the
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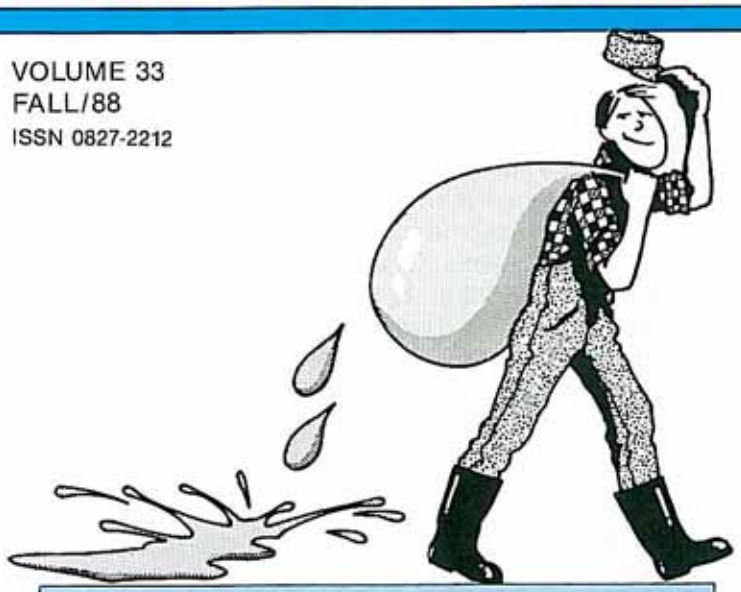


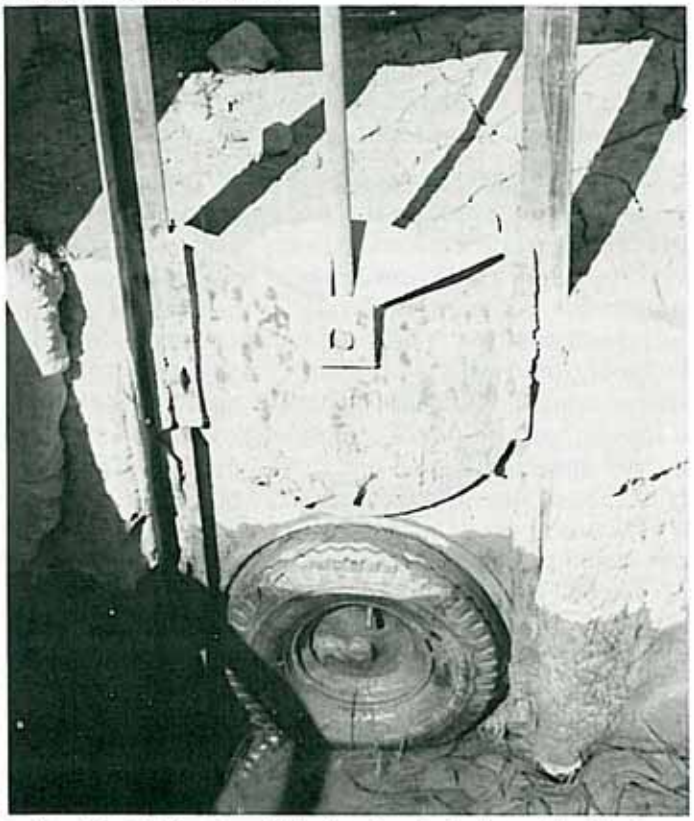
IN THIS ISSUE:

A WINTER PIPELINE PLUG WITH A DIFFERENCE

Who Says Old Tires & Rims Aren't Useful.

With the changing colors and the onslaught of winter just around the corner, district personnel have changed their thoughts from delivering water to one of removing it from their pipeline works. Winterizing of a pipeline is probably one of the most important procedures in this annual seasonal change. If this job is not done properly, the damage and expense can be horrendous come next spring.

In most situations, "winterizing the pipeline system" is a straight forward and very simple procedure. District personnel simply open all the valves along the line, then either open the gravity drain outlet or pump the entire line dry. Once the system has been dewatered, a final check is made to make sure the inlet gate is tightly closed to prevent rodents from taking up residence in the pipeline.



