

EQUATE**ENVIRONMENTAL CLEARANCE PROCESS
QUALITY AND PRODUCTIVITY INITIATIVE
TEAM FINAL REPORT**

This is a study of the Environmental Clearance Process (ECP) as performed at the Arizona Department of Transportation. The study documents the existing ECP using the Environmental Assessment (EA) as the base document for investigation. Five distinct broad phases of development were identified as needed to complete an approved final EA. In addition, special issues of concern to Governmental Agencies and private groups leading to specific mitigation measures on highway projects were also examined. These special issues of concern were called Special Studies. Six of these were identified for closer study because they were believed to cause the greatest degrees of concern to project development.

While examining the ECP the problems causing project delays were uncovered and addressed. Recommendations are included in the report providing ideas for improving the current process to help scheduled project development be completed in a more consistent manner.

**ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DEVELOPMENT GROUP**

MARCH 1993

EQUATE
ENVIRONMENTAL CLEARANCE PROCESS
QUALITY PRODUCTIVITY INITIATIVE
TEAM FINAL REPORT

Selected Excerpts:

- **Executive Summary**
- **Problems addressed in recommendations**
- **Summary of costs and benefits**
- **Implementation plan**
- **Follow-up measurements**

EXECUTIVE SUMMARY

MISSION STATEMENT

The Environmental Clearance Process (ECP) is neither well-defined nor widely understood within ADOT. We the Environmental Quality Team (EQuaTe), accept the charge to investigate and develop strategies to increase awareness of the ECP and improve ADOT's effectiveness in implementing the Highway Development Process and Construction Program.

PROBLEM STATEMENT

Highway construction projects frequently experience delays in their bid advertisement dates due to the lack of approved special environmental studies or required permits not being completed or obtained within the time frame allotted in the project design development schedule. Furthermore, the ECP and its decision making process are not always clearly defined within ADOT. Individuals responsible for doing the work are not always well equipped to do quality work.

SIGNIFICANT EVENTS

In late May 1992 the Highway Development Group Quality and Productivity Initiative (QPI) assigned the first three ADOT processes to be analyzed by Total Quality Management (TQM) teams. Environmental Clearance was one of those processes selected. The team leader, John Carr, was chosen and authorized to form a team based on a list which provided Services and Agencies from which to obtain members. Joe Spadafino was assigned to serve as facilitator for the team.

By mid-June the team members were approved and met for four days to develop the problem statement, potential issues to be addressed, the Mission Statement, goals to be accomplished, and a high-level flowchart.

Team Building, Problem Solving, and Business Process Improvement (BPI) training were given to the team members in late June 1992. In July the Ernst and Young Consultant, Dave Farrell, was assigned to train and guide the team to complete a BPI on the ADOT ECP. He has met with us almost every week.

Our next task was to identify customers of the process and interview them to determine their needs, the degree of importance of those needs, and their level of satisfaction in having those needs met. From this data a priority list of needs was developed, and a variety of measurements determined to examine the existing process. At the same time the ADOT Environmental Planning Services (EPS) staff assisted the team in flowcharting the existing process from the viewpoint of

producing an Environmental Assessment (EA) following federal funding requirements. In addition, the high-level block diagram was refined, a shortened version of the clearance process was created to show the Categorical Exclusion (CE) process, and six environmental special study processes were studied and flowcharted. These special studies were selected as representing the most likely issues to affect project development out of more than thirty issues the EPS staff checks on all projects. The special studies chosen were Hazardous Materials, Cultural Resources, U.S. Army Corps of Engineers 404 Permitting combined with Arizona Department of Environmental Quality Water Quality 401 Permitting, Noise Analysis, and Air Quality. The EPS staff assisted in flowcharting these special studies as well.

In evaluating the nature of the existing process two limitations became quite clear. First, most elements in the process were imposed by federal or state regulations. Consequently, attempts to combine, delete, or reduce major parts of the process were prevented by legal restraints. Thus, unless the laws can be changed or reinterpreted, those legally required parts of the process cannot be altered. Also, while attempting to gather measurement data the retrieval efforts were frustrated by finding incomplete, inconsistent, or nonexistent data. Many sources of data collection were attempted. Few gave any useful data for measuring the existing ECP. Consequently, one of our recommendations addresses improving process documentation.

