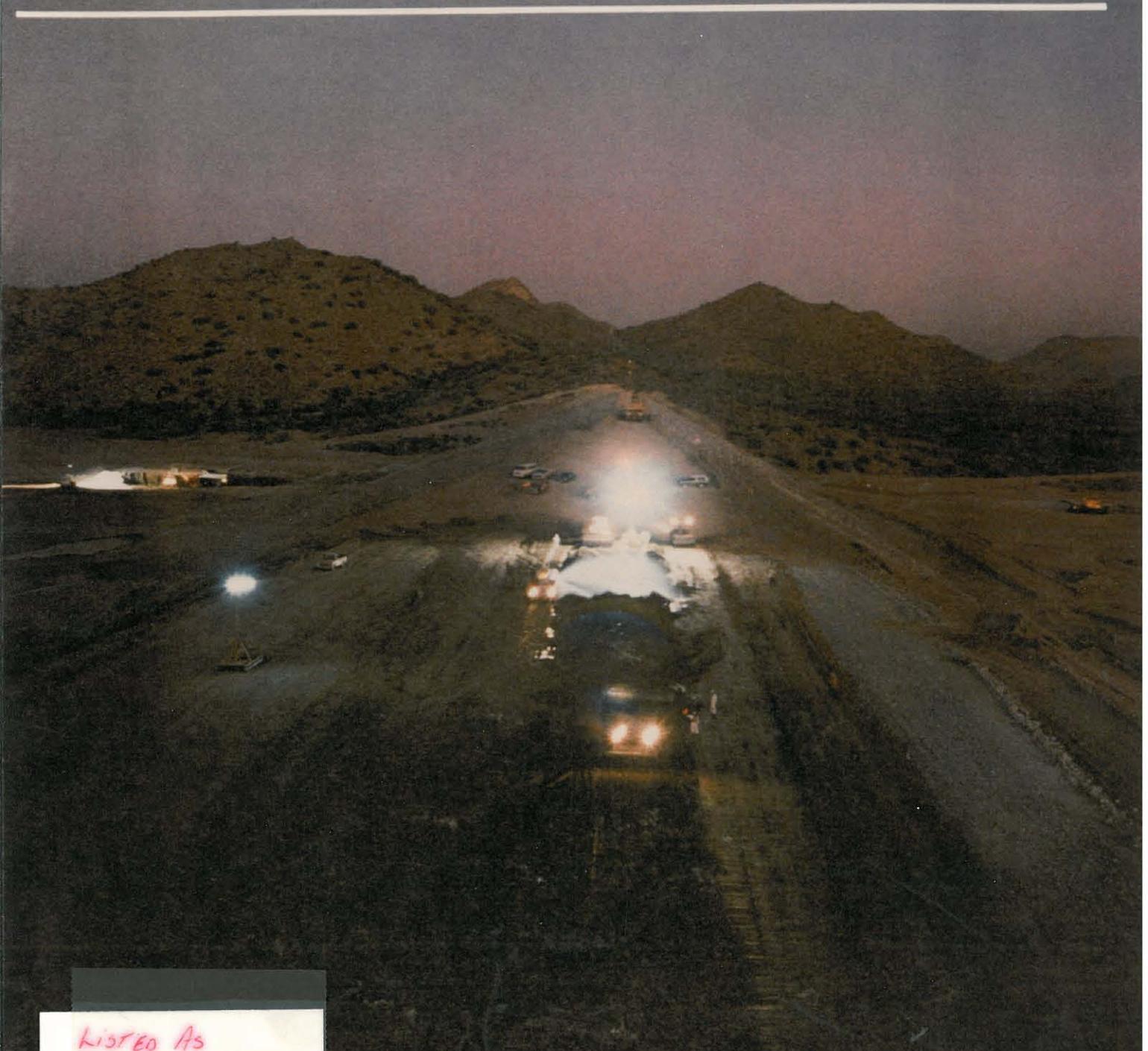


# SOUTHWEST CONTRACTOR



*Listed As*

## Sundt finishing New River Dam

## AMERICAN PUBLIC WORKS ASSOCIATION Rules and Regulations Governing The APWA Contractor of the Year Award

The Contractor of the Year Award was established to promote excellence in public works construction by recognizing the key role of the contractor in public works projects. Because excellence in construction is achieved only with the cooperation and under the supervision of responsible and knowledgeable public works officials, this award also pays tribute to them. Awards are given each year in two categories: 1) jobs costing under \$2 million, and 2) jobs costing \$2 million or more.

These rules govern the APWA Contractor of the Year Award, and each Chapter is obliged to use the same criteria for selection of a Chapter Contractor of the Year Award winner if its selection is to be considered for the APWA Award.

The recipient of the APWA Contractor of the Year Award shall be determined by the Board of Directors, upon the recommendation of a three-member Selection Committee appointed annually by the President of the Institute for Municipal Engineering. The Committee shall meet during the first quarter each year to select the award recipient from among the public works contractors previously chosen as winners of a Chapter Award on the basis of work completed during the preceding calendar year.

Nominations of projects are to be made by the public works agencies to a Chapter Committee by the end of the calendar year. Each agency is limited to one nomination except for those agencies which are responsible for projects within the limits of more than one Chapter. Such agencies may nominate one project from each Chapter in which they have had projects completed. A standard Nomination Form shall be used to submit the Chapter's nomination and must bear the Chapter President's signature. These forms will be sent to all Chapters and are also available upon request.

The project must have been completed during the calendar year in which the Chapter submits the Intent to Participate Form and must qualify as a public works project. Public works is defined as the physical structures and facilities that are developed, owned, and maintained by public agencies to house governmental functions and provide water, power, waste disposal, transportation, and similar services in accordance with established public policy.

Criteria to be used in the selection process shall include:

- 1) Use of good construction management techniques and completion of the project on schedule.
- 2) Safety performance as indicated by the number of lost time injuries per 1000 man hours worked by contractor personnel (includes both prime and subcontractor personnel), and a demonstrated awareness of the need for a good-overall safety program during construction.
- 3) Community relations as evidenced by the contractor's efforts to minimize public inconvenience due to construction, safety precautions to protect public lives and property, provision of observation areas, guided tours, or other means of improving relations between the contractor and the public.
- 4) Demonstrated awareness for the need to protect the environment during construction.
- 5) Unusual accomplishments under adverse conditions including, but not limited to, adverse weather, soil, or other site conditions over which the contractor had no control.
- 6.) Additional considerations deemed of importance to the public works agency; such as exceptional efforts of the contractor to maintain quality control and, if value engineering is used, construction innovations as evidenced by time and/or money-saving construction techniques developed and/or successfully utilized.

The schedule for the selection process is:

- |             |   |
|-------------|---|
| December 1  | Deadline for submission by Chapter of Intent to Participate Form.   |
| December 31 | Deadline for nominations and/or applications, as determined by each Chapter, for the Chapter Contractor of the Year Award. The project must have been completed during the calendar year. |
| February 1  | Deadline for the Chapter to make its selection and submit the Nomination Form to APWA Headquarters.   |
| March 31    | Deadline for the APWA Contractor of the Year Selection Committee to make its selection.   |
| May         | Presentation of the APWA Contractor of the Year Award at a suitable ceremony during National Public Works Week.   |

The Chapter Award, which can be ordered from APWA at cost, is a handsome certificate mounted on a walnut base. The APWA Award consists of an etched metal plaque and a bronze monument to be placed on the winning project.