Inflated Tent Trailer tire with bolt and center holes welded shut - provides a 100% seal against water entering the pipeline during off-season.

In the problem cases, the pipeline inlet is submerged by water trapped against it or from storm runoff. Without much head, the slide gates often leak and the ditchrider no sooner gets the line pumped dry, but water trickling back in soon fills it. When this happens, some special dewatering techniques may be required. The best solution is to seal the pipe inlet off completely.

The St. Mary River Irrigation District has been experimenting with various pipe sealing methods for years trying to find a solution to this annoying problem.

Sandbags do work, but they are messy to clean up and are not a 100% seal. In 1986 the SMRID sprayed a polyurethane foam on a pipe inlet gate to seal it against leakage during the winter. This foam was a complete success in sealing the pipeline inlet, but some of the foam entered the system during spring start up and caused major problems with valve and sprinkler nozzle operations. A better solution had to be found.

In the fall of 1987, the district's Russ Olson, superintendent of construction developed an inflatable plug. The plug is made from an ordinary vehicle tire and rim with the center hole and lug bolt holes welded shut. Installation is as simple as raising the slide gate to its fully open position, inserting the deflated tire and rim assembly, then inflating the tire. Olson states "the plug worked well and is a 100% positive seal". To remove it in the spring, the tire is simply deflated, and the tire and rim assembly pulled out. Cost for buying a secondhand tire and rim and welding the holes shut is about $75.00. A very small cost when compared to one or two men having to go back time and time again throughout the fall and winter to pump a pipeline dry.

For Russ Olson and the SMRID the old adage if at first you don't succeed try and try again, has certainly paid off in a positive, low cost winter pipeline seal.

For more information, please contact Russ Olson, Superintendent of Construction, St. Mary River Irrigation District, P. O. Box 278, Lethbridge, Alberta, T1J 3Y7. Telephone (403) 328-6712.■

CANAL REHABILITATION

The Answer for Saline Soil Reclamation?

A variety of rehabilitation methods have been used in southern Alberta over the past twenty years to curtail salinization of land due to seepage from leaky canals. More than 250 million dollars have been spent since 1969 by the thirteen irrigation districts under the Irrigation Rehabilitation Cost-Sharing Program, with another 50 million dollars allocated for the same program until 1990. These expenditures have been defended on the basis of increased capacity and efficiency of water distribution systems and enhanced productivity of salt-affected land through reclamation.

The Coopers and Lybrand Consulting Group concluded in 1987 that a documented record of the reduction in seepage-affected land through the existing canal rehabilitation program is currently not available in Alberta. Detailed soil investigations and sampling, associated with land irrigability classification activities conducted by Alberta Agriculture during the past decade, provide some evidence that attempts at reclamation of salt-affected land through canal rehabilitation have met with mixed success. Some land units have apparently been reclaimed within one or two years, whereas others have shown little change in persistently high water table and salinity conditions for several years following canal rehabilitation.

Monitoring instrumentation and sparse wheat growth on one of the plots at SMRID Lateral 12 Bow Island (July 31, 1985).

Eight sites, located within four irrigation districts in southern Alberta, were selected in 1984 to document changes in groundwater conditions and the salinity status of salt-affected soils adjacent to rehabilitated irrigation canals. Study sites were established on a variety of soil types and represent four rehabilitation methods (Table 1). Three plots were instrumented along each rehabilitated lateral. Monitoring activities from 1985 to 1987 included soil moisture, water table level and irrigation/precipitation measurements, fall soil sampling and EM-38 salinity surveys. The irrigation suitability of the soils within each site were evaluated on the basis of the 1983 Alberta land classification standards.

Reclamation of soils at the majority of the study sites has not been achieved within the two to eleven years since rehabilitation activities were completed. A general decrease in the level of the water table from 1985 to 1987 was observed in only about half of the affected areas investigated. Improvement in the salinity-status of some of the soils was detected when water table levels were maintained at depths greater than 1 m throughout most of the growing season. This observation is consistent with previous findings in southern Alberta that have shown that the critical water table depth required to prevent salinization of soils in southern Alberta varies from 1 to 1.5 m, depending on the salinity of groundwater, soil characteristics, local climatic conditions and type of crop. Van Schaik and other workers have previously shown that capillary rise of groundwater from a shallow water table will inevitably result in further salinization of soils unless the water table is maintained below the critical depth and sufficient irrigation water or natural precipitation is applied to promote net downward movement of water.

