

Irrigator Struck in Face by Pipe Valve¹

California NURSE Project²

SUMMARY : CASE 192-114-01

Farm irrigators set up and take apart pipes that carry water to fields. An irrigator was taking apart a sprinkler system in a cotton field. His line of sprinkler pipes was connected at one end to the main water line. This connection was made by a valve screwed down on the water line, and a ring clamped over the valve and line.

Just before taking apart the sprinkler system, water was flowing in the main water line into the irrigator's line of sprinkler pipe. To shut off the water to his sprinkler line, the irrigator bent over the connecting valve and began turning its faucet handle. The valve cap on top of the connecting valve came loose. Water pressure from the main water line fired the valve cap into the worker's face. This broke the worker's jaw, knocked out his front teeth, and gave him a concussion. Headaches, dizziness and blurred vision bothered him for weeks after the injury.

How could this injury have been prevented?

- Turn the water off at the main water line, not at the hookup between the main line and the sprinkler pipe.
- Check equipment before using it, including the screw threads and clamps of connecting valves.
- Train workers in safe work methods. This farm did not have a written outline for safety training.

BACKGROUND

On May 29, 1992, NURSE staff received a written report of an agricultural injury from a local medical clinic. The clinic had treated a 27 year-old Hispanic male irrigator for head and facial injuries. The incident occurred on May 27, 1992 in a cotton field watered by a pipeline sprinkler system. The irrigator's job was to move the sprinkler system pipes into the field, assemble them and connect the pipes to the main water line. While the worker was turning off a valve in the sprinkler system, water pressure blew the cap of the valve into his face.

A nurse from the NURSE Project discussed the incident with the injured irrigator on June 12, 1992. The Senior Safety Engineer from the NURSE Project discussed the incident with the farm owner and the two irrigation foremen at their farm office on July 10, 1992. The pipeline sprinkler system had been dismantled and moved soon after the incident, so the NURSE engineer was unable to inspect it. NURSE staff also reviewed the employer's investigation report and the worker's medical records.

The California Occupational Safety and Health Administration (Cal/OSHA) was not notified and did not investigate the incident.

The incident occurred at a family owned and operated cotton farm. The farm has 12 full-time employees and 25 casual (1-12 weeks per year) employees. The injured irrigator was hired as a casual employee and had been on the job for five days. He had worked as an irrigator on other farms. The Senior Safety Engineer reviewed the farm's written safety program and noted it did not address all components required by Title

1. This document, CDHS(COHP)-FI-92-005-17, was extracted from a series of the Nurses Using Rural Sentinel Events (NURSE) project, conducted by the California Occupational Health Program of the California Department of Health Services, in conjunction with the National Institute for Occupational Safety and Health. Publication date: May 1992.

2. NURSE Project, California Occupational Health Program, 2151 Berkeley Way, Annex 11, Berkeley, CA 94704.

8 California Code of Regulations 3203 -- Injury and Illness Prevention Program. (As of July 1, 1991 the State of California requires all employers to have a written seven point injury prevention program: designated safety person responsible for implementing the program; mode for ensuring employee compliance; hazard communication; hazard evaluation through periodic inspections; injury investigation procedures; intervention process for correcting hazards; and a health and safety program.)

One component that the safety program did not cover in sufficient detail was safety training. On this farm, it is the field foremen's responsibility to give safety talks to workers. At the time of the NURSE investigation, the field foremen did not have a written outline to use when reviewing safety procedures with workers. The farm's written safety materials were in English, and the field foremen verbally translated the safety information into Spanish for the employees.

Also, on this farm, on-the-job training consists of the irrigation foremen observing the irrigators for the first few days on the job. An annual safety training program is conducted for the farm by its workers compensation insurance company. The insurance company also reviews the farm's safety program each year and discusses job safety issues with the foremen and the 12 full-time field workers.

INCIDENT

At approximately 8:00 a.m., on May 27, 1992, a 27 year-old Hispanic male irrigator was taking apart a sprinkler irrigation system in a cotton field. This sprinkler system consisted of long sections of pipe, 20-30 feet in length, connected by clamps. These pipes are then connected by a valve assembly (see diagram) to an 8-inch water line. Water flows from the water line into the sprinkler pipe at pressures of 55-60 pounds per square inch. The water is turned off by a lever on the cap of the valve which is screwed onto the sprinkler pipe, and then clamped on the pipe with a "snap ring," a ring which tightens and clamps the pipe to another pipe when it is snapped closed.

Before he took the pipeline apart and moved the sections to another place in the field, the irrigator turned the lever on the valve cap to shut off the water to the sprinkler pipeline. While the irrigator was bending over the valve assembly, with his face 1-2 feet away, water pressure forced the valve cap off and blew it into his face.