M. M. SUNDT CONSTRUCTION COMPANY  
NOMINATION FOR 1985  
AMERICAN PUBLIC WORKS ASSOCIATION  
CONTRACTOR OF THE YEAR AWARD



Nominated by:  
Flood Control District of Maricopa County  
3335 West Durango  
Phoenix, Arizona 85009  
(602) 262-1501

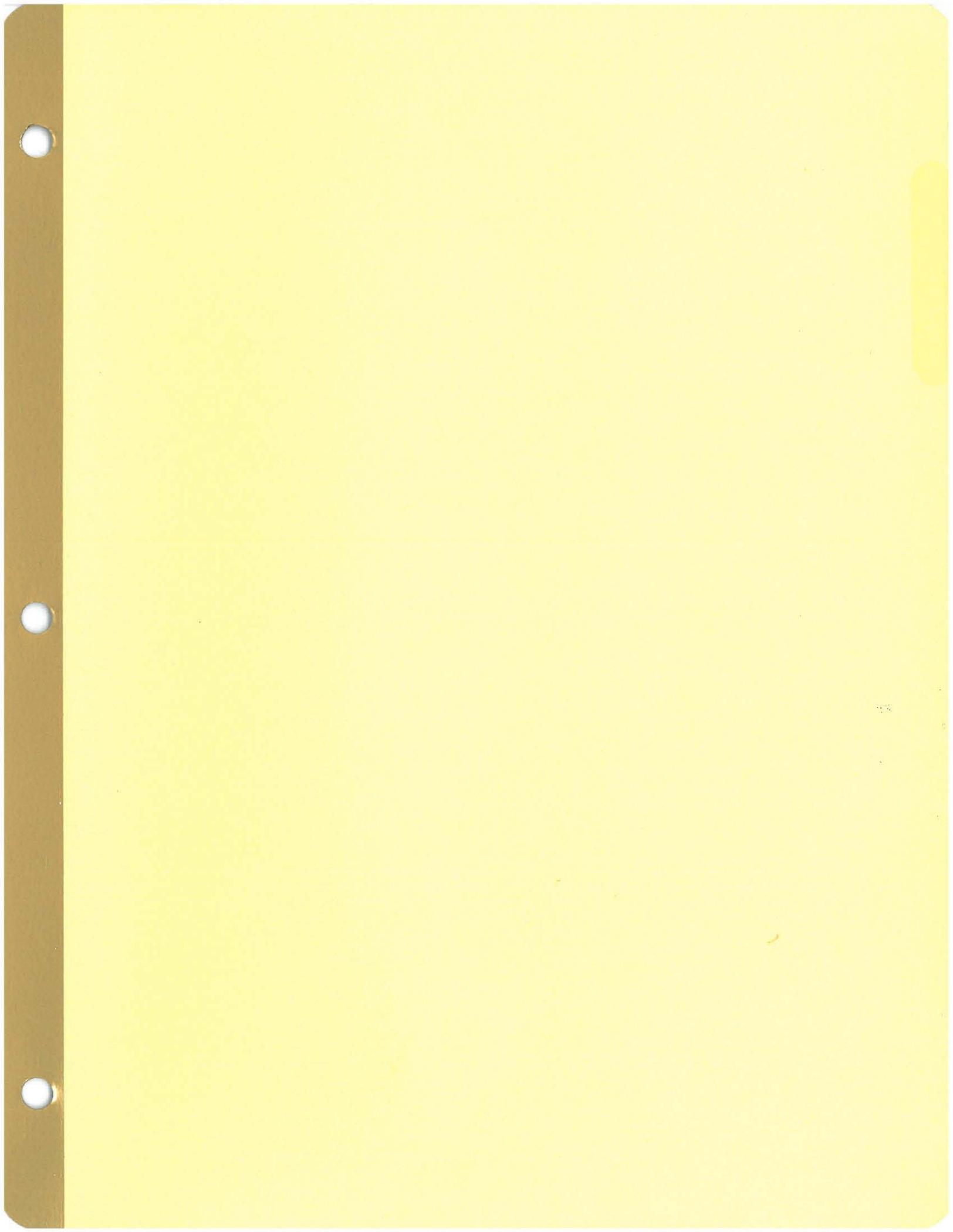


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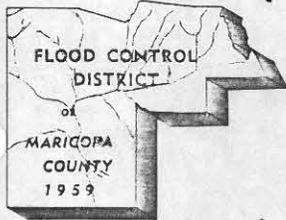
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**FLOOD CONTROL DISTRICT**  
of  
**Maricopa County**

3335 West Durango Street • Phoenix, Arizona 85009  
Telephone (602) 262-1501

D. E. Sagramoso, P.E., Chief Engineer and General Manager

**BOARD of DIRECTORS**

Tom Freestone, Chairman  
George L. Campbell  
Carole Carpenter  
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Ed Pastor

JAN 17 1986

Mr. John E. Orrahood  
President, Arizona Chapter, A.P.W.A.  
Maricopa County Highway Department  
Assistant County Engineer  
Traffic Engineering Division  
3325 West Durango Street  
Phoenix, Arizona 85009

Dear Mr. Orrahood:

It gives the Flood Control District of Maricopa County great pleasure to nominate M.M. Sundt Construction Company for the 1985 Contractor of the Year Award presented by the Arizona Chapter of the American Public Works Association. The Flood Control District wishes to recognize M.M. Sundt for its outstanding achievement in the construction of New River Dam under the auspices of the U.S. Army Corps of Engineers.

It is the belief of the Flood Control District of Maricopa County that M.M. Sundt exhibited outstanding performance in their construction management of the New River Dam project. For this achievement Sundt should, in our opinion, be awarded the Contractor of the Year Award for the Arizona Chapter of the American Public Works Association.

Enclosed is the formal nomination package for your consideration as President of the Arizona Chapter of APWA, and hopefully for the consideration of the National Selection Committee for this prestigious award.

Sincerely,

D. E. Sagramoso, P.E.

Copies to: Mr. Neil Erwin, Corps of Engineers  
Mr. R. C. Esterbrooks, Assistant County Manager/Dir. of Public Wks.  
and County Engineer

Enclosure

**COPY**

CONTRACTOR OF THE YEAR AWARD

Nomination Form  
(Please type or print)

1. Name of project New River Dam  
under \$2 million \_\_\_\_\_ more than \$2 million X

2. Name and address of the prime contractor M.M. Sundt Construction Co.  
4101 East Irvington, Tucson, Arizona 85726

3. Brief description of project: (photographs and architect's renderings may be submitted if desired but may not be returned) \_\_\_\_\_  
New River Dam: Zoned earthfill, 2,320' in length, 104' in height, potentially storing  
43,520 Ac.ft. of water for slow, safe release; also constructed were 2 dikes totalling  
6,056' in length.

4. Date project was substantially completed\* February 1985

5. Completion date contained in contract, including time extension granted September 1985

6. Construction management: scheduling and control techniques used Critical Path Method (CPM)

7. Safety performance: number of lost-time injuries per 1000 man-hours worked by prime and sub-contractor personnel \_\_\_\_\_  
Approximately 200,000 man hours without a lost time injury.

Overall safety program employed during construction A superior program was followed for prime and  
all subcontractors. Toolbox meetings for all workers each Monday; Foremen and  
Supervisors each Thursday, Contractor and COE each Wednesday.

8. Environmental consideration — summary of steps taken to protect the environment during construction Sundt established  
special management zones for soils and vegetation protection; designed to protect all  
cultural resources; special precautions established in vehicular yarding & maintenance;  
special efforts taken to blend dam into existing terrain; very special efforts to salvage  
usable native vegetation.

9. Community relations — summary of efforts by the contractor to protect public lives and property, minimize public inconvenience, and im-  
prove relations between contractor personnel and the public \_\_\_\_\_  
Guided tours were given at least once weekly; project was well signed and fenced;  
live-on watchman for public safety; stringent effort to control dust and particulate

10. Unusual accomplishments under adverse conditions including but not limited to adverse weather, soil, or other site conditions or con-  
straints over which the contractor had no control Sundt developed methods to safely and effectively work  
the west abutment, having a slope greater than 1:1, with heavy equipment. This required  
innovative use of winches and a deadman system for crawler tractors, drilling rigs, and  
\_\_\_\_\_ /men.

11. Additional considerations: construction quality Sundt made exceptional efforts to assist COE in  
quality control tests; daily quality control reports. During the course of the  
contract, Sundt submitted a Value Engineering Change Request, saving \$35,000.

Construction innovations These included the application of lasers for establishment of centerline  
references and elevations; also, Sundt developed the innovative methods listed under #11  
regarding the techniques employed in working the west abutment with heavy equipment and  
workmen.

