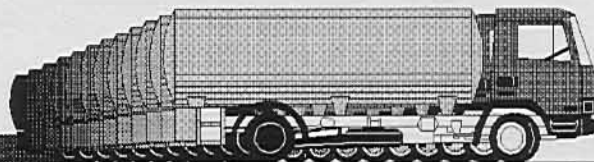




Take it Away



Amoco Pipeline truck driver Alvis Bryson

Hauling and processing wastewater from natural gas wells in Wyoming is a good business; just ask the companies that are now paying Amoco to do that in the Wamsutter Field.

After years of trucking crude oil around Wyoming, driver Alvis Bryson has had to make some changes. He is now hauling water, not oil, bound not for a refinery, but for Amoco's new South Evaporation Pond in the Wamsutter Field of the Greater Green River Basin.

"Hauling water is pretty much the same, except for one thing," he says. "Water freezes."

"It's one of the few opportunities we've had to take something that was an expense, and turn it into a profit."

-Clark Bennett

their employer entered a new line of business. APL-T formed an innovative, new cross-sector partnership with its sister company, Amoco Production Company (APC). After having long paid outside contractors to remove wastewater from its Wamsutter gas wells, APC retained APL-T to do the job.

This year, the APC/APL-T partnership took another significant step. In April, it began serving "third-party" gas producers, hauling away wastewater and disposing of it in Amoco's own evaporation facility. So far, seven companies have signed up for the service. Amoco Pipeline has gained \$8,400 per month in new revenue from third-party hauling. Amoco Production, by accepting wastewater from other operators, receives \$16,600 per month in added revenue.

The arrangement has had a marked effect on APC's operating results in the Wamsutter Field, says Amoco production supervisor Clark Bennett. "It's one of the few opportunities we've had to take something that was an expense, and turn it into a profit."

Win-Win

APC operator Mark Tanner runs one of Amoco's two wastewater-disposal facilities in the Wamsutter Field. He and another operator, Randy Phipps, were instrumental in creating the cross-sector partnership in 1994-95. Since then, Tanner has viewed its benefits firsthand. "We saw it as a way to generate new income for the trucking company, and at the same time save money for Amoco Production," he says. Previously, APC was paying contractors approximately \$2.13 per barrel for wastewater removal. Now, the cost per barrel is about \$1.32.

Virtually all APC natural gas wastewater generated in the Wamsutter Field—about 500,000 barrels

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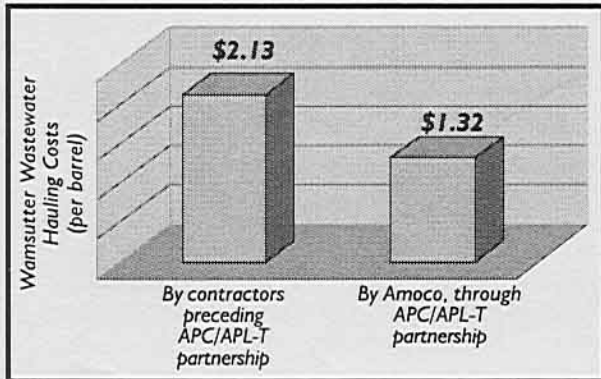
Mark Tanner at the south evaporation pond.

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per year—now is hauled by Amoco Pipeline's trucking company. At \$1.32 per barrel, the agreement has brought



\$660,000 in new revenue to APL-T. Amoco Production, meanwhile, has cut its costs by 81 cents per barrel, saving more than \$400,000 annually, solely as a result of the APC/APL-T partnership.

expenses. At APC's evaporation facility, "I always have a good handle on the budget," says Tanner. "It's like running your own business. There are basically two ways to improve your bottom line. One is to cut costs. The other is to increase production."

The South Evaporation Pond was designed with much more capacity than Amoco presently needs. The pond will be able to process approximately 1,300 barrels of wastewater per day, on an annualized basis. Water from non-Amoco producers will take up roughly 30 percent of its annual processing capacity. A second facility, APC's North Evaporation Pond, is used to treat Amoco wastewater only. Amoco water is also disposed of in a deep-injection well.

trucking company had vast knowledge of APC's gas well locations, and of the mileage and time required to service them. Efficient routes were devised long before the idea of water-hauling was conceived.

The precise origin of the water-hauling concept is not clear. But some of its ear-



Wamsutter Operations Center foreman
Doug Miller

Cross-Sector Marriage

APL-T's ability to haul Amoco wastewater more cost effectively than its competitors is surprising only in its degree. The per-barrel rate of \$1.32, compared with other suppliers' rates approximately 60 percent higher, stems from an obvious competitive advantage enjoyed by APL-T.

