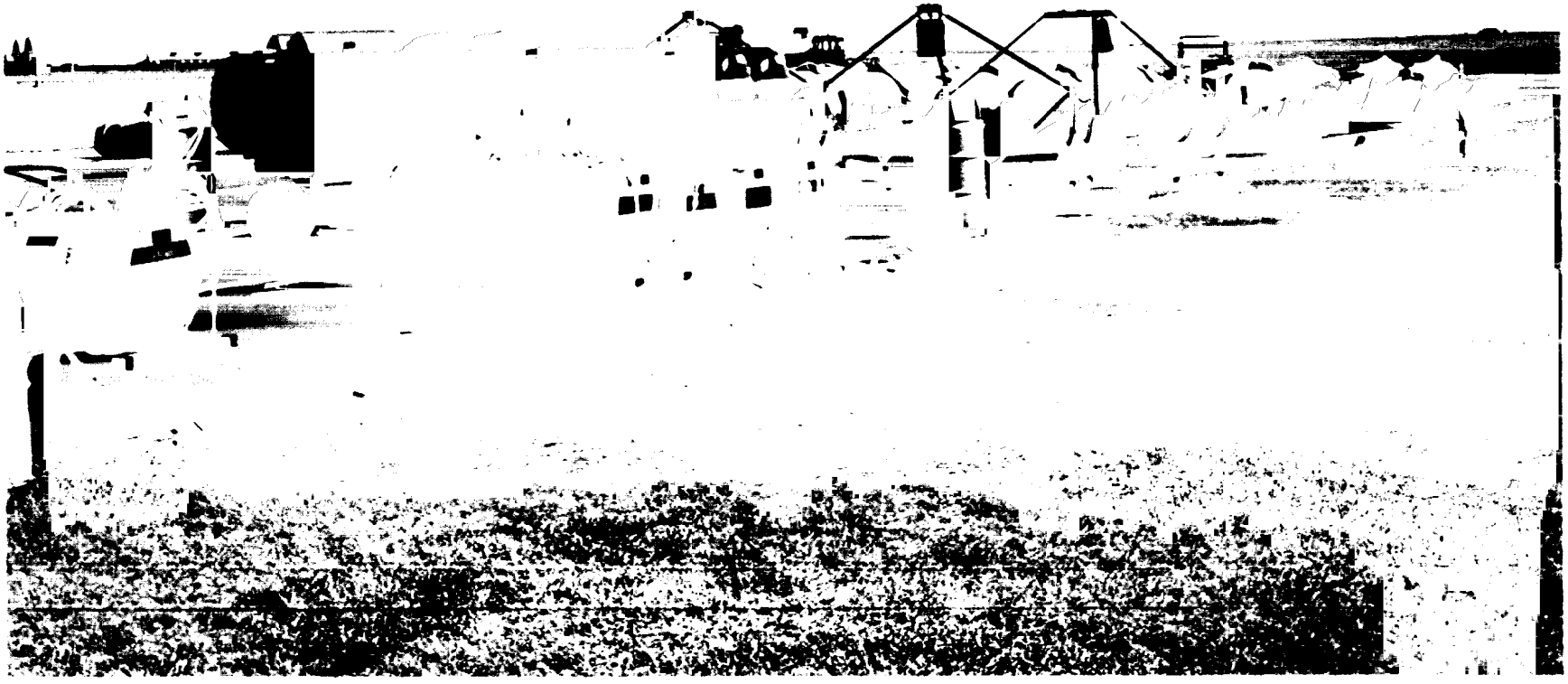
Also, the drains and the ground showed evidence of dumping of hazardous chemicals and oil products.

--Oklahoma Water Resources Board officials said that they found a hose running from the industrial waste treatment plant lift station into a storm drain. This could permit wastes to run into the storm drains and eventually in the streams.

--A large amount of oil has been improperly dumped into drains leading to the industrial waste treatment plant. This oil was caught in the oil/water separators in the drains and in the plant. About 621,000 gallons of oil slurry collected from these oil/water separators were disposed of in injection wells at a cost of $235,075 during the 11-month period ending June 30, 1984.

An Oklahoma Water Resources Board inspection in June 1984 noted chemicals and oil in Khulman Creek which they believed to be the result of a backup from an industrial waste treatment plant lift station which serves the Airborne Warning and Control maintenance activity. According to the Board, the waste overflowed the lift station and ran into the storm drain through a hole in the storm sewer. The inspection also identified oil and tetrachloroethylenes in a tributary of Soldiers Creek.