\*Substantially completed means the client has beneficial occupancy, however, certain seasonal tasks such as seeding and sodding of  
mechanical testing of HVAC may not have been completed

Nominated by Flood Control District of Maricopa County Date 11/15/85

Name of public agency administering the contract U.S. Army Corps of Engineers/Flood Control District  
of Maricopa County

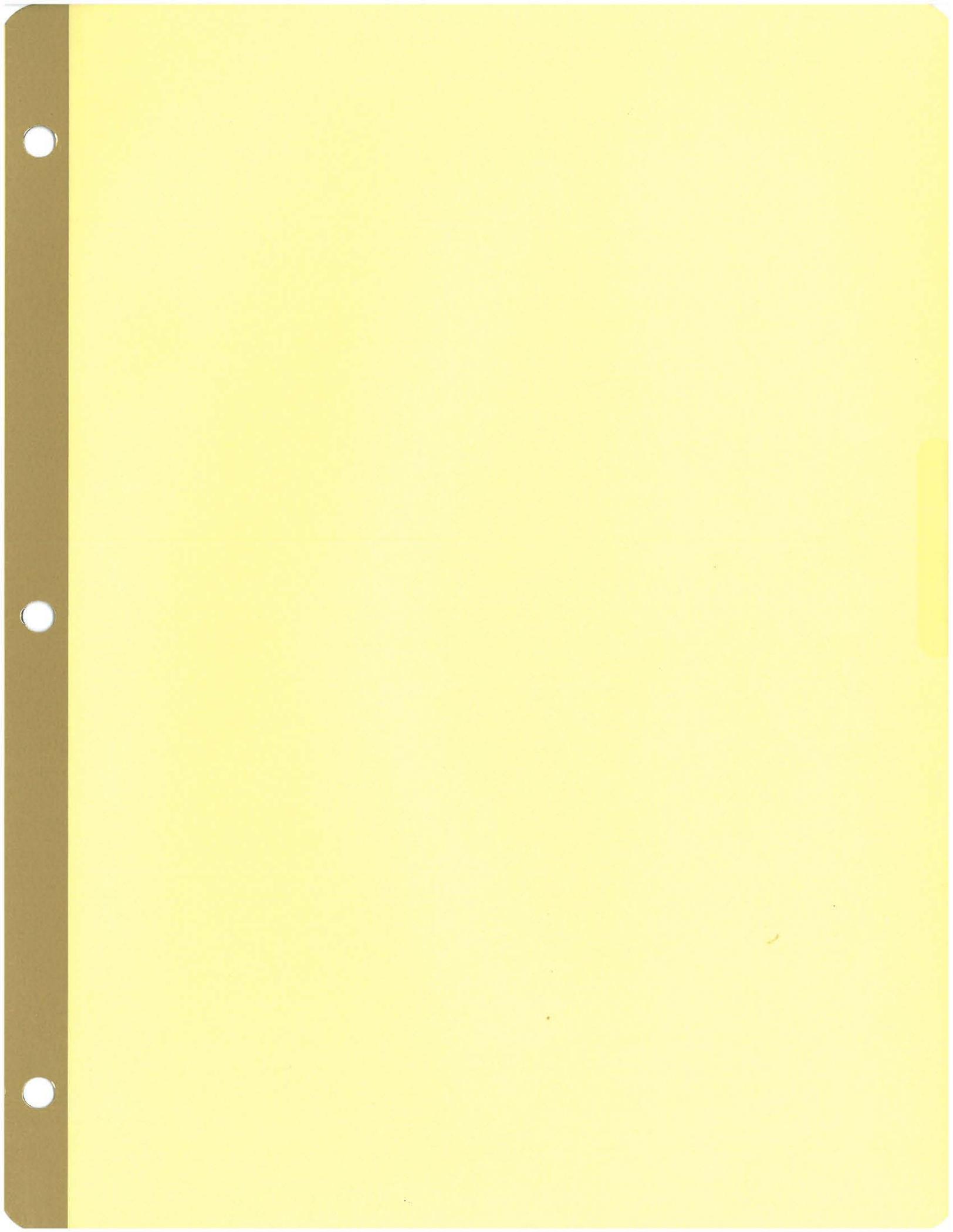
Signed D. E. Sagramoso Date 11-15-85  
D. E. Sagramoso, P.E. (Public Works Administrator)

Certification: I certify that this application was judged by the Arizona Chapter of the American  
Public Works Association for the calendar year 1985

Signed [Signature]  
Date 1-30-86

M.M. SUNDT CONSTRUCTION COMPANY  
A Synopsis of Accomplishments  
New River Dam Project  
Following APWA Selection Criteria

1. Sundt's bid price was substantially below the Engineer's estimate. The Contractor substantially completed the project 7 months early on a 24 month contract.
2. Sundt and its subcontractors worked more than 150,000 man-hours over 442 work days without a single lost time accident despite technically difficult and inherently dangerous activities. Sundt conducted 130 days of night operations safely and without incident.
3. Sundt provided tours for over 250 visiting individuals, provided a resident watchman to field specific public inquiries and provided interpretive signing at high traffic areas.
4. Sundt made special effort in salvaging existing native vegetation, restricted vehicular traffic and operations to specific areas, and made special efforts to harmonize the dam and dikes aesthetically with the surrounding Sonoran desert.
5. Sundt's accomplishments in this area include preparation of the 100 foot high, 1:1 slope of the west abutment utilizing a winching system and three crawler tractors, and construction of a series of diversion dikes to redirect flows away from on-going work areas.
6. Sundt utilized a laser system for establishing and maintaining grades, checking elevations, and for innovatively establishing a continuous centerline reference. Sundt provided several soils engineering technicians to work under government supervision in making systematic density determinations. Sundt also submitted a value engineering change that resulted in a \$35,000 savings to the government.



A NOMINATION  
OF  
M.M. SUNDT CONSTRUCTION COMPANY  
FOR THE  
AMERICAN PUBLIC WORKS ASSOCIATION  
CONTRACTOR OF THE YEAR AWARD

During the construction of New River Dam (See Figure 1) for its Designing Agency and Contract Administrator, the U.S. Army Corps of Engineers, M.M. Sundt met or exceeded all established selection criteria for nomination. The Flood Control District of Maricopa County feels that the performance of M.M. Sundt during its management of this important construction project is most worthy of recognition by its peers and by the public. A brief discussion of Sundt's accomplishments under each criterion, pursuant to Appendix E-9 of APWA's Rules and Regulations Governing the Contractor of the Year Award Nomination follows:

**1. "Use of good construction management techniques and completion of the project on schedule."**

M.M. Sundt's corporate motto is "Our People Make the Difference", and is exemplified by the concerted effort on the part of corporate management towards development of its frontline supervisory staff. For instance, during New River Dam's construction two extensive training sessions emphasizing leadership and communication skills were conducted for all Foremen and Supervisors. This positive corporate attitude towards personnel management sets the stage for significant accomplishments by Sundt's employees.

In terms of management strategies, Sundt's selection of a modified Critical Path Method (CPM) for maintenance of strict scheduling control resulted in completion of the project significantly ahead of schedule.

The project was substantially complete in February 1985, a full seven months early in the 24-month contract period ending in September 1985. This was, in effect, foretold when Sundt submitted an original bid price that was substantially lower than the Engineer's estimate. Their superlative efforts at planning were further exemplified by Sundt's submission of very few change orders, the total of which was less than 1/2 of 1% of the contract amount.

With regard to on-site management, the overall job was reviewed weekly with the Contract Administrator. A two-week bar chart was prepared for each review session, allowing clear assessment of accomplishments and areas requiring adjustment in emphasis. These sessions measurably assisted in the coordination of the contract and on innumerable occasions led to timely recognition of problems and resolution of potential conflicts.

Further, crews met each morning or evening prior to the start of each shift for a "shake-out" meeting where the day's (or night's) operations were discussed and planned. In this way potential problem areas, safety considerations within each work area, and potential conflicts were anticipated and resolved before work started. This forward-looking approach streamlined the shift's activities and increased the efficiency of man and machine.

Another example of successful management is evidenced by the successful nighttime operations employed during this project. Although not greatly different from practices utilized during daytime hours, there were exceptions with regard to safety considerations. These will be discussed under criterion #2.

Additionally, exceptional efforts on the part of M.M. Sundt in terms of innovative uses of lasers, and creative techniques utilized in working the west abutment of the structure, will be addressed specifically under nomination criterion #6. These, however, very positively affected the swift completion of the project and resulted in significant savings in time and money.