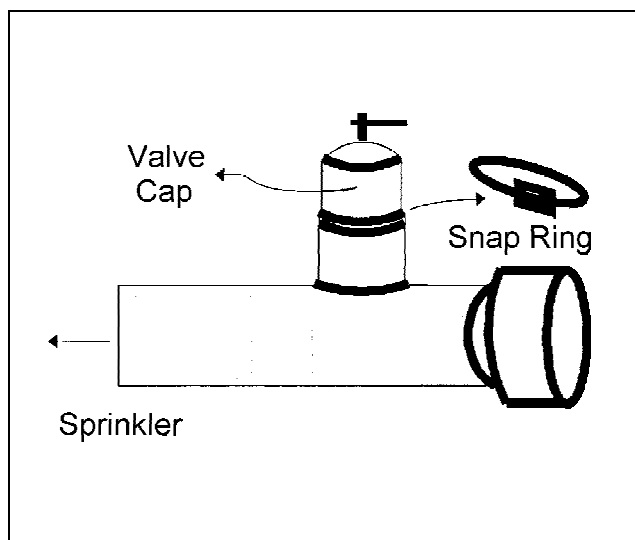


Figure 1. Valve assembly

It is not clear why the valve cap came loose. The valve cap may not have been securely screwed onto the sprinkler pipe, or the snap ring may not have been securely clamped. When the irrigator attempted to screw the valve closed, the turning action may have loosened the valve cap, and then water pressure forced it off. It is also possible that some part of the valve assembly failed. If the screw threads holding the valve cap on the pipe were damaged, or the snap ring clamping the valve cap to the pipe was broken, the water pressure could have forced off the valve cap.

Another irrigator closing valves on a different section of pipe in the field heard the injured irrigator cry out and came to his assistance. This co-worker ran to the road and flagged down the irrigation foreman. The foreman had the injured irrigator lie down in the cab of his pickup truck, and drove him to the local medical clinic about 10 miles from the farm.

The injured irrigator was treated at the medical clinic at approximately 8:45 a.m. He had bruises on his face, a concussion, a deep cut on his right cheek, a broken upper jaw, and his top front row of teeth were broken off at the base. Doctors at the clinic gave him pain medication, a tetanus shot, and stitched the cut on his cheek. They then immediately sent him to an oral surgeon for treatment of his broken jaw and teeth.

At the time of the NURSE interview on June 12, 1992, the irrigator was still receiving follow-up care from an oral surgeon. He was still complaining of dizziness, blurred vision and headaches. He is expected to remain on medical disability until the end of the summer.

PREVENTION STRATEGIES

1. The employer should establish a standard operating procedure for the safe performance of each task. The procedure should require irrigators to turn off the water flow to the main water line before closing the valves on the sprinkler lines and moving the pipes. (The irrigator noted that this had been the procedure at the farms where he had worked before.) If the standard operating procedure on this farm had been to turn off the water flow at its source, the irrigator would not have been working on a sprinkler system under high water pressure. Even if the valve cap had not been securely fastened, water pressure could not have forced it off, and the irrigator would not have been injured.
2. The employer should have a comprehensive written injury prevention program*. Workers should be trained to recognize and avoid hazards associated with specific tasks. Foremen should be given a detailed written outline of topics to cover in a safety training session, and the training materials should be written both in English and the language used by the foremen and workers. In this incident, the nature and extent of the safety training the worker received are not clear. If the irrigator had been trained in safe methods to take apart the sprinkler lines, he would not have worked on a system under high water pressure and would not have been injured. ***Title 8 California Code of Regulations 3203 -- Injury and Illness Prevention Program.**
3. The irrigation foreman or a designated safety person should check all equipment before use. Every time a sprinkler system is assembled it should be checked before turning on the water line. All snap rings for valves should be checked to see if they are missing, rusty, or damaged. If they are, they should be replaced. Valves should be checked before use, and faulty valves repaired or replaced. The entire valve assembly should be checked for any dirt or debris that might block the connection. If the irrigation foreman or other designated person had checked the sprinkler system before use, a faulty valve or snap ring might have been found and replaced. If the valve had functioned correctly, then the irrigator would not have been injured.
4. Field crews should have an adequate emergency medical response procedure. The crew should have a cellular phone or radio available to contact the Emergency Medical Services (EMS). Crews should be trained to call 911 before moving an injured

worker. One or more members of the crew should be certified in first aid and cardiopulmonary resuscitation (CPR)**. In this incident, if the foreman had been trained in proper response to an injury, he would have called 911 and then administered first aid until trained EMS personnel evaluated and provided further treatment for the injured worker's condition. This might have reduced the risk of complications from the injury. **** Title 8 California Code of Regulations 3400 (b): "In the absence of an infirmary, clinic or hospital, in near proximity to the workplace...a person or persons shall be adequately trained to render first aid."**

FURTHER INFORMATION

For further information concerning this incident or other agriculture-related injuries, please contact:

NURSE Project
California Occupational Health Program

Berkeley office:
2151 Berkeley Way, Annex 11
Berkeley, California 94704
(510) 849-5150

Fresno office:
1111 Fulton Mall, Suite 214
Fresno, California 93721
(209) 233-1267

Salinas office:
1000 South Main St., Suite 306
Salinas, California 93901
(408) 757-2892

The NURSE (Nurses Using Rural Sentinel Events) project is conducted by the California Occupational Health Program of the California Department of Health Services, in conjunction with the National Institute for Occupational Safety and Health. The program's goal is to prevent occupational injuries associated with agriculture. Injuries are reported by hospitals, emergency medical services, clinics, medical examiners, and coroners. Selected cases are followed up by conducting interviews of injured workers, co-workers, employers, and others involved in the incident. An on-site safety investigation is also conducted. These investigations provide detailed information on the worker, the work environment, and the potential risk factors resulting in the injury. Each investigation concludes with specific recommendations designed to prevent injuries, for the use of employers, workers, and others concerned about health and safety in agriculture.