Measurement data was based originally on ninety-nine projects, selected as our sample out of one hundred and fifty projects, which were bid in the State Fiscal Year 1991-1992. Among these projects eighteen were environmentally cleared by way of an EA. The remainder were cleared as CEs with ten of them requiring special studies. After our first Final Report presentation we decided it was necessary to examine some of the data for the remaining 51 projects advertised for bid in FY 91-92. All of these projects were cleared as CEs. Out of this collection of data a number of charts and graphs were developed to help visually depict what is taking place to environmentally clear a project. Also, during our evaluation it became apparent that the part of our problem statement which indicated that project bid advertisement dates are frequently delayed for environmental reasons was not altogether verified by our sample of projects. Our data indicated that only 12% of our 99 sample projects were actually delayed for environmental issues. When we looked at all 150 projects bid in FY 91-92 we still found only 13% to be delayed for environmental concerns.

The next phase of our study took us out to interview representative groups of people who actually perform the process. The interviewees were asked questions regarding the accuracy of the existing flowchart, what problems they experienced, where rework occurred, what they would recommend to improve the process, and related questions. The results of the responses were assembled, categorized, combined, simplified, prioritized, and incorporated into the flowcharts.

From among all the responses we received from the customers, the process interviewees, the EPS staff, and the EQuaTe team members, we then selected the final recommendations. All recommendations were cross-checked with the needs of the customers, and the high priority concerns expressed throughout our study, to assure all major items were addressed. Eleven formal recommendations were written which included a discussion of the issues which promoted the need for each recommendation, an action plan and schedule for implementing the recommendation, a list of qualitative and/or quantitative benefits if the recommendation is implemented, estimated cost to implement the recommendations, and a list of other alternatives which may be considered in addition to the recommended alternative. Detailed follow-up measurements are given to improve our method of measuring the ECP and pinpointing areas needing improvement in the future.

Finally, a formal presentation was prepared to communicate the results of our study to the EPS staff, to managers of Sections and Services involved in the process, and to SLIM representatives.

Once approved for implementation each person identified as a member of a particular recommendation's implementation team will be given a copy of the recommendation and a cover letter explaining their involvement. An EQuaTe team member is assigned to each implementation team to provide input as to the intent of the recommendation and to assure the recommendation is implemented in a timely fashion.

RECOMMENDATIONS

EQuaTe has eleven recommendations to make in hopes of improving the ECP at ADOT. The four starred (*) recommendations were clearly rated the most important by all the participants in this study.

MANAGEMENT AND MEASUREMENT OF THE ENVIRONMENTAL CLEARANCE PROCESS

- * Develop a Project Log to remain with the project file on which the dates of significant events occur that directly effect the ECP.

- * Establish a cost management system using Activity Based Costing to determine the actual cost and cycle time for performing environmental activities and to provide a more thorough approach to tracking Cost of Quality.
- Determine the number of staff members needed to do quality environmental work in ADOT.

QUALITY OF THE ENVIRONMENTAL CLEARANCE PROCESS

- Conduct a historical review at the completion of construction projects which have significant environmental impacts, to evaluate how effectively environmental expectations were met.
- Conduct an environmental process review for each project, upon the completion of the environmental clearance letter, to encourage recommending methods that will improve the environmental documentation process.
- Prepare Consultant Selection Guidelines to help Environmental Planning Services secure the services of the most qualified firms to perform environmental studies for ADOT.