2. "Safety performance as indicated by the number of lost time injuries per 1000 man hours worked by contractor personnel (includes both prime and subcontractor personnel), and a demonstrated awareness of the need for a good overall safety program during construction."

M.M. Sundt's safety performance during construction of New River Dam speaks clearly for itself. More than 150,000 man-hours were worked during the life of the project without a single lost time accident occurring to Sundt or any of its subcontractors. In this effort toolbox safety meetings were conducted each Monday for all workers. Each Wednesday Sundt met with the Contract Administrator to review the existing safety program, to develop new specific plans related to upcoming phases of the project, and to discuss any changes that might be required to meet existing or changing conditions. Each Thursday all Foremen and Supervisors met to discuss the operational safety plan.

Extraordinary safety accomplishments were realized during the dangerous mechanical working of the west abutment (See Plates 1 & 2). In this case a trio of crawler tractors, a D-8, a D-9, and a Case 1150, were developed into an operating system for slope cleaning. The 1150 was tethered through the D-8 to the D-9 by means of a winching system. The tractors were thus able to work across the entire width of the 1:1 slope more than 100 feet in height in efficiently preparing the interface. Also, pressure grouting operations required that a rock drilling rig with a failsafe 2-cable system be used on this same slope. In a final phase of the operation, men worked the 1:1 slope suspended from safety lines in a parallel pattern to maximize safety while scaling out loose rock prior to dental grouting operations.

Safety requirements for night operations were met with a specific safety orientation for all night crews. Also, an extensive system of light plants was established, high visibility white clothing was provided for all ground personnel, and a network of highly reflective markers was emplaced to delineate all haul roads so they could be safely negotiated in the dark (See Cover).

3. **"Community relations as evidenced by the contractor's efforts to minimize public inconvenience due to construction, safety precautions to protect public lives and property, provision of observation areas, guided tours, or other means of improving relations between the contractor and the public."**

New River Dam's location, approximately 18 miles northwest of Phoenix, is decidedly rural. Nonetheless, M.M. Sundt provided guided tours weekly. Approximately 250 individuals visited the construction site over the length of the project. Sundt also provided a resident watchman for security and to respond to specific public inquiries. All access roads were fenced and well-signed. Project information signs were placed at strategic locations having high vehicular use. In coordination with the Flood Control District and the Army Corps of Engineers several project-wide tours were provided by M.M. Sundt to familiarize the public, visiting dignitaries, and staff of the various cooperating agencies with the ongoing project. Visitors were able to oversee various construction activities from an observation area set up for these occasions.

4. **"Demonstrated awareness for the need to protect the environment during construction."**

From start to finish M.M. Sundt demonstrated a clear concern for protection of the environment from unnecessary impact as well as their dedication to minimizing the visual and aesthetic impact during and after construction.

In this effort special management zones were established to restrict vehicular traffic and protect native desert vegetation, cultural and archaeological resources, and unique riparian habitat. Drainage through the natural stream course of New River was maintained while large runoff volumes were handled in such a way as to divert flows away from the borrow pit and construction areas. Temporary haul roads were built during construction and after use were ripped and reseeded with native shrubs and grasses. Special precautions were taken to insure that no environmental insult occurred due to spillage of oil, fuel, and/or chemical contaminants. Administrative facilities, parking areas, and crew areas were clearly designated to minimize trash and maintain an appropriately neat appearance.

Also important was Sundt's effort to salvage all cacti possible. These were selected to be replaced on the downstream face of the main structure and the west face of Dike #1. Other native plants were acquired to blend the structure as much as possible into the existing vegetative community (See Plate 5). The downstream face of the main dam was surface treated with a layer of decomposed granite and landscape stone material excavated from the spillway and west abutment. The stone was treated with a compound designed to artificially accelerate the weathering process to simulate the appearance of desert varnish. Finally, exposed concrete areas, particularly the outlet works, on the downstream side were stained a desert beige color to harmonize with the surrounding terrain.

5. **"Unusual accomplishments under adverse conditions including, but not limited to, adverse weather, soil, or other site conditions over which the contractor had no control."**

Some of Sundt's accomplishments in this area have already been discussed under Criterion #2, in particular the difficulty of working the west abutment with heavy equipment. However, other difficulties existed in terms of the control of water during the three phases of construction.

Phase I included the construction of a ring dike to divert any potential water away from activities on the west abutment. This included the excavation of the foundation trench.

Phase II moved construction activity to the natural channel of New River and diverted any potential flows to the west abutment where the foundation trench constructed during Phase I was covered with an impervious layer of material (See Plate 3).

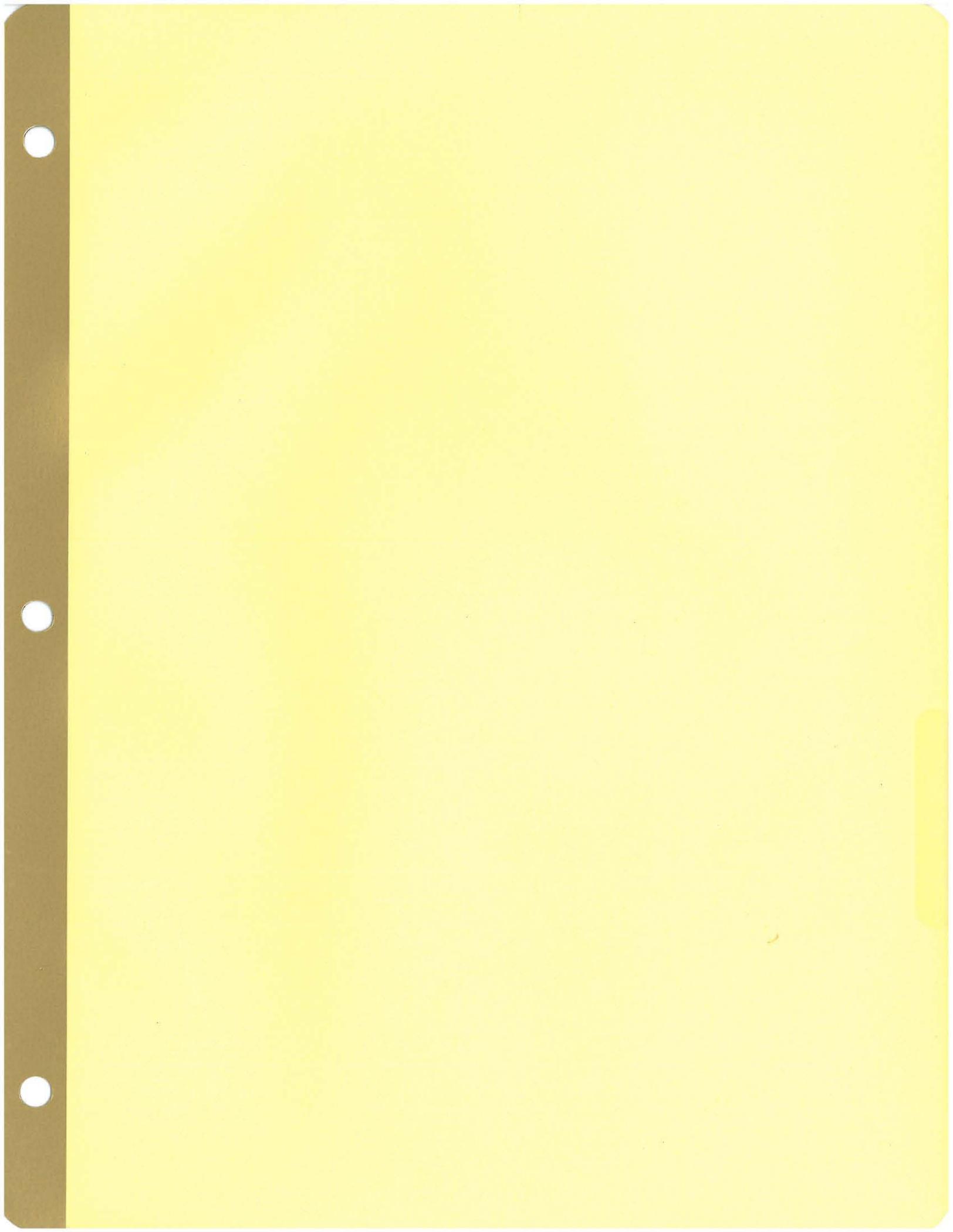
Phase III consisted of closure of the dam (See Plate 4). This had to be accomplished during a dry time of year. Fortunately, streamflows occurring during the scheduled completion phase were accommodated by a corrugated metal pipe which directed flows to the outlet works. In this way construction continued from the rear of the borrow pit and accessed the structure over the outlet channel.