Irrigation and major precipitation events promoted some leaching of excess salt below the upper portion of the root zone, however, only two of the twenty-three salt-affected land units evaluated have improved sufficiently within the short term to permit reclassification into an irrigable category. Subsurface drainage may be required, within most of the salt-affected land units investigated, to permit greater control of the water table and leaching of excess salt within a more reasonable time frame.

For further information please contact Rod Bennett, Land Evaluation Section, Land Evaluation and Reclamation Branch, Alberta Agriculture, Agriculture Centre, Lethbridge, Alberta, T1J 4C7. Telephone (403) 381-5894.■

Table 1. Method and timing of rehabilitation at each of the eight study sites.

Site	Rehabilitation Method	Year Of Rehabilitation
LNID Lateral 62H	Unreinforced concrete lining	1978
LNID Lateral 62K	Polylining with gravel armour	1985
RID Lateral R-8-1	Series 100 P.V.C. pipeline	1984
SMRID Lateral 12 Bow Island	CANRON & P.V.C. pipelines	1983
TID Lateral 1 Barnwell	Unreinforced concrete lining	1976
TID Lateral 2 Barnwell	Series 100 P.V.C. pipeline	1983
TID Lateral K	B-25 concrete pipeline	1985
TID Lateral 20	Canal deepened by 1 m	1984

FACTS

Home Grown Fish & Chips.

Did you know that approximately 300,000 kg of lake whitefish are netted out of 18 irrigation reservoirs in southern Alberta by commercial fishermen each winter? These fish are marketed locally throughout southern Alberta and through the Fresh Water Fish Marketing Board in Winnipeg, Manitoba.

Southern Alberta potato growers on the other hand raise annually about 275,000 tonnes of potatoes on 23,000 acres to accompany these fish to the dinner table.

FROM THE FARM PERSPECTIVE

Irrigation Management Program Assists Alfalfa Seed Producers Win Award.

John Braul, an alfalfa seed grower in the Duchess area north of Brooks, used modern day irrigation technology to assist him in winning the Northrop King Seeds award for his 1987 alfalfa seed. Braul's award was given to him chiefly for his top yield of 300 kg/acre, but also for his crop purity at delivery and his high standard of management practices as witnessed by the seed company.

There is, however, another side to the story which adds yet more merit to the producer's achievement. It concerns the adverse soil conditions associated with seepage discharges that exist in the field, and the water management techniques employed by him to overcome the problem in cooperation with Alberta Agriculture's Irrigation Branch management technologist, Dave McKenzie, in Brooks.

Many parts of the region's irrigation canal systems, which are up to 75 years old, and in need of rehabilitation, can discharge considerable seepage losses into adjacent lands and Braul's field is a case in point. His field exhibited a high water table which was being continually recharged in this manner during the irrigation season and was, as a result, steadily being salinized.

Aware of the threatened loss of his crop's productivity Braul had in mind some irrigation strategies that he developed along with McKenzie to assist sustenance or even improvement of his eventual alfalfa seed yield.

In McKenzie's opinion Braul really succeeded in his meticulous management by inspection of the soil moisture status by hand auger complemented by the use of a crop stress infrared monitor. Through these techniques the high water table was discovered and quantified and timely adjustments made to the irrigation water management strategy accordingly.

Factors involved in the management decisions were: the degree of sub-moisture recharge, irrigation application amounts, the alfalfa seed crop bloom stage, the crop micro climate for "leaf cutter" bee pollination and weather forecasting. In this instance Braul and McKenzie found waterlogging and soil salinization in June 1987 at varying degrees of severity throughout the field.

Bloom stage was prolonged by intentional blocking of the wheel-move sprinkler nozzles thus arresting irrigation in the wetter areas, and by applying only light four-hour irrigation sets in less severe areas.

As a result, when unexpectedly high rainfalls occurred in August 1987, the soil moisture levels were low enough to accommodate the moisture, thus avoiding harm to the bloom from a high micro humidity. The arrival of the relatively heavy rain in August was largely responsible for significant reductions of alfalfa seed yields in the Duchess area in fields with abundant soil moisture reserves at that time.