ENVIRONMENTAL CLEARANCE PROCESS IMPROVEMENT RECOMMENDATIONS

- * Conduct project scoping earlier in project development. Match the proposed Priority Programming Process (PPP) by assisting project prioritization and by completing pre-engineering by Interdisciplinary Design Teams (IDT) before projects are included in the Five Year Highway Construction Program (FYHCP). During this scoping include more emphasis on identifying environmental issues by EPS staff and Environmental Scoping Teams (EST).
- * Use a formal partnering process with each key Agency using a generic relationship focus, rather than project specific to lay the ground work for dealing consistently and predictably with project specific issues.
- The ECP should be described to all involved ADOT parties, including Highway Development, Construction and Maintenance personnel to insure that all environmental issues are easily recognized, documented, and mitigated in an efficient and professional manner.

- Allow for consideration of all prudent design alternatives, while addressing environmental mitigation measures, by permitting an acceptable degree of design criteria flexibility agreeable to ADOT and the affected Agencies.
- Develop a statewide graphic display using the county map series that would portray by color and other codes what environmental information is available regarding a selected segment of highway within the State System.

RECOMMENDATIONS FOR FURTHER STUDY

1. Evaluate a Geographical Information System (GIS) to match environmental resource data with their locations along highways in the State System. Compare a GIS with other computerized and non-computerized systems.
2. Evaluate the use of local and wide area computer networking systems to link EPS with other State and National agencies to retrieve useful environmental data for project specific locations.
3. Form a multi-agency team to evaluate the feasibility of performing concurrent intra-ADOT and interagency reviews of environmental and engineering documents.

PROBLEMS CARRYING OUT THE BPI

Most of us on the EQuaTe were participating in a formal Business Process Improvement (BPI) for the first time. We were bound to experience shortcomings along the way. Hopefully, future teams will benefit greatly from our trials. Briefly listed below are most of the problems we encountered in our effort to perform a complete BPI.

- A. The team was initially given an overly optimistic schedule for completing a full BPI.
- B. The team members conducted meetings on four full days on the BPI before receiving any formal training. Our facilitator both performed on the job training and facilitated our meetings.
- C. When the team did receive formal training it initially concentrated on problem solving. This caused confusion since we expected training to specifically fill us in on the full BPI.
- D. Actual formal BPI training was very brief.

- E. Our BPI training caused us to reexamine our time commitment to complete our assignment. It was going to take much longer to complete.
- F. Several schedule adjustments were required over the course of the study.
- G. Team members and their supervisors were frustrated by the frequent shift to increasing time commitment to the assignment.
- H. Conflicting rumors over SLIM's involvement in our study caused consternation among team members.
- I. The Environmental Clearance Process (ECP) study proved to be much more involved and time consuming than was originally anticipated. Parts of the overall process would be substantial studies unto themselves.
- J. Data collection proved to be only marginally successful for gaining useful measurement tools to evaluate the existing process. Lots of time consumed trying to make useful sense of what was available.
- K. Much of the ECP is regulated by federal legislation. Attempts to improve the process were thereby hindered.

**ENVIRONMENTAL CLEARANCE PROBLEMS
ADDRESSED IN RECOMMENDATIONS**

NUMBER OF DAYS FOR ENVIRONMENTAL CLEARANCE

The Number of Days for Clearance charts in Appendix B graphically depict where the greatest concentration of project environmental clearances occur over time. One notable similarity in all the charts is that the largest number of clearances for all clearance categories occurs in the shortest time period. The remainder clearances drop off sharply to the next time period and then gradually decrease in number over time. The only category which less dramatically follows this pattern is that for Environmental Assessments (EAs). EAs are so individualized that their amounts of time to complete vary over a wide range of time.

Out of 99 projects studied 50 received environmental clearance within six months of starting environmental activities. Three of these projects received EAs. Also, 69 projects were cleared environmentally within one year, with four of these receiving EAs.

The major reasons for project environmental clearances taking longer than one year are summarized on the chart called REASONS FOR LONG ENVIRONMENTAL CLEARANCE PROCESS following this written summary.