6. "Additional considerations deemed of importance to the public works agency; such as exceptional efforts of the contractor to maintain quality control and, if value engineering is used, construction innovations as evidenced by time and/or money-saving construction techniques developed and/or successfully utilized."

Under this criterion M.M. Sundt illustrated considerable originality. In particular, an innovative application for lasers in the establishment of centerline references and elevations was employed. In this technique, a single vertical sweeping beam laser was utilized for both day and night operations to maintain centerline references and elevations. This resulted in considerable savings in time and manpower.

Sundt assisted the Contract Administrator in its quality assurance role by providing several soils engineering technicians to work under government supervision in the making of systematic density determinations. Also, Sundt performed daily quality control inspections, tests, and documentation on concrete materials, form tolerances, lift thicknesses, gradation, moisture content, and compaction.

Additionally, during the course of the project Sundt submitted a value engineering change request resulting in a savings to the Contract Administrator of \$35,000.



2 1/2 25% COTTON FIBER

FIGURE & PLATES

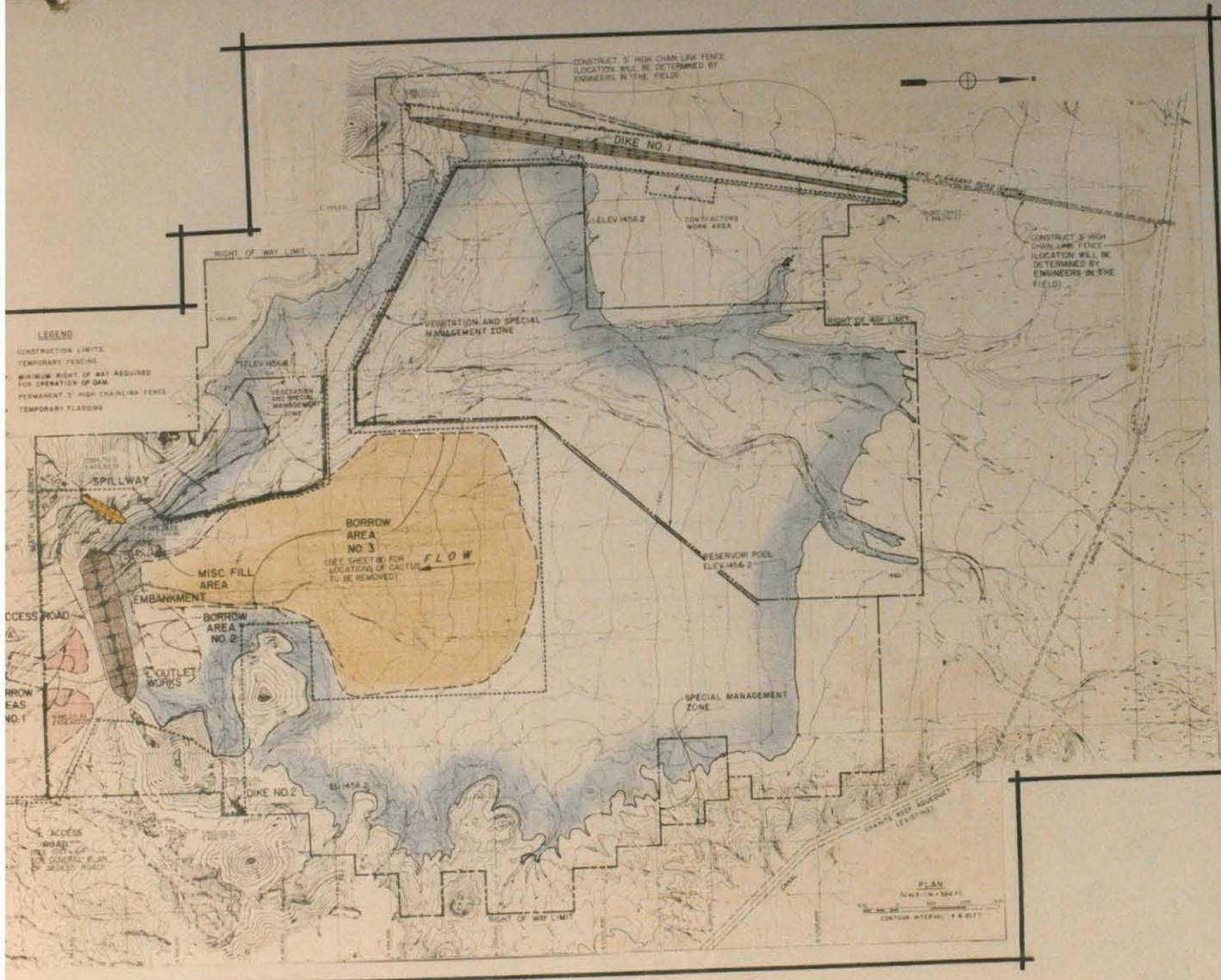
Almond Bond

FIGURE 1:  
GENERAL SITE PLAN

*Wenatchee River  
25% COTTON FIBER*

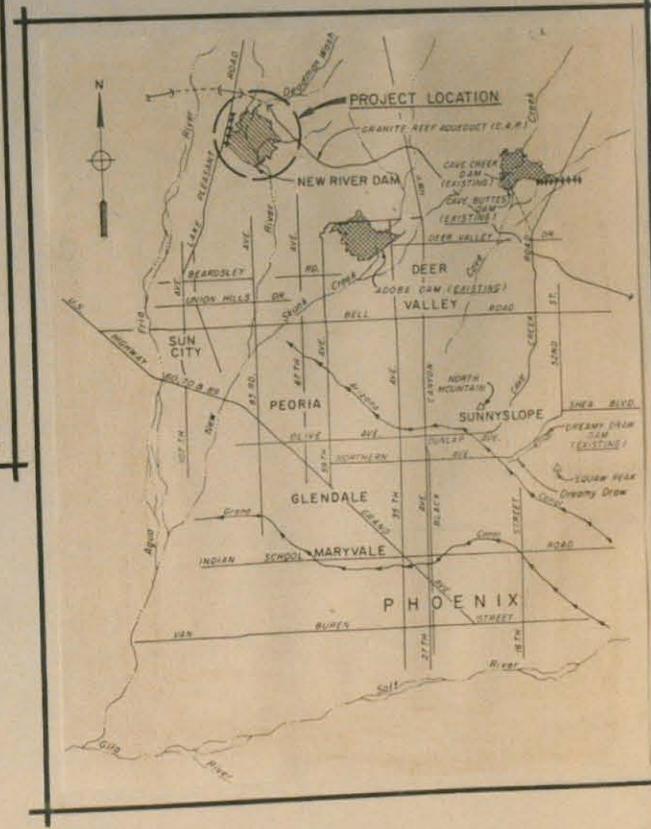
U.S. ARMY ENGINEER DISTRICT

LOS ANGELES



**NEW RIVER  
DAM**

**GENERAL SITE PLAN**



**FIGURE 1**

PLATE 1:

INITIAL STAGE OF WEST ABUTMENT SLOPE  
PREPARATION. NOTE STEEPNESS OF SLOPE AND  
WINCHING SYSTEM IN USE.