In Braul's opinion, if he and his sons had not taken the time to probe the soil to obtain data on the prevailing levels of moisture in the soil throughout the 1987 season and monitor the crop stress index, it would just have been a poor to average year. That would have meant a yield of about 180 kg/acre and so a probable loss of income in the region of $340/acre.

Technologist measuring crop infrared reflectance for moisture stress management.

The Alberta Irrigation Management (AIM) advisory program, operated by the Irrigation Branch, is one whereby subscribing farmers are taught the knowledge and practical skills in irrigation management to optimize crop yields through the effective use of their soil and water resources. Even in less than ideal conditions where, for example, irrigation works contribute undesired water, the best can still be made of the situation if the grower develops his own management skills and makes the effort to utilize them effectively.

For more information please contact Rodney Jones, Irrigation Specialist, Irrigation Branch, Alberta Agriculture, Box 1318, Brooks, Alberta, T0J 0J0. Telephone (403) 362-1212.■

REVEGETATION OF CANAL BANKS

Three Different Methods of Grass Seeding Tested.

What is the most effective method of reseeding a rehabilitated canal bank? During the summer and fall of 1987 the Irrigation Branch tried various seeding methods and seed mixtures in order to compare the results. A site was selected in the Raymond Irrigation District near Welling. Broadcast seeding, hydroseeding and the installation of grass mats were the three methods tried.

Seedbed preparation included removing weed growth and loosening soil with hand rakes prior to seeding of the canal slopes. A backpack type cyclone seeder was used to broadcast seed and a sod roller used to roll the seed into the bed. Hydroseeding was contracted out to Bos Sod Farms Ltd. Grass mats with organic, biodegradable seed blankets were purchased from Proseed, Inc. of Calgary with the seed mixture already in place. Spikes were used to hold the seed mats in place.

The seed mixtures used included: Kentucky bluegrass, Fairway crested wheatgrass, creeping red fescue, Streambank wheatgrass, and annual ryegrass in varying combinations. Except for an initial soaking of the grass mat site, no water was applied to any seeded site in order to have natural climatic conditions occur. Seeding took place in early July at site one and late October for the second site.

Results after one year have been positive for the July-seeded sites but were very poor for the fall-seeded sites. Of the July-seeded sites, the fertilized hydroseeded section had the best catch and the most mature stand. The Fairway crested wheatgrass was the most common plant species established from the five varieties seeded. In the fall seeded sites, only the grass mat material showed any sign of growth. The quantity of grass sown did not vary considerably from one seeding method to the next.

The summer-seeded grass was probably more successful because of good rainfall immediately after seeding. Soil conditions were better with more topsoil in this shallow cut section of the canal. Precipitation in the first month following the summer seeding was equal to that of the ensuing eight months following the fall seeding. Seeding time is more related to precipitation than to season; the only advantage fall seeding would appear to have is the cooler growing conditions.

Technologist counting and classifying plants in 0.25 m^2 area.

Hydroseeding with fertilizer was the most effective method of establishing a quick regrowth of grass on a canal bank; however, for economical reasons, broadcast seeding in all probability will continue to be the method widely used. All three seeding methods would greatly benefit from a more nutrient rich and organic seedbed.

Where sites are to be reclaimed, the following parameters should certainly be considered:

- soil or seedbed properties including texture and available nutrients (topsoil is essential)
- local groundwater conditions
- expected climatic precipitation
- ease of propagation
- resistance to disease and winterkill
- cost of seed and method of application

Each parameter has relevance to the success of reclamation of a site. Examine and evaluate the data thoroughly before embarking on a large scale grass seeding reclamation project.

For further information, please contact Dave Cholka or Svat Jonas, P. Eng. of the Irrigation Branch, Alberta Agriculture, Agriculture Centre, Lethbridge, Alberta, T1J 4C7. Telephone (403) 381-5877.■

TREE REMOVAL PROGRAM IN WESTERN IRRIGATION DISTRICT

A Never Ending Battle.