1 TO 1-1/2 YEAR ECP

Seven of the eleven projects, cleared between 12 and 18 months, were projects without any environmental concerns. The Environmental Planning Services (EPS) staff gave seven of these projects a low priority on their work schedule. With limited resources, the staff diverted their energies to more pressing projects. Even though four of these seven projects had their bid advertisement dates delayed, only one of the projects was delayed due to an environmentally related issue. That issue involved preparation and review of the environmental document, which was done by a consultant hired by a local government. The local government environmental process is completely separate from that done by ADOT. EPS staff reviews these documents at the request of the local government, but has no other input to its preparation. Local governments handled four of these seven projects.

Three of the remaining four projects in this group were affected by changes in scope of work. Such changes required EPS to address any environmental concerns which would be affected by this new work on the project. All three of these projects did require additional environmental studies to clear the project for construction. The issues were biological evaluation, hazardous materials, and cultural resources. Only one eventually caused a delay to advertise the project for bids due to the environmental issue.

1-1/2 to 2 YEAR ECP

The next group of projects were cleared between 18 and 24 months. Again, change in scope of work was a major contributor to the long time frame to environmentally clear the projects. It affected four of eight projects. Though three of these projects required biological evaluations, these studies were not the cause of any project bid advertisement delays. These same three projects, along with another in the next group, were to be bid together. The change in scope really only applied to one project, but affected the other three due to their being bid together.

The other major issue in this group was agency coordination which affected three projects. One involved an Indian community which was slow in responding to archaeological surveying and testing requirements. Another involved a slow responding Park Service which gave a low priority to this ADOT project in their work load. The other involved an agency requiring mitigation of safe passage for animals crossing the State highway. The ADOT ECP had to wait for the completion of a study on the desert Bighorn sheep before mitigation with the State agency sponsoring the study could be worked out. This issue caused 24 months delay to project bid advertisement. It was the only project in this group to cause an environmentally created delay.

The last project in this group had a consultant prepare the environmental document. A lack of an aggressive project manager and EPS project leader monitoring their work was attributed as the main cause for less than timely work on the document.

2 TO 3 YEAR ECP

The next group of projects took two to three years to complete their environmental documents. Three of the seven projects had special environmental studies needed. One of these was the result of a change in scope of the project. A wetlands issue arose on another of these projects due to poor maintenance of a metal culvert which plugged up and caused water to pond. This caused a two month delay in the bid advertisement.

Two other projects had agency coordination problems. Both concerned relations with Forest Services. On one the Forest Service archaeologist was slow to take action on field archaeological investigations. On the other the Forest Service imposed strict adherence to completing the Integrated Resource Management process even though it was introduced in the middle of the project, and they were already overloaded with ADOT projects. This process required an Environmental Assessment even though the Federal Highway Administration accepted only a Categorical Exclusion to environmentally clear the project. It cost the project almost two years of bid delays.

Of the two remaining projects in this group, one was a local government project. A consultant prepared the environmental document, but the contract money ran out before the document was completed. The city needed assistance from EPS to help show them how to complete the document. This delayed the project bid for a year and a half. The other project experienced poor consultant preparation of the environmental document requiring much rework to complete. There was also a scope of work change causing environmental rework, and eleven months of project bid delay.

3 TO 4 YEAR ECP AND 5-1/2 YEAR ECP

In the last two groups two were local government projects. Both took three to four years to clear. One had a dispute regarding right of access being revoked to local users. Neither of these projects were delayed for environmental reasons.

The third project, taking three to four years to clear, had been environmentally surveyed and cleared for hazardous materials. However, further into project design the Geotechnical Section found gas in the soil during their drilling for test samples. A full hazardous materials study and removal was then undertaken. The project lost two and a half years in delay to the bid advertisement date.

The last project topped the list with almost five and a half years time required to environmentally clear the project. Again, initially the problem was hazardous materials. In the end, the roadway alignment was shifted to avoid the site. However, the project also switched from state funding to federal funding requiring a higher level of environmental investigation. Later, another project was added to this one, essentially changing the project scope, and requiring an Environmental Assessment to address it. Total environmentally caused bid advertisement delay was 31 months.

EVALUATION OF FINDINGS

A number of EQuaTe's recommendations address the environmental clearance problems discussed above. Listed in the second chart below are the major problem areas discovered and the recommendations put forth to improve the process. See the individual recommendations for detailed discussion of the improvements.