*Weanah Bind*  
15% COTTON FIBER



**PLATE 1**

PLATE 2:

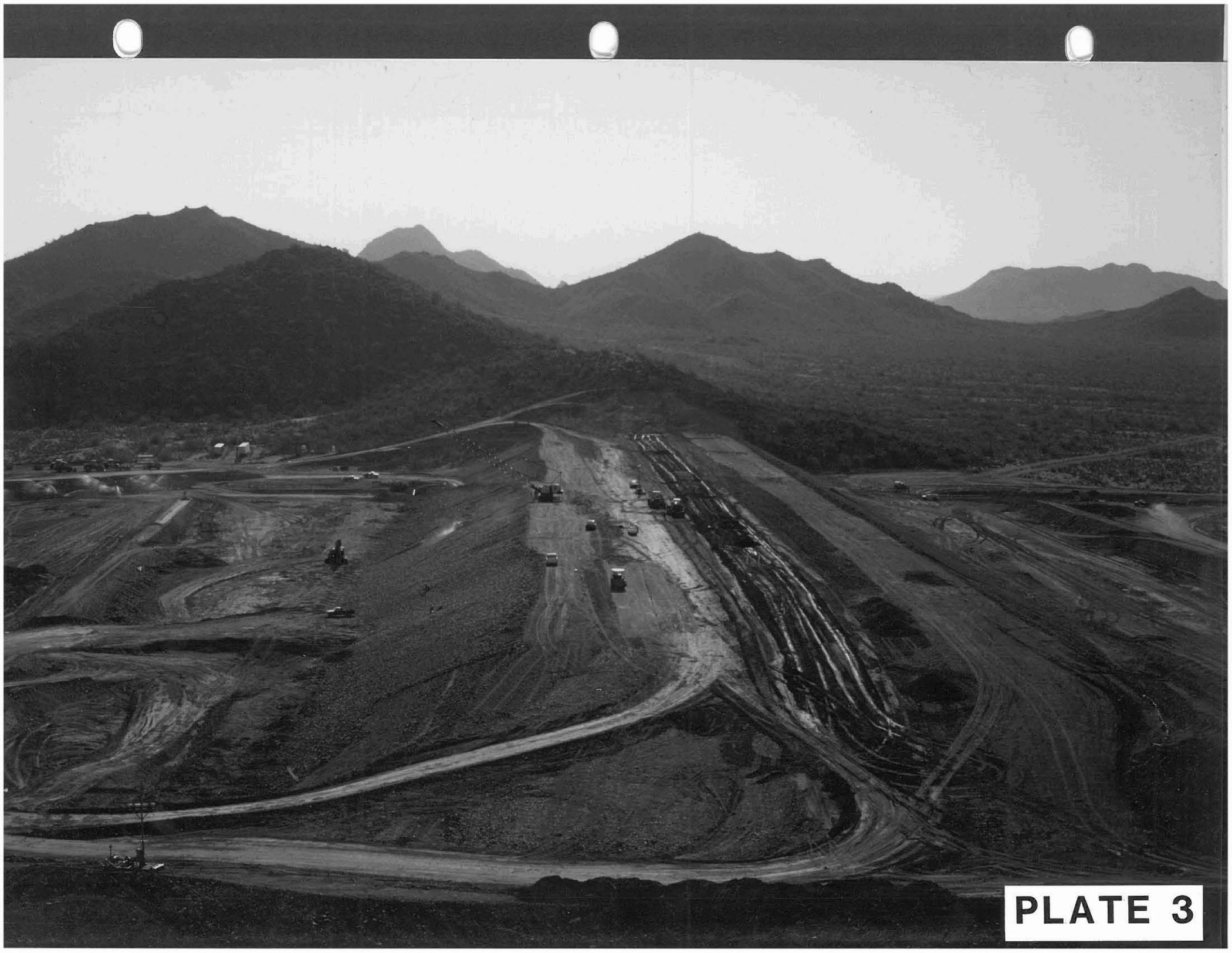
INTERMEDIATE STAGE OF WEST ABUTMENT  
SLOPE PREPARATION. MEN WORKING IN A  
PARALLEL PATTERN FOR SAFETY WHILE  
SCALING OUT LOOSE MATERIAL.



**PLATE 2**

PLATE 3:

PHOTO FROM WEST ABUTMENT FACING EAST.  
SHOWS THE DAM APPROXIMATELY ONE-HALF  
WAY THROUGH PHASE II. CLOSURE HAS NOT  
COMMENCED. LANDSCAPING ROCK IS BEING  
APPLIED. CORE AND TRANSITION MATERIAL  
EXPOSED.



**PLATE 3**

PLATE 4:

AERIAL FACING NORTH SHOWING CONTINUING  
PROGRESS TOWARDS CLOSURE, THE NEARLY  
COMPLETED OUTLET WORKS, HAUL ROAD  
NETWORK, BORROW AREA, AND PATTERNED  
LANDSCAPING ROCK.



PLATE 4

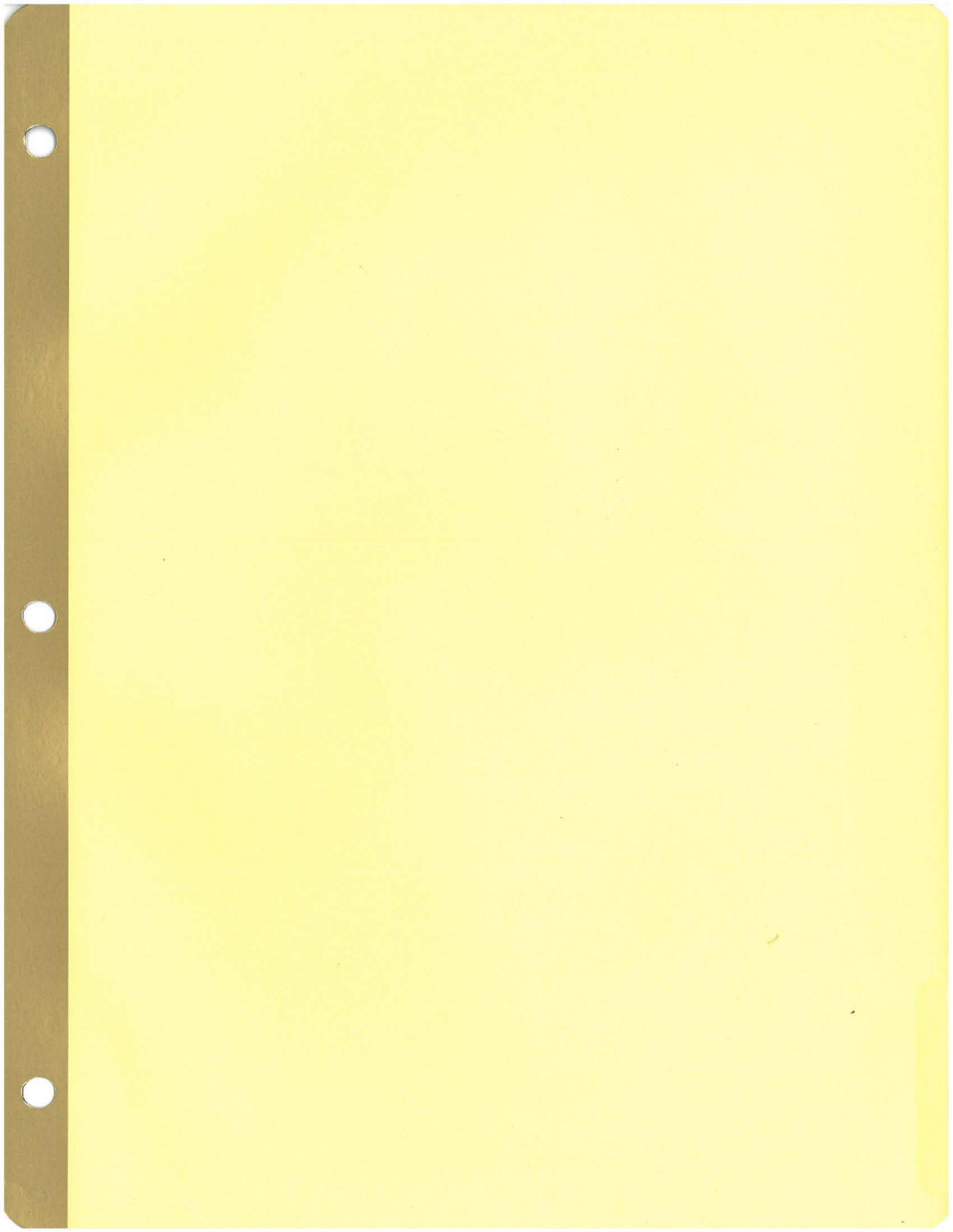
PLATE 5:

PHOTO TAKEN ON THE DOWNSTREAM SIDE OF  
THE DAM SHOWING COMPLETED LANDSCAPING.