Just how much regrowth and what maintenance is required along a canal bank after a tree removal program, were the questions answered in a seven year monitoring program of the Western Irrigation District. Staff of the Irrigation Branch have been carrying out this monitoring program to try and ascertain just how much regrowth occurs, and what methods and costs to the district were required to keep this regrowth in check.

In order for flows in the canal to be restored to original design capacity, the district forces along with some hired equipment have been removing trees on several canals since 1981. The tree removal is done under the ICW program and is an ongoing operation. The operation involves removal of the large trees, cutting down all brush and then reshaping the canal side slopes and sometimes rebuilding the canal banks to restore freeboard where necessary.

The equipment and procedures used by the district while doing the rehabilitation work has been outlined in an earlier issue of the Water Hauler's Bulletin Volume 4, 1981 Summer issue. Although some of the equipment used back then has changed, the procedure of doing the work remains the same.

Even after the canal rehabilitation work is complete, the district's tree problems are not over. As everyone knows, canal banks are a good environment for vegetative growth because of the abundance of moisture and regrowth occurs very rapidly. Only after one irrigation season, the rapid regrowth of willows and poplars reinfest the canal banks. This is where the district must follow up with a maintenance program to control tree regrowth along the rehabilitated canals.

Five ICW rehabilitation projects on the district's irrigation canals have been spot checked by the Irrigation Branch staff. Photos have been taken at 15 sites along roughly 150 kilometres of canals which have been rehabilitated since the tree removal program began. Visual inspections were also done at random spots between sites. The district was consulted to ascertain what maintenance was done on each project. The data collected was summarized in the form of a report.

The district has used a boom mounted rotary mower to cut down the brush which has regrown each season.

WID Secondary A Canal three years after tree removal program. Note regrowth of trees.

This is followed up by a spray program where Dycleer 2-4 is applied on the side slopes of the canal after regrowth begins. Dycleer 2-4 is a herbicide which kills broad-leaved vegetation. It is 2-4-D and Dicamba based and usually kills the complete plant including the roots. It will not affect the grasses. According to Gordon Vornbrock, assistant manager of WID, the spray application is repeated for about 3 seasons by which time the resprouting of the trees should cease. WID feels that this procedure is quite effective in controlling the tree regrowth.

It was observed from the site visits that the driving bank was well maintained. The opposite bank was not as well maintained and regrowth in some areas reached 1 to 2 metres in height. The reason for this was that the high side of the canal was sometimes inaccessible and as a result was not rotobladed or sprayed.

Spray applications may be made while the water is in the canal but care should be taken to keep the herbicide away from the water. Rotoblading is usually done when the canal is dry as the chips tend to clog up the system during the irrigation season.

Although WID may have the greatest problem with trees along its canals compared to other districts, the problem does exist in other districts and may cause similar concerns as WID. Districts are advised that permits are required from Alberta Environment prior to using sprays as a vegetative control along irrigation canals.

For further information, please contact: Craig Gordon, Manager, WID, P.O. Box 714, Strathmore, Alberta, T0J 3H0, telephone (403) 934-3542 or Jack Ganesh, P. Eng., Irrigation Branch, Alberta Agriculture, Agriculture Centre, Lethbridge, Alberta, T1J 4C7, telephone (403) 381-5869. ■

IRRIGATION SPILLWAY EVALUATION STUDY

In June 1988, a pilot study was initiated by the Irrigation Branch to determine the severity of erosion and other factors related to irrigation spill water flowing in drainage, tailout and coulee channels within the irrigation districts of southern Alberta.

The pilot study included investigation of a variety of channels totalling 30 sites in the Turin - Iron Springs area of the LNID to obtain a database and develop a list of criteria. Upon completion of the pilot study, a spillway evaluation criteria as to: gradient, condition of structures, capacity, date of construction and erosion was set up in tabular form, using a rating scale of 1 to 5.

There is an estimated 350 to 400 spillways to be evaluated in the thirteen districts scheduled over the next number of years.

Above: Spillway in eroded coulee before rehabilitation.

Below: Rehabilitated spillway (fabriform chute).

THE WINTER WORKSHOP

The Key to a Successful Maintenance Program.

Awareness through education and experience is the key to any successful irrigation district maintenance program. A plan and a budget are essential for a progressive maintenance program. However, if a district is to survive in these drought stricken years in western Canada, it is incumbent upon every employee to emphasize water conservation by improving operation and maintenance practices. Aggressive action is needed to seek out new maintenance methods and cost savings.