REASONS FOR LONG ENVIRONMENTAL CLEARANCE PROCESS

30 Projects Taking Longer Than One Year to Clear Environmentally

Project Number	Project Name	Type of Clearance	Work Days to Clear	Major Reasons for Long Clearances									
				Environmental Issue				Scope Change	Agency Coord.	Local Govt.	Con-sultant	Project Mgmt.	Low Priority
				BE	HM	GR	WL						
F - 022-2(37)	GRAND AVE, AGUA FRIA BRS 312, 313	EA	1350		X			X					
IR - 17-1(172)	INDIAN SCHOOL RD TI & RAMPS	CW	846		X								
S - 214- 309	SR360 - SCENIC DR (IDAHO RD)	EA	828							X			
M - 700-4(3)	75TH AV (INDIAN SCHOOL-CAMELBACK)	EA	765							X			
F - 038-1(14)	ASH CREEK - SYCAMORE CREEK	EA	692						X				
M - 901-9(3)	LAKE MARY RD (I-17 - WALAPAI DR)	EA	637							X	X		
IR - 40-5(89)	WINDOW ROCK TI	CE	626								X		
BRF - 037-3(5)	S FORK BADGER CRK BR #0100 *	CW	594	X				X					
F - 027-1-519	SHOW LOW - SHUMWAY, UT II	EA	568						X		X		
F - 026-1-932	CORDUROY CREEK BRIDGE #0216	EA	533			X							
F - 035-1(13)	BIG SANDY BRIDGE #0327	EA	522				X						
IM - 40-5(92)	APACHE CO LINE - PINTA TI	CE	480			X			X				
F - 063-1-512	NEW WATER RD - QUARTZSITE	CE	474					X					
F - 039-1-510	HOOVER DAM - SOUTH, PH II	CE	451						X				
F - 039-1-509	COTTONWOOD RD - MP 59	EA	419									X	
BRF - 037-3(6)	SOAP CREEK BR #0101 *	EA	413	X				X					
BRF - 037-3(8)	BLUE CLAY WASH BR #0114 *	CE	408	X				X					
F - 060-1-510	KEAMS CYN - STEAMBOAT	CW	389			X			X				
BRF - 037-3(7)	JACOB WASH BR #0113 *	CW	387	X				X					
IM - 17-1(209)	16TH ST - BUCKEYE RD	CE	359								X	X	
RS - 347 (16)P	MARICOPA RD, PAPAGO RD - SR84	EA	342			X		X		X			
S - 244- 513	NAVAJO RESERVATION BDY, MP 368	CE	340							X		X	
RS - 316 (22)	RAY MINE - SUPERIOR	CE	332							X		X	
RS - 631 (2)P	ARIVACA TOWNSITE - ARIVACA JCT	CE	322							X		X	
F - 071-1-508	ST JOHNS - NORTH	CE	315									X	
FIR - 40-2(107)	SELIGMAN-PINEVETA, (EB) UT II	CE	312									X	
F - 027-1-518	NAVAJO BLVD, HOLBROOK	CE	310									X	
F - 056-1-504	ROBLES JCT - AVRA VALLEY RD	EA	274		X			X					
N - 900- 549	KARTCHNER CAVERNS STATE PARK	EA	270						X				
F - 022-3-569	DEVILS CANYON BRIDGE #0261	EA	254	X				X					

RECOMMENDATIONS TO ADDRESS PROBLEM AREAS

RECOMMENDATION	PROBLEM AREA						
	Env. Issues	Scope Change	Agency Coord.	Local Govt. *	Env. Consultant	Project Mgmt. #	Low Priority
MGMT. & MEASUREMENT RECOMMENDATIONS							
Project Log +							
Cost Management System +							
Staffing Analysis @							
QUALITY RECOMMENDATIONS							
Post-Construction Environmental Review.							
Environmental Clearance Completion Review							
Assurance of Quality Consultants							
PROCESS IMPROVEMENT RECOMMENDATIONS							
Pre-Programming Project Scoping							
Agency Coordination							
Environmental Education							
Creative Designs							
Environmental Resources Maps							

* Local Governments' ECP is not related to ADOT's ECP.