*Washburn Bond*  
*2 1/2% COTTON FIBER*



**PLATE 5**



## Finding the centerline

*To save time and expense in building New River Dam, Sundt is putting a laser to a somewhat different use — establishing limits for the three types of fill material.*

**By Don Gehring**

M.M. Sundt Construction Co. anticipates January '85 completion of its \$11 million contract for New River Dam.

Credit for early wrap-up goes principally to 3 factors: lasers for establishing both centerline and elevation, carefully planned and maintained patterns of one-way haul roads and mostly dry, open weather.

And while gaining the bottom-line benefits of early turnaround, Sundt racked up an impressive 442 days of work without a lost-time accident — indicative of close attention to safe working procedures.

Use of the laser for establishing elevations on big earth-moving projects is relatively routine. Its use for centerline reference, however, is less common. The Sundt organization is thought to have pioneered the concept in Arizona about three years ago on Adobe Dam, another flood control project similar to New River and also northwest of Phoenix.

The technique is simple. For establishing and maintaining grade, whether constructing a dam or tilling a cotton field, for that matter, a revolving mirror reflects the highly concentrated beam of light into a circular plane, horizontal to the ground. The plane of light typically is detectable by eye or instrument as much as 1,000 feet away.

For centerline checking, however, the revolving mirror is turned 90 degrees. Now, the laser emits its plane of light at right angles to the ground, laying a pink centerline (clearly visible on the ground at night) and projecting into the sky a big, flat dish of light.

Set up upon either abutment of New River Dam, or, in the latter "final closure" phases of the job, upon the high ground of the previously built-up bulk of the earthen structure, the laser confirmed the dam's centerline without need of survey crew or stakes. The grade checker (and dumpman), having constant, visual reference to the plane of light, can readily direct the haulers in dumping their loads to the widths prescribed for each of three types of borrow at each foot of elevation.

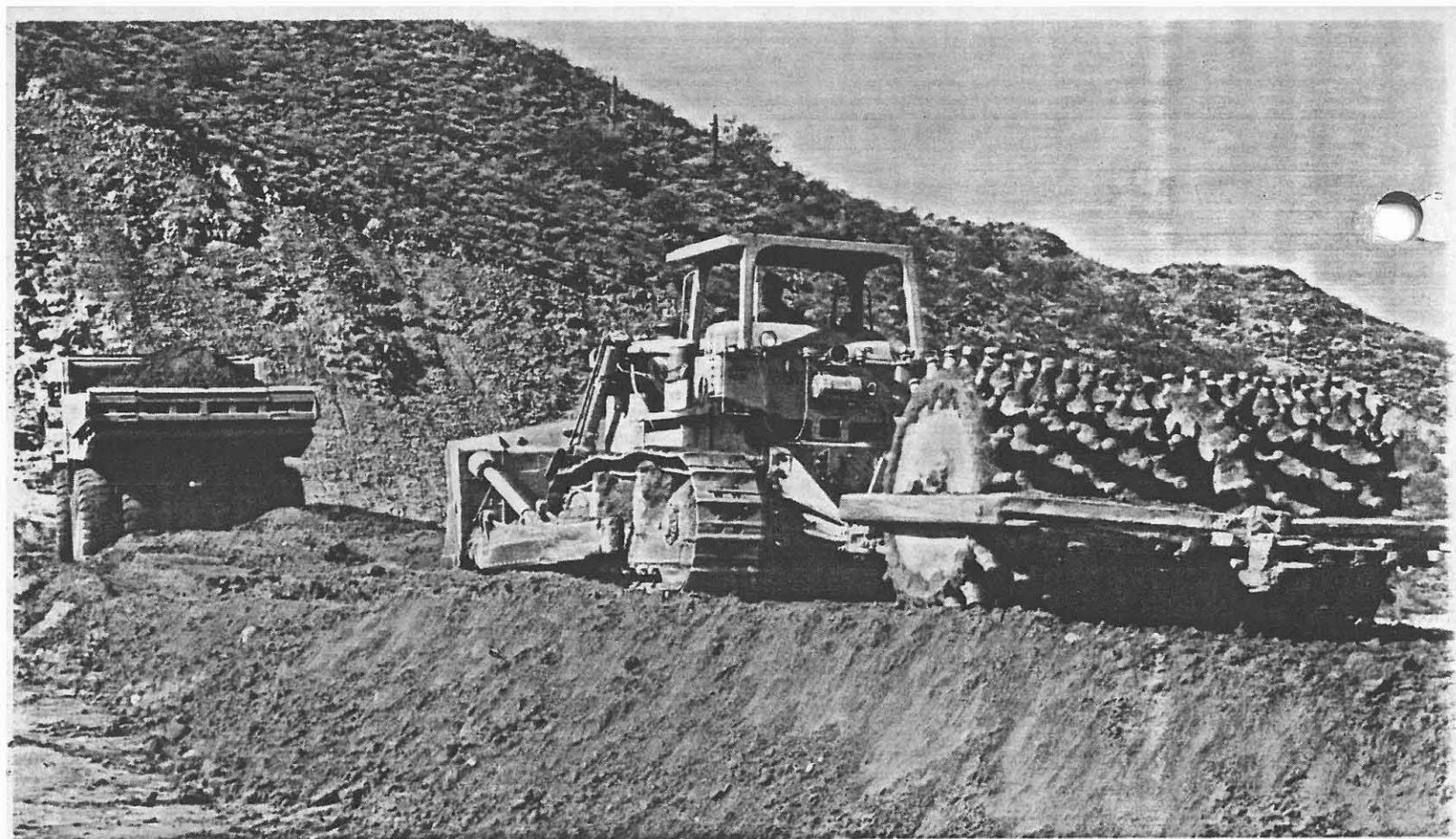
More conventionally, Sundt also on occasion used a second laser for checking elevation. In addition to the increased productivity and added safety of the lasers, both for centerline and elevation, the company realized cost savings. This was through elimination of the need for a three-man survey crew, at a typical cost of \$60 an hour. The Tucson contractor demonstrated flexibility in management and unwillingness to be locked into "technology" for its sake alone. On portions of

the job, particularly at final closure of a relatively short length of dam at its western end, the more usual centerline stakes and pennants were set out for the grade checker. This worked fine during the day shift, but the laser was better for the night shift.

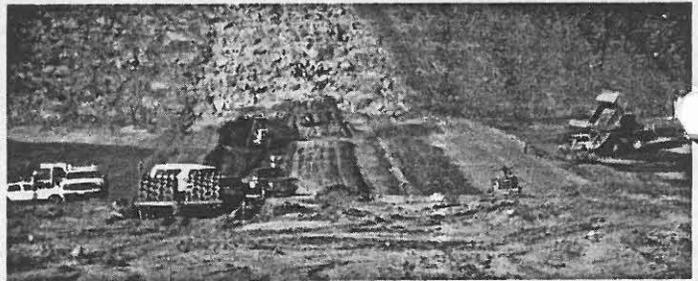
Sundt's one-way haul road patterns are not unusual or different from any other major earth-moving job (or mine, for that matter), but they obviously have contributed to a faster moving and safer job. Basically, they provided an upgrade access ramp to that part of the dam area being built up, with a downgrade ramp at the far end of the embankment. Wide, one-way roadways leading to and from these ramps and



*Some of the final core material for the New River Dam is being put into place. This shot, taken from the western abutment, roughly corresponds to the cover photo. The D-9 Cat in the left foreground is pulling a sheepfoot roller for compaction.*



*Above, a Cat D-9 tows a sheepfoot roller, compacting core material dumped by Terex 3309 beyond it. In the background is prepared area of western abutment, with which dam material will make a positive bond. At right is the final closure operation. Terex 3309 haulers come from one of three borrow pits in the basin to the north (right) of the growing structure and dump their loads.*



across the bottom of the reservoir area upstream of the dam looped back to the borrow areas, also in low, bottom ground. These generous one-way loops have permitted the Terex 3309 haulers to operate safely at top speeds.

The good weather, with an absence of upstream rains, which will have helped Sundt bring the job in ahead of time, has had a slight negative aspect, too. It demanded a higher level of maintenance on the haul roads, in terms of continual sprinkling to control the dust. This, of course, was both a safety measure and a response to Corps of Engineers' environmental requirements.