One source of contamination in Crutcho Creek appears to be Tinker's fire training pit. JP-4 is used to burn an aircraft mock-up which is doused by water. The resulting mixture of water and JP-4 is then drained into a storage tank. If this tank is not pumped out before it rains, the tank may overflow into the



Tank trailers containing JP-4 and other oil products have leaked leaving trails of dead grass and oil stains. Some of these tank trailers were parked next to storm drains and near creeks.

creek. The rain also washes excess JP-4 on the ground near the pit into the creek. We observed black stains and dead grass adjacent to the fire training facility and storage tank that indicated the oil products had contaminated the surrounding area.

Stream monitoring by the base's Bio-Environmental Engineering Group and analysis by the Oklahoma Water Resources Board indicate that the contamination is continuing. The sources of this pollution appear to be the chemicals, heavy metals and oil products that reach the streams through the storm sewer drains, and other runoff from open storage sites. (See picture on p. 17.) Tinker's industrial and domestic waste treatment plants and old hazardous waste dump sites on base were also cited.

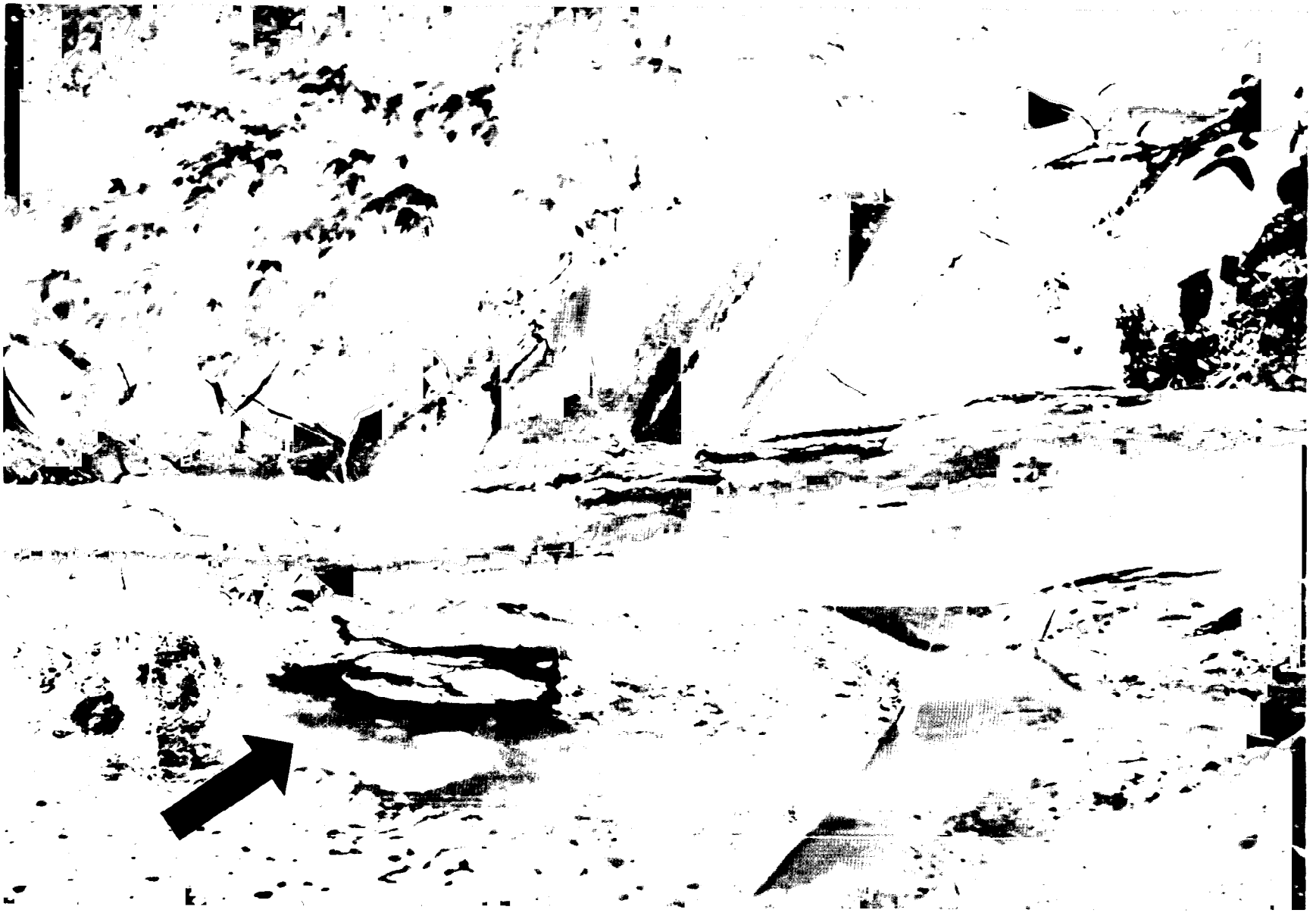
A Water Resources Board official said that the streams on or near Tinker are so polluted that no aquatic life exists for several miles downstream from the base. The official also said that the contamination from the base has seeped into the groundwater. Tinker lies directly over the known recharge area for the Garber-Wellington aquifer from which Tinker and several cities near Oklahoma City obtain most of their water supply. According to the Board officials, one of the wells from the aquifer and Soldiers Creek were both contaminated with chloroethylenes.