Project Management Issue has already been addressed by EPS.

+ Project Log and Cost Management System are both aimed at improving how ADOT's ECP is measured. They do not address project-specific issues.

@ Staffing Analysis is related to the measurement recommendations in that a certain amount of measurement data is needed to conduct the staffing analysis.

SUMMARY OF COSTS AND BENEFITS

DETERMINATION OF COSTS AND BENEFITS

Each recommendation contains a Cost Section detailing the costs expected to implement them. EQUaTe produced the ESTIMATED BENEFITS FROM REDUCED REWORK chart on the next page in consultation with the ADOT Sections listed in the chart. Each Section was asked what percentage of their staff's work is rework and what percentage of their rework is due to environment issues. These percentages were multiplied times each Section's total annual employee related expenses. To this was applied an expected percentage reduction in rework EQUaTe expects its recommendations will make in improving the Environmental Clearance Process. The TOTAL estimated benefits expected from reduced rework was \$1,041,500.

The second sheet below, entitled BENEFIT FORMULAS, gives the basic formulas used to derive expected benefits. Under Reduced Rework are the formulas used to determine the ESTIMATED BENEFITS FROM REDUCED REWORK discussed above. The second category, Unnecessary Work, lists the cost savings possible by reducing the number of times a project must go to the Project Development Committee due to a Recommended Project Change caused by an environmental issue. Finally, the Construction Cost Savings is based on impacts to District personnel who must shift people resources to other locations when projects, they expected to construct, get delayed due to environmental problems.

The last two sheets of this section, RECOMMENDATIONS COST/BENEFIT SUMMARY, summarize all the costs to implement the recommendations, along with all the financial benefits. The net results show a potential first year net savings of \$370,000 with additional future year annual net savings of \$620,000.

BENEFIT FORMULAS

REDUCED REWORK:

of affected FTEEs x Average hourly pay = Annual salaries

Annual salaries x % of total rework x % rework due to environmental
x estimated % reduction in rework (env.) = \$ Benefit

(see chart entitled "Estimated Benefits from Reduced Rework" on
previous page)

UNNECESSARY WORK

Trips to PDC due to environmental = 52 for F.Y. 91'-92'

Weekly PDC meeting preparation:

Project Leader -	1 person x \$29.08 (Grade 22) x 3.5 hours = \$102
Designer -	1 person x \$21.70 (Grade 19) x 2.0 hours = \$ 43
Supervisor -	1 person x \$31.87 (Grade 23) x 0.5 hours = \$ 16
Other Svc. Rep. -	1 person x \$29.08 (Grade 22) x 1.0 hours = \$ 44
Supervisor -	1 person x \$31.87 (Grade 23) x 0.5 hours = \$ 16

At the meeting:

Project Leader -	1 person x \$29.08 (Grade 22) x 0.5 hours = \$ 15
Service Rep. -	1 person x \$29.08 (Grade 22) x 0.5 hours = \$ 15
PDC members -	10 people x \$38.28 (Grade 25) x 0.5 hours = <u>\$191</u>
	Total \$442

Rounded to \$500

x 25 meetings

= \$12,500

CONSTRUCTION COST SAVINGS:

Assume 2 projects are affected and \$39/day long term travel per person

2 projects x 8 people/project x 5 days/week x 35 weeks x \$39/person/day
= \$109,200