Up to five Terex 3390s were used to move the borrow from pits to dam. Two Cat D-9s and two Cat 14-G motor graders were on site to keep up with the haulers' output and to work and spread the materials on the steadily rising embankment. The number of haulers in use at any time was adjusted to keep up with the output of the loaders and to match the distance of the haul from pit to dam for the particular one of the three types of borrow being mined.

These types of borrow were designated "pervious shell" (the outside embankments); "transition" and "core." (See typical cross-section.) The pervious shell was essentially coarse-grained, silty, sandy gravels, with less than 10% passing No. 200 sieve. When placed and compacted, it formed a non-shrinking, dense outer shell for both upstream and downstream embankments.

The transition zones (between the shell and the core) was

the finer portions of the shell material, passing four inches. The core material came from blending soils from all three borrow areas designated in the detention basin (to be formed), but with a sufficient quantity of fines, at least 20 percent passing No. 200 sieve, providing a relatively impervious core.

To meet the requirements for these materials, specified by the Corps, Sundt set up procedures for selective mining of the three borrow pits in the detention basin area.

Distinct from the embankment materials, three other types of stone, varying in gradation requirements, were produced and used for both upstream and downstream slope protection. For example, one was designated Type 3, a minus-6-inch stone.

This was used for downstream protection of the main dam structure itself, placed as sort of plating on top of the pervious shell material.

Another was the rock blasted to form the spillway in the mountain forming the west abutment of the dam. This was at first set aside and then, as the dam rose, was used to dress the downstream slope for cosmetic purposes. Areas of stone dressing alternate with open soil, into which saguaros eventually will be transplanted. The western slope of Dike #1, along Lake Pleasant Road, was similarly dressed.

Finally, the areas of cosmetic rock will be treated with a product called "desert varnish." This will cause the rock to "weather" to a more natural appearance. In concert with the areas of soil with their saguaros, the overall effect will be to

- **ADVANCED TECHNOLOGY**
- **RELIABILITY**
- **PRODUCTIVITY**
- **PROFITABILITY**



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*Corps of Engineers technicians check compaction of core materials on New River Dam project. The Corps is project manager for the owner, the Flood Control District of Maricopa County.*

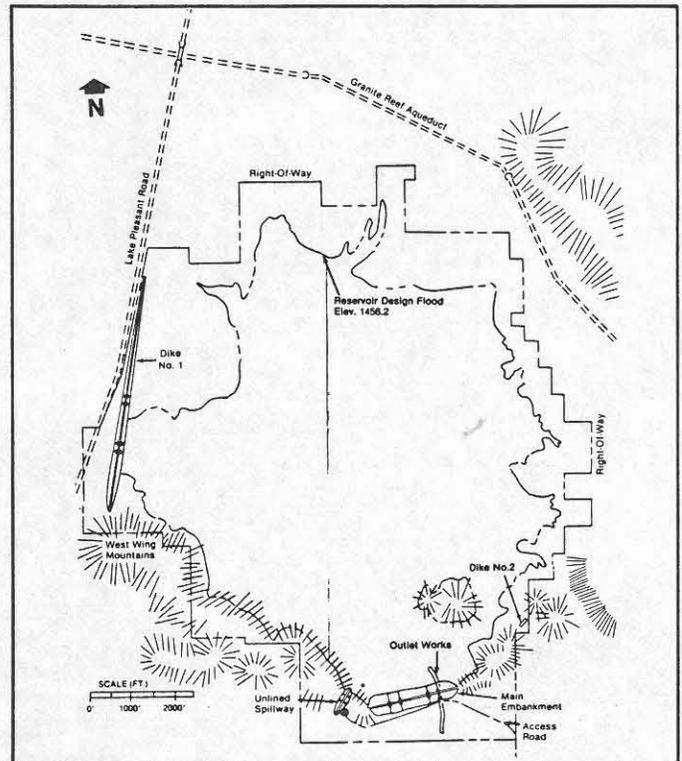
meld the dam (and the dike) inconspicuously into the surrounding desert habitat.

The weather, or rather, the weather record, has had much to do with the construction phases of the dam and with Sundt's anticipated early completion. Historically, the New River has had its minimum flows between Oct. 15 and Nov. 15 in the fall and between April 15 and June 30 in the spring. Thus, the bulk of the main dam structure itself had to be built with those periods in mind.

Further, final closure had to be fitted into one of those two "windows," that is, during a time when the gap in the structure could safely be closed without the threat of flood waters washing out any of the previously placed dam structure.

If Sundt had not put into place the 1,683,000 cubic yards of material required for the bulk of the structure by Oct. 15, they would have had to wait until April 15 of 1985 to close the gap.

Lacking only five feet of the summit for all but the 800-foot-long gap on the west, Sundt expects to complete the 2,320-foot-long structure by yearend, well within the fall "window," which has been extended several weeks due to the dry weather.



*Diagram of New River Dam area.*

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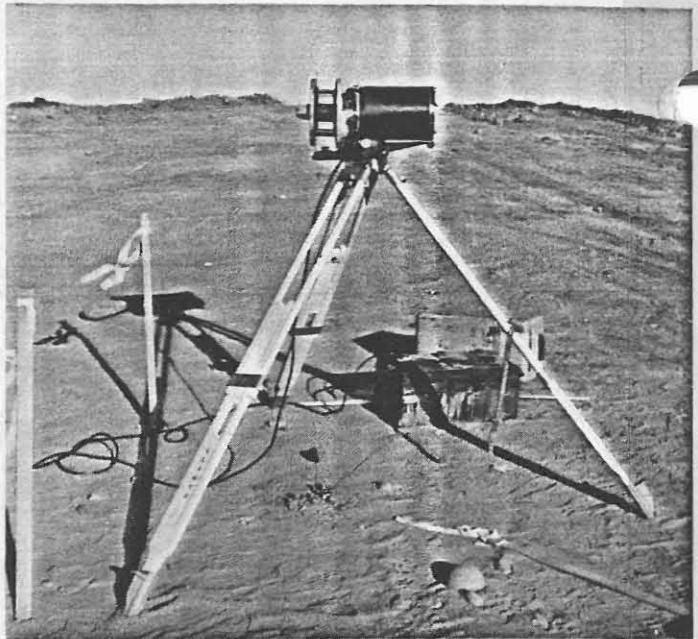
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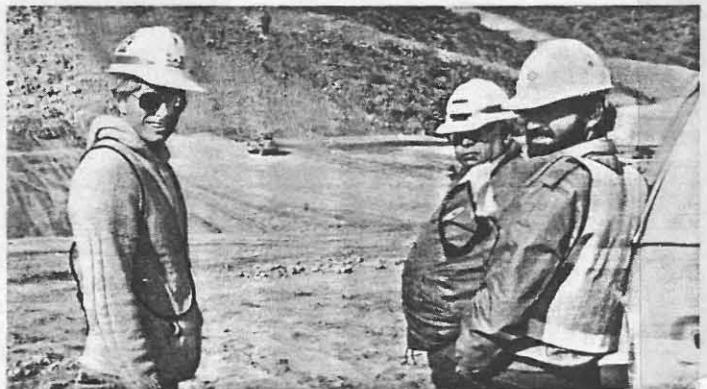


*This Laserlevel, Model 945, set up on the east side of final closure gap at the dam project, emits highly concentrated beam in a vertical plane, delineating centerline for grade checker.*

In addition to the dam (which is eight miles upstream from the confluence of the New River and the Skunk, just south of Greenway Road) Sundt's contract included a 7,464-foot-long dike along Lake Pleasant Road, as well as a spillway around the dam, an access road, and an outlet channel through the main embankment. The outlet channel was completed early in 1984, with the dike and spillway substantially completed by June.

Taken together, the dike and dam will form a detention basin with a gross capacity of 43,520 acre-feet of water, allowing room for accumulation of sediment over 100 years and a net flood control capacity of 38,600 acre-feet.

Because the intent of the basin is flood control and not storage, the net effect, via the spillway and outlet channel, will be to slow the water enough so that it can be returned to the New River channel for normal outfall, without threat to homes downstream in Peoria, Glendale and Sun City. □



*Working at New River Dam project are, from left, Robby Crist, Corps of Engineers inspector; Joe Salinaz, the Corps' assistant project engineer; and Hedy Bagher-Pour, Sundt quality control engineer.*