To help minimize the amount of contaminants leaving the base, Tinker has several low water dams to divert water through oil/water separators and to create sediment ponds. Because contaminants from the sediment ponds were reaching the streams and the groundwater, the Oklahoma Water Resources Board requested Tinker to dredge the hazardous waste from two sediment ponds. Complying with this request cost about $132,000.

Inadequate manifest system

RCRA requires that the shipment and disposal of hazardous waste be tracked and documented. This is accomplished through the EPA manifest system. Tinker, as a generator of hazardous waste, has the responsibility for monitoring hazardous waste manifests to insure that waste is delivered to the appropriate disposal site. The Oklahoma State Department of Health must grant interim or final permits for disposal sites used by Tinker and other hazardous waste generators and has the oversight responsibility for assuring that hazardous waste reaches the appropriate disposal sites under state requirements.

The state provides manifests to each generator in the state, but does not keep records of the prenumbered manifests given to a particular generator. States are not required by EPA to do this. The manifest system is delegated to the generator, who becomes responsible for making sure the wastes reach their



Polluted water (see arrow) entering one of the creeks on Tinker Air Force Base.

destination. Because the state does not keep track of the manifest numbers and does not require the generators to use the manifests in sequence and account for all numbers assigned, the state does not know how many manifests have been used and if it has received completed manifests on all hazardous waste shipments. Because all manifests are not accounted for by sequence number, other shipments could have been made which were not accounted for. In addition, the generator, including Tinker, does not have to account for the manifests by number when reporting on how much hazardous waste was disposed of each quarter. Tinker officials do not use or account for manifests by number sequence.

Each individually numbered manifest has an original and four copies. The amounts and types of waste are recorded on a manifest at the time the hazardous waste is picked up. The original (white) and three copies of the manifest are to accompany the hazardous waste to the disposal site and a copy (yellow) is to be retained by a contract monitor at Tinker. A disposal site official is to sign the manifest verifying the waste was received. The disposal site keeps one copy, gives another to the transporter, and the original is then to be sent to the Oklahoma State Department of Health and a copy (green) is to be returned to the contract monitor at Tinker. Thus, Tinker's files should contain two copies of each hazardous waste manifest: one (yellow) signed when the waste is picked up and the second (green) when the waste is disposed of. The contract monitor should compare these two copies to ensure that the shipments reached the designated disposal site.

Tinker had 541 shipments of hazardous wastes to disposal sites during the 11-month period ending June 30, 1984. Our review showed that the records for shipments were not complete and that Tinker had no record of some of the hazardous waste being disposed of. We found 42 instances where the yellow manifest copy that should have been left with the contract monitor at the time of pickup was not in Tinker's files. The absence of this copy of the manifest may indicate that the individual responsible for monitoring the pickup was either not there or failed to turn in the manifest copy to the contract monitor.

We also found 15 instances where the contract monitor's files did not contain green copies of the manifest that should have been signed by the disposal site operator at the time of disposal. Without both the yellow and green copies stating the type and quantity of hazardous waste and where it was shipped, Tinker officials cannot be sure all of the hazardous waste is being properly disposed of.

We also found 17 instances where the amount recorded as shipped on the yellow copy of the manifest differed from the amount received at the disposal site (green copy).