ESTIMATED BENEFITS FROM REDUCED REWORK

Office	Affected FTEEs*	Avg. Grade	Avg. Hourly	Annual (\$1,000s)	% Total Rework	% Rework due to Envi.	Est. % Reduction	\$ Benefits
<u>Direct Involvement (1)</u>								
EPS	13		\$14.80	\$400	30%	100%	50%	\$60,000
AES in-house	22	20	\$24.22	\$1,108	10%	70%	75%	\$58,200
consultant	5		\$60.00	\$624	30%	70%	75%	\$98,300
SP in-house	8	21	\$26.61	\$443	5%	50%	75%	\$8,300
consultant	5		\$60.00	\$624	5%	50%	75%	\$11,700
<u>Indirect Involvement (2)</u>								
AES in-house	22	20	\$24.22	\$1,108	40%	10%	75%	\$33,200
consultant	30		\$60.00	\$3,744	40%	50%	75%	\$561,600
SP in-house	8	21	\$26.61	\$443	10%	50%	75%	\$16,600
consultant	20		\$60.00	\$2,496	10%	50%	75%	\$93,600
R/W in-house	118	18	\$20.03	\$4,916	10%	5%	75%	\$18,400
consultant	15		\$50.00	\$1,560	10%	5%	75%	\$5,900
HPS	53	21	\$26.61	\$2,933	12%	10%	75%	\$26,400
C&S	12	20	\$24.22	\$605	20%	2%	75%	\$1,800
Districts	20	24	\$34.93	\$1,453	1%	100%	75%	\$10,900
RDS	3	18	\$20.03	\$125	15%	5%	75%	\$700
Materials	3	18	\$20.03	\$125	25%	5%	75%	\$1,200
BDS	69	19	\$21.70	\$3,114	20%	2%	75%	\$9,300
EPS in-house cons. monitors	5	19	\$21.70	\$226	20%	75%	75%	\$25,400
TOTAL								\$1,041,500

* FTEE = Full Time Employee Equivalent

- Notes: (1) Direct Involvement is performance of environmental work and administration of consultants doing environmental work.
(2) Indirect Involvement is engineering and other work which is not directly environmental.

RECOMMENDATIONS
COST / BENEFIT SUMMARY

I Management and Measurement of the Environmental Clearance Process

<u>Recommendation Name</u>	<u>One-time Expense</u>	<u>On-going Annual</u>
Project Log	\$ 500	\$ 1,860
Cost Management System	8,820	11,340
Staffing Analysis	<u>4,360</u>	<u>0</u>
Total Costs	\$13,680	\$13,200

II Quality of the Environmental Clearance Process

<u>Recommendation Name</u>	<u>One-time Expense</u>	<u>On-going Annual</u>
Post Construction Env. Review	\$ 0	\$32,200
Env. Clearance Completion Review	0	8,110
Assurance of Quality Consultants	<u>7,800</u>	<u>0</u>
Total Costs	\$7,800	\$40,310

III Environmental Clearance Process Improvement Recommendations

<u>Recommendation Name</u>	<u>One-time Expense</u>	<u>On-going Annual</u>
Pre-Program Project Scoping	\$ 0	\$490,560
Agency Coordination	136,000	0
Environmental Education	18,590*	0
Creative Designs	47,200	0
Environmental Resources Maps	<u>24,400</u>	<u>0</u>
Total Costs	\$226,190	\$490,560

Note:

* Environmental Education expense assumes that the video will be produced in-house. If by consultant, the expense would be \$45,000.

COSTS SUMMARIZED:

I Management and Measurement	\$ 13,680	\$ 13,200
II Quality of ECP	7,800	40,310
III Improvement Recommendations	<u>226,190</u>	<u>490,560</u>
TOTAL COSTS	\$247,670	\$544,070

RECOMMENDATIONS
COST / BENEFIT SUMMARY

BENEFITS SUMMARIZED:

Reduced Rework	\$1,041,500
Unnecessary Work	12,500
Constr. Cost Savings	<u>109,200</u>
TOTAL BENEFITS	\$1,163,200

NOTE - See formulas on previous page for
explanation of Benefit calculations.