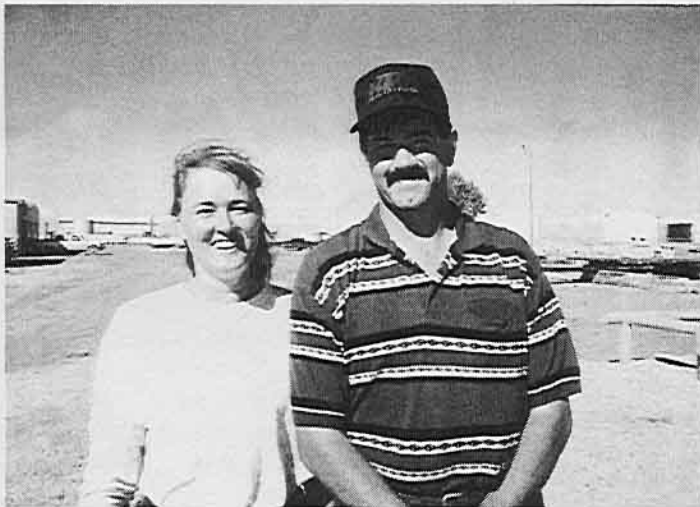
"Before we started transporting water, we were already hauling crude off the

very same leases," says Mindy Hixon, a manager in APL-T's office in Wamsutter. The

liest discussions were between Hixon and an APC employee with whom she'd had frequent contact—her husband. Vance Hixon is an operations specialist in the Wamsutter Field, with a firsthand view of Amoco Production Company's need for cost-effective trucking service.

Federal trucking regulations were forcing water-trucking companies to upgrade their vehicles, and raise their rates, recalls Vance Hixon. "We had very little control over our transportation costs. So I said, 'Why not have Amoco Pipeline do the work?'"

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Cross-sector partners Mindy and Vance Hixon.

"It is definitely a win-win situation," says Tanner. "Not only are we paying less for better service, but the money stays within the corporation." As a partnership, the deal encourages each party to watch out for the other's interests. "We're joined at the hip," he says. "If their costs go up, chances are mine are going up. I'm very conscious of APL's bottom line." Even at the field operations level, he says, APC employees are attuned to the WBU's stated mission of generating maximum positive cash flow for Amoco Corporation.

Increasingly, field personnel at Wamsutter are expected to manage with responsibility for their own revenue and

Wherefore wastewater?

With the natural gas that flows from wells in the Wamsutter Field comes a good deal of unwanted water. Approximately 10 barrels per day, on average, is pumped from a producing well. Wastewater from natural gas wells is often quite salty. Like many inland

petroleum deposits, Wyoming's gas reservoirs are made of sediments that were originally deposited in or near ancient seas. The sedimentary beds once were saturated with salt water. What remains is the by-product of natural gas production.

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Out of the Box

A water-hauling partnership was proposed to Wamsutter supervisor Dick Peterson, who is now retired. "Dick was an out-of-the-box thinker," recalls Mindy Hixon. "He said we could consider it as long as we treat it as any other business opportunity; as long as we could get a 15 percent return above our operating costs." Another champion of the process was Kermit Tilford, an Amoco engineer now working in New Orleans. Tilford provided engineering and financial support.

A steering team, with representatives of APC and APL-T, was formed to consider the water-hauling idea. "It was basically a no-brainer," says Vance Hixon. On the list of pros and cons, the biggest negative was an increased workload for operators at the wells. Throughout 1996, with the program running smoothly, the steering team met bi-weekly, working constantly to improve processes and cut costs.

In 1996, Wamsutter Operations Center foreman Doug Miller proposed the idea of hauling wastewater for third-party operators. "It made perfect sense economically," he says. "It would give Amoco Production an additional revenue stream, with almost no added costs."

Miller and an engineering/operating team tried three separate times to convince leadership teams in Denver of the efficacy of third-party water hauling. In their final attempt, they employed the Amoco Common Process. "ACP helped us better demonstrate to management that we had effective controls and auditing processes, to eliminate environmental concerns," says Miller. The Leadership Team's greatest reservation was the potential impact of one particular contaminant (see next section). With that resolved, the proposal was approved.

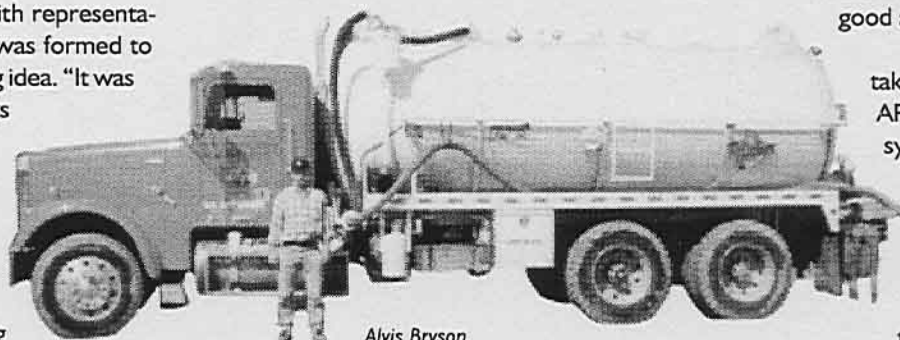
Testing, Testing

The efficiencies of transporting and processing wastewater could come only to an "integrated" company involved in both businesses. Few contractors will even cross

the line between oil- and water-hauling, let alone serving third parties, says Miller.