The Oklahoma State Department of Health requires operators of hazardous waste disposal sites to sign and return to them the original (white) of each manifest. Because Tinker's records were not complete, we reviewed the manifest records maintained by the Oklahoma State Health Department for the 541 shipments of hazardous waste from Tinker. We found that the state did not have the original (white) copies of the manifests showing that the waste had been disposed of for 41 shipments. Based on our review of Tinker's files and the disposal site operator's files, we found that 14 of these shipments were disposed of in Oklahoma--1 at a Tulsa recyler, 9 at the Tulsa injection well, and 4 at the Lone Mountain landfill in Waynoka, Oklahoma. Of the remaining shipments, 22 had been to hazardous waste recyclers in California, 3 to a landfill in Port Arthur, Texas, and in 2 instances we could not determine from Tinker and state records where they were shipped. Under present EPA regulations, Oklahoma cannot require these out-of-state disposal site operators or recyclers to return the properly completed manifests. As a result, Tinker and state officials do not know if the waste was disposed of as intended.

Of the 541 shipments of hazardous waste, Tinker records show that 181 shipments went to the Lone Mountain Landfill. Because Tinker and state records did not contain the completed disposal copies of the manifests for four shipments to Lone Mountain, we visited the landfill and found manifest copies for two of the four shipments that were missing. Thus, the disposal site did not have any record of having received the shipments. These two manifests accounted for about 47 tons of hazardous waste. We found no evidence that either Tinker or the state attempted to follow up on what happened to the waste.

An EPA report dated September 6, 1984, also noted that the Tinker manifest tracking and filing system was disorganized and that all hazardous waste manifests were not being accounted for.

Inadequate surveillance of contractors

The hazardous waste generated at Tinker is disposed of under two contracts. One contract was awarded by the Defense Property Disposal Service to a California based firm, which in turn subcontracted most of the work to a local disposal contractor. The contract originally covered a 1-year period ending July 31, 1984, but was extended through January 1985 while a new contract was negotiated. Subsequently, the contract was awarded to the local contractor for an additional year. The second contract, awarded by Tinker Air Force Base, also went to the same local contractor. Originally for 1 year, the contract was extended for 2 more years through July 1985. Total cost of the two contracts for the period covering August 1, 1983, through July 31, 1984, was over $1.1 million.

The Defense Property Disposal Service evaluated the California contractor's performance for the packing, removal, and disposal of hazardous waste on one delivery order. In its January 1984 report, the contractor was found to have disposed of hazardous waste at disposal sites that were not approved on the manifests by the State of Oklahoma, incurred manifest violations, mixed DOD and non-DOD waste, and operated in an unsafe fashion. The report concluded that the contractor did not have the capability to execute the contract requirements and that there was sufficient justification to invoke a default clause against the contractor. This was not done, but the contract was terminated at the end of the extended contract period.

In May 1984, EPA's National Enforcement Investigations Center reported administrative problems with the California contractor's performance under three contracts, including the one at Tinker. The Center also found significant problems with the contractor's performance on other contracts, including not manifesting the hazardous waste, not delivering the quantity listed on the manifest, and delivering the hazardous waste to facilities not designated on the manifest.

In our review of Tinker's procedures for monitoring the activities of its hazardous waste contractors, we found that they were not adequate to determine if the contractor was performing in accordance with the requirements of the contract. In our evaluation of the procedures, we compared the local contractor's billings with copies of Tinker's manifests and found instances where the contractor's invoices were not supported by manifest numbers, quantities on the invoices and supporting manifest varied, and the same manifest number was used to support more than one invoice. Tinker was not reviewing these for accuracy or proper support.

We also found and brought to the attention of Tinker officials overcharges by the local contractor of over $54,000 for the 11-month period ending June 30, 1984. Overcharges included duplicate billed manifests and differences in (1) weights recorded as received and (2) loads manifested and charged to Tinker but not delivered at disposal sites. We found that Tinker's contract monitoring procedures did not identify these problems. We also provided this information to the Air Force Office of Special Investigation, and this case is still being investigated.