POTENTIAL FIRST YEAR BENEFITS \$1,163,200

FIRST YEAR COSTS

(Includes One-Time Implementation Expense
Plus First Year On-Going Annual Expense)

\$247,670 + \$544,070 \$ 791,740

FIRST YEAR SAVINGS = \$ 371,460
(Benefits - Costs)

ON-GOING ANNUAL BENEFITS \$1,163,200

ON-GOING ANNUAL COSTS \$ 544,070

ON-GOING ANNUAL SAVINGS = \$ 619,130
(Benefits - Costs)

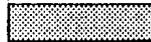
IMPLEMENTATION PLAN

IMPLEMENTATION PLAN

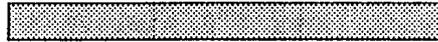
	January- March 1993	April- June 1993	FY 1994 July- September 1993	October- December 1993	January- March 1994	April- June 1994	FY 1995 July- September 1994	October- December 1994
Recommendation								

MANAGEMENT AND MEASUREMENT OF THE ENVIRONMENTAL CLEARANCE PROCESS

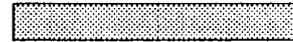
Project Log



Cost Management System



Staffing Analysis



QUALITY OF THE ENVIRONMENTAL CLEARANCE PROCESS

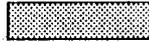
Post-Construction Environmental Review



Environmental Clearance Completion Review



Assurance of Quality Consultants

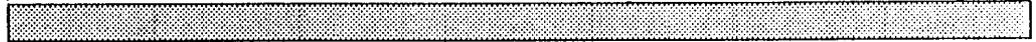


ENVIRONMENTAL CLEARANCE PROCESS IMPROVEMENT RECOMMENDATIONS

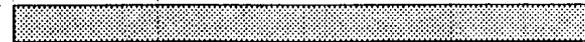
Pre-Programming Project Scoping



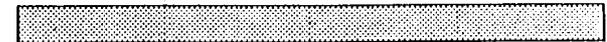
Agency Coordination



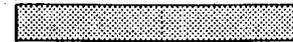
Environmental Education



Creative Designs



Environmental Resources Maps



FOLLOW-UP MEASUREMENTS

FOLLOW-UP MEASUREMENTS

Two EQUaTe recommendations create firm follow-up measurement tools for obtaining future Environmental Clearance Process (ECP) costs, cycle-times, and activity times. One is the Project Log, and the other is a Cost Management System. See the recommendations with these titles in this report for more detailed descriptions of these tools under the Benefits section of each recommendation.

These two recommendations will capture the following data to measure the ECP:

1. Cycle time, activity time, and costs to complete the ECP and produce a specific environmental document like an Environmental Assessment, Environmental Impact Statement, or Categorical Exclusion with or without special studies.

The EQUaTe study has developed some preliminary statistics on timely ECP completions for our 99 selected projects (see the Late Environmental Clearances discussion at the end of the BASE LINE DATA section of this report). This data can be used as a base from which to compare the completion dates for future groups of projects.

EQUaTe has also produced a summary of the number of projects taking longer than one year to achieve the environmental clearance (see Number of Days for Environmental Clearance under ENVIRONMENTAL CLEARANCE PROBLEMS ADDRESSED IN RECOMMENDATIONS in this report).

2. Key original project model dates will be captured on the Project Log. These will be compared against revised and actual completion dates to measure the success rate of completing ECP milestones according to original schedule. Milestone dates to be recorded include:

- Start file
- EPS staff assigned project
- Initial PA/DCR
- Field review(s)
- Scoping meeting
- Final PA/DCR
- Coordination letters
- DEA/DEIS
- Public meetings
- Public hearing notice/offer
- Public hearing
- FEA/FEIS
- CE completion
- EPS clearance memo

3. Capture cycle time, activity time, and costs to complete special environmental studies. The project models have key milestone activities and dates for more detailed and time consuming special studies. New EPS BTS activity codes have been developed to capture activity time and costs.
4. Record the original project bid advertisement date along with any officially revised dates. Include a comment to say what the major reason was for revising the date. This will record both environmental and non-environmental reasons for the delay.

EQuaTe gathered data to show the results of project delays due to environmental reasons (see Delayed Project Bid Advertisements near the end of BASE LINE DATA in this report). The results can be used as base line data to compare to future FY projects.