Amoco's entry into the water business was motivated first by its own environmental concerns. In 1994, with increased gas drilling planned in the Wamsutter Field, APC was beginning to exhaust its capacity in the other main wastewater-disposal technology, direct-injection wells.

Evaporative ponds were the obvious solution. Both ponds were designed with



Alvis Bryson

uncompromised attention to environmental concerns. Each is fitted with an early-warning detection system, and a heavy plastic barrier to prevent seepage.

But one environmental concern remained, according to Ed Foy, an environmental coordinator in the Wamsutter Field. Particularly in handling water from third parties, where the source is less familiar than Amoco-operated wells, APC must constantly monitor for a particular contaminant—chlorinated hydrocarbons. The CHC threat was the biggest obstacle in getting third-party water hauling approved by the WBU Leadership Team in Denver.

CHCs do not occur naturally in wastewater; they come from man-made petroleum products such as industrial cleaning solvents. Typically they get into wastewater as a result of someone dumping used solvents, illegally, into tanks that have been unattended.

To find a reliable test for CHC contamination, Foy contacted the Amoco Research Center in Naperville, Ill. "It turned out they had a test that had been used for years," he says.

A simple device, used at Amoco

refineries and service stations, measures the fluid's chemical content. It is now used routinely to test incoming wastewater at the South Evaporation Pond, at a cost of about \$10 per application.

Getting it Right

Amoco's move this year into third-party water hauling might have come sooner, acknowledges Mindy Hixon. But speed was not the highest priority. "Before we took [the service] outside, we wanted to make sure we were extremely good at it."

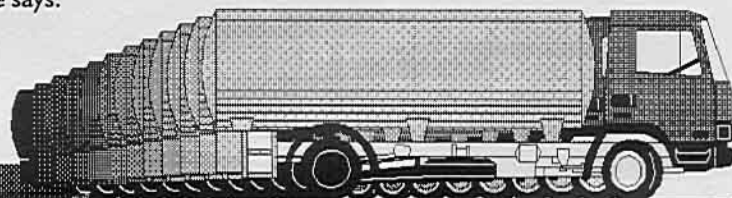
Process revisions have taken many forms, she says. APL-T has made an effort to systematically reduce the number of daily stops made by trucks. The company has learned to use different pumps, to accommodate water's thinner viscosity.

In handling wastewater, drivers do much more than drive. One of their greatest challenges is keeping water separate from oil. When they pick up water from a field storage tank, the task involves "a lot of running up and down stairs" of platforms, to keep track of the water/oil dividing line.

The list of satisfied customers now served by the APC/APL-T partnership includes seven Wamsutter gas producers: Samedan, Abraxas, Yates, Petro Gulf, Cabot, Hunt Oil, and Presideo. Those companies dispatch approximately 18,000 barrels of wastewater per month to Amoco's South Evaporation Pond, compared to a total of 45,000 barrels per month produced in the Wamsutter Field by Amoco Production.

With the success of water hauling at Wamsutter, APL-T and Amoco Production are eyeing a similar arrangement in the nearby Moxa Arch field. Excess capacity there would permit processing as much as 20,000 barrels per month of new waste-

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Wastewater Wizards Win R&R Awards

Amoco employees involved in the APC/APL-T third-party wastewater program have received R&R awards for their efforts. In an August memo from BGAT asset manager Margot Timbel, recipients were cited for "role model leadership" in revamping water-handling in the Wamsutter Field. "The team identified an underutilized resource and challenged themselves and others to take advantage of the opportunity."

R&R Award recipients included:

Alvis Bryson
Ed Foy
Tore Hatlen
Mindy Hixon
Vance Hixon
Ruth Johnson
Terri Jones
David Lovato
Becke McGee
Doug Miller
Don Perry
Carrie Phipps
Kirk Shepherd
Lora Staker
Mark Tanner
Kermit Tilford

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water. Considerable capacity would remain even if Amoco were to accept the greatest possible inflow of new water from its largest potential customer, Cabot Oil & Gas. Regulatory approval of the idea is expected by November 1998.

What's next in the partnership's quest for continuous improvement could provide

a major boost to efficiency. APC and APL-T are considering combined shipments in which water and condensate oil would be transported in a single truck tank. Separating the two would be done at the LACT unit near the evaporation pond. From there, the oil would go via pipeline to the refinery, and water into the pond. Combined loads would cut costs by reducing the number of trips per truck.

Meanwhile, in the competitive market for oil transportation contracts, APL-T people believe water hauling gives them an edge, by creating goodwill among customers. "We hope it will help us hold our contracts," says Mindy Hixon. Water hauling represents a still small but growing part of APL-T's operation at Wamsutter. "We think it adds stability to our business," she says.



Wamsutter Field production supervisor Clark Bennett.

In the pipeline . . .

Look for these features in future issues:

- *R+ recipients profiled*
- *The "3 x 3" financial process*
- *Third-quarter results*

WBU

WBUlletin is for Amoco employees supporting the assets of the Western U.S. Business Unit. We intend to fill future bulletins with more great news about great Amoco people in the great West. We invite your suggestions for future features. Please send ideas and comments to the Amoco WBU Leadership Team c/o Chris Ansel in Denver.

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