APPENDIX II

HAZARDOUS WASTE TINKER AIR FORCE BASE

DISPOSED OF BY CONTRACT

(Year Ending July 31, 1984)

Hazardous Waste	Quantities
Gallons:	
Oily bottom sludge	621,250
Cleaning paint stripper and paint chips	199,530
Alkaline precleaner	124,200
Mixed acids	60,600
Alkaline rust remover	46,625
Cim cool	45,550
Carbon remover	36,450
Cyanide acid	31,500
Phosphoric acid	27,835
Potassium permanganate	23,500
Miscellaneous chemicals	20,446
Chromic acid	19,500
Paint stripper	19,300
Emulsion cleaner	13,300
Total	1,289,586
Tons:	
Industrial sludge	4,244
Dredgings from sediment ponds	1,502
Cadmium compound	380
Total	6,126
Pounds:	
Various chemicals (such as cyanide)	5,845
Drums:	
Various chemicals (such as perchlorethylene and trichlorethane)	1,596

OBJECTIVES, SCOPE, AND METHODOLOGY

On June 4, 1984, the Chairman, Subcommittee on Environment, Energy and Natural Resources, House Committee on Government Operations, requested that we review DOD's efforts to dispose of the hazardous waste currently generated at Tinker Air Force Base. Our objectives were to (1) determine DOD's policy concerning the management of hazardous waste and (2) evaluate how the Air Force has implemented this policy by examining the hazardous waste program at Tinker Air Force Base to determine if it is meeting the requirements of the RCRA.

To respond to the request and accomplish our objectives, we

--interviewed officials at Tinker Air Force Base and Defense Property Disposal Office involved in the generation and/or management of hazardous waste;

--reviewed Tinker's hazardous waste manifests for the 11-month period ending June 30, 1984, to determine amounts and types of waste being disposed of and disposal sites being used;

--reviewed Tinker's contract files and contractor billings for hazardous waste disposal;

--reviewed EPA, DOD, Air Force, and State of Oklahoma regulations governing the handling and disposal of hazardous waste;

--interviewed officials at the Oklahoma Department of Health--which has responsibility for regulating hazardous waste management--about their oversight and control over Tinker's disposal of hazardous waste in Oklahoma disposal sites;

--reviewed state inspection reports on disposal sites and the hazardous waste manifest system;

--interviewed officials at the Oklahoma State Water Resources Board--which is responsible for ensuring the quality of surface and groundwater--and obtained reports concerning inspections made at Tinker;

--interviewed officials at the Texas Water Resources Board and Louisiana Department of Environmental Quality--which oversee hazardous waste management in their respective

states--concerning disposal of Tinker's hazardous waste in their states;

--interviewed EPA Dallas Regional officials concerning their monitoring of Tinker hazardous waste management and reviewed EPA records on various disposal sites receiving Tinker's hazardous waste;

--interviewed commercial recyclers concerning the potential for recycling Tinker's waste oil and solvents;

--interviewed officials from the Air Force Engineering and Services Center--which provides technical assistance and review of hazardous waste activities at Air Force bases--concerning their evaluation of Tinker's industrial waste treatment plant and the possible treatment of certain waste chemicals in the plant; and

--interviewed disposal site officials and reviewed records concerning Tinker's use of their disposal site.

Our review was made between June 1984 and December 1984, and information has been updated where possible. Our work was performed in accordance with generally accepted government auditing standards.

APPENDIX IV

NINETY-EIGHTH CONGRESS

Congress of the United States

House of Representatives

ENVIRONMENT, ENERGY, AND NATURAL RESOURCES
SUBCOMMITTEE
OF THE
COMMITTEE ON GOVERNMENT OPERATIONS
RAYBURN HOUSE OFFICE BUILDING, ROOM B-371-B-C
WASHINGTON, D.C. 20515

June 4, 1984

Honorable Charles A. Bowsher
Comptroller General of the
United States
General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Bowsher:

As Chairman of the Subcommittee on Environment, Energy and Natural Resources of the Government Operations Committee, I am very concerned with measures being taken to prevent contamination of our environment. During the past year we heard testimony from Department of Defense (DOD) officials on its installation restoration program (IRP), a program to identify and clean up old hazardous waste sites. DOD also has a program, managed by the Defense Logistics Agency, to dispose of hazardous waste that is currently being generated.

While I understand that both programs are currently under review by your office, I would like an expedited review and report by October 15, 1984 on the adequacy of DOD's efforts to dispose of hazardous waste that is being generated by current operations at Tinker Air Force Base. I am particularly concerned with the operation at Tinker because it is a major military generator of hazardous waste.

I hope that this request does not interfere significantly with your current reviews. If so, or if you wish to discuss this request please contact Mr. Don Gray on 225-6427. Your consideration is greatly appreciated.

Sincerely,

Mike

MIKE SYNAR
Chairman

(392075)

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