Recognizing this need is the first step. Employees need to be encouraged by management to submit new ideas and methods for more economical operation and maintenance practices.

Personnel can be stimulated to develop new innovative maintenance practices by a system of recognition and sometimes a monetary reward. Nothing causes creativity more than management recognition and a little something for the bank account.

Management on the other hand must provide an atmosphere where these new techniques and developments can be passed on to other operating personnel. Here's where the mid-winter seminar or workshop is an all important tool in providing a means to disseminate this newly gained information and to air areas of concern. An in-service education program allows employees to utilize ideas developed by others and may even stimulate a desire to be creative and innovative themselves.

The little workshop can be organized on a very small informal basis where nothing more than a group of employees get together on a cold winter day to discuss relevant topics which have been suggested by management and staff. Don't get it too structured but leave ample room for free open dialogue.

The key of any maintenance workshop must be towards self-improvement through the interchange of ideas and solutions. If your district is too small to practically organize a workshop by yourself, why not get together with one or more of your twelve neighboring irrigation districts.

If it is felt that outside resource people are needed, or assistance in other areas, the Irrigation Branch may be able to assist you. Please feel free to contact Mr. Akos Pungor, Branch Head, Irrigation Branch, Alberta Agriculture, Agriculture Centre, Lethbridge, Alberta, T1J 4C7. Telephone (403) 381-5140.■

JOHN CALPAS RETIRES

It could have been termed "John Calpas Night in Lethbridge" on September 16/88 as over 250 people attended a farewell party at the Lethbridge Lodge Hotel. People from all over the province paid tribute to the Tilley native from the Eastern Irrigation District who after 32 years with Alberta Agriculture, has retired.

After graduating from the University of Alberta in 1956 John began his career in Taber as a district agriculturist. Moving steadily up the ladder of success throughout his career, John retired as director of the Irrigation & Conservation Division.

On his retirement, reflects John "It's been an honor and privilege to work with the department, Alberta's farmers, and the dynamic irrigation industry in particular. My staff and co-workers in the department have always been first-class, a dedicated group that I and farm families could depend on, in my experience. I want to thank them all and wish them every succe in their future endeavors. And that goes for all the irrigation district managers and their boards, their staff, Irrigation Council, and the many Agriculture Canada research scientists who continue to develop, improve and test the new technology in cooperation with Alberta Agriculture." Always a pragmatic idealist, John figures we need to set our sights as a province and industry to eventually displace Ontario at the head of the list for the highest gross and net value of agricultural production in Canada. "Southern Alberta is already leading the way with its irrigation based crop diversity and extensive livestock industries. There are more opportunities to pioneer and we have the vision and people to do it," states John.

John is not straying too far away from irrigation as he and wife Juli-Ann plan to continue to live in Lethbridge. John will be involved with the Lethbridge Community College as an agricultural program administrator, setting up a wide range of agricultural courses and programs throughout the region.

On the occasion of his official retirement from the department, may we extend our congratulations and best wishes for a long happy future.■

WATER HAULER'S BULLETIN SUCCESS

Communicate your resourcefulness by having an article published in the Bulletin. Its success depends upon your help in obtaining and submitting new and useful ideas.

THE WATER HAULER'S BULLETIN

Designed to provide the operation and management personnel of Irrigation Districts with items of interest in their line of work. Comments are welcome. Please contact Duncan Lloyd, editor, at Area Code (403) 381-5539, Lethbridge.

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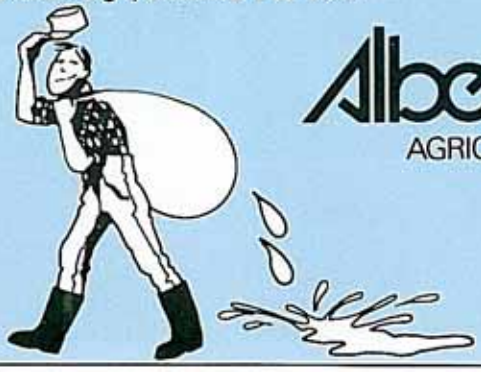

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