A SURVEY OF SELECTED DRILLING CONTRACTORS CONCERNING ENTRY LEVEL PERSONNEL

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CHAPTER I

INTRODUCTION

Since the embargo, imposed on October 22, 1973 by a number of Middle East oil producing nations, the United States has felt the effect of energy dependency and is now underway in its search for energy self-sufficiency. The ultimate solution likely will be found in the development and utilization of a variety of energy resources. However, for the next several years, the primary energy source most likely will be oil and gas; and increasing emphasis will be given to its domestic extraction. An Exxon Company report (1) predicts that over half of the total natural gas and oil production requirements by 1990 must come from domestic reserves yet to be discovered.

With such an emphasis on petroleum extractions, the drilling industry already has begun a significant expansion in activity. However, in the path of the expansion effort, manpower appears to be a major constraint and is considered by some to be a special concern of the industry.

In March, 1975 Business Week (2) reported that the companies that drill for oil are unquestionably the most short-handed employers in the nation and indicated 5,400 additional workers would be required for the 175 new oil drilling rigs scheduled to go into operation that year. The article quoted Warren Baker, executive vice-president of the International Drilling Contractors' Association (now retired), who stated:

"there is no such thing as an experienced man who is unemployed . . . . An oil well driller can almost name his price" (p. 44). Further, it is Baker's view that "companies will apparently have to train everyone they hire from scratch, including roughnecks, derrickmen, drillers, and toolpushers" (p. 44).

T. B. O'Brien (3) a vice-president of the HNG Oil Company stated: "the industry seems to be awakening to a problem that has been developing for quite some time. Most operating companies, large and small, new and old, are critically short of capable operation personnel" (p. 7). His paper quotes Drilling DCW that "7,350 weevils [beginning personnel] are needed now" (p. 8); and W. H. Moore, president of the Offshore Company, who estimates that 15,000 experienced workers will be needed for offshore exploration by 1976. O'Brien further stressed that the effects of 100 per cent rig utilization and a growing drilling industry are driving costs up. In addition to inflation, a more significant increase in cost results from judgment errors made by less qualified people.

The preceding may represent a general concensus of the industry. However, there are differences of opinion as to how acute the problem is; and there are those who do not consider manpower a matter of concern. Overall, the industry's projections and general position concerning manpower appears to be one of uncertainty. From such elements as these, the following statement of the problem has evolved.

Statement of the Problem

The problem with which this study is concerned is the uncertainty of projected manpower needs of the drilling industry and the lack of information relative to what training resources, if any, might be

desired and supported by this industry. In particular, there appears to be a definite lack of such information about the domestic, onshore, drilling industry within the mid-continent region. Further, since a large majority of the drilling contractors within this region are members of the International Association of Drilling Contractos (IADC), the problem is directed toward determining their position regarding the projected need for entry level, rotary rig crewmen. Moreover, the contractors' position with respect to an entry level training program is an added concern.

Purpose of the Study

The purpose of this study is to evaluate the position of selected International Association of Drilling Contractors (IADC) members with respect to entry level, rotary rig crew personnel. Specifically, the study seeks to answer the following questions:

1. What is the anticipated need through 1978 for entry level, rotary rig crew personnel within the regional area of Oklahoma, Kansas, and the Texas panhandle?
2. What is the interest and potential for employers' support of an entry level school for these personnel within the regional area?

Need for the Study

If this study substantiates that the contractors' position is one of a projected, increasing need for entry level, rig crewmen; perhaps, more attention would be focused on seeking means to

alleviate the problem. Especially, if the contractors were favorable toward the support of a training program for these personnel; then, the combined efforts of industry and education might be more effectively and expeditiously applied in response to the problem.

CHAPTER II

REVIEW OF LITERATURE

Identification of the Need

A manpower report of the President (4) has determined that since the oil embargo of October, 1973, the combined pressure of recession, inflation, and steeply rising energy costs has resulted in a general slackening of the nation's economy. The report further states that the impact of these developments has created an anomaly of critical manpower needs in certain areas while high employment conditions prevail in others.

In response to these developments, a national program known as Project Independence (5) has been established with a primary objective of achieving energy self-sufficiency. Fundamental in meeting this objective will be a full utilization of our human resources. However, a program implementation plan prepared by the Energy Research and Development Administration (6, p. 135) reports:

> An adequate information system to determine manpower supply and demand information does not exist with the required precision to plan the national effort to achieve energy objectives efficiently. Only a general and spotty picture of future manpower requirements can be generated.

A report by the Secretary of Labor (7) suggests that the search for new energy resources will have major manpower implications for the extractive industries. This report further indicates that employment

in the oil and gas extraction industry as a whole is expected to increase between now and 1980. This will involve the exploration, drilling, oil and gas well operations and maintenance, plant operations, and extractions of oil from oil sands and shale. The report notes that the output increase will be centered in the oil segment of the industry and employment in this industry could amount to 416,000 workers by 1980, an increase of over 150 per cent of current manpower requirements.

As early as March, 1973, before the oil embargo, warnings of manpower shortages in the drilling industry were being signaled by industry spokesmen. Long (8, p. 34) observed that "idle crewmen are becoming so extinct that they may be placed on America's list of 'endangered species'". Long further stated:

> A United States gain of about 100 rigs a year since 1971, similar gains in Canada and a continuing buildup in the 750 rig overseas operations have created a heavy demand for more superintendents and crewmen. In fact, if you consider that three new five-man crews are needed for each rig, some 3000 more men have joined or rejoined the drilling scene. Also, 200 toolpushers and additional superintendents have been added to the picture.
>
> Concern already is mounting over where additional men will come from. Just like some oil reserves, the labor pool is about syphoned dry in most sections of the country and there are too few men being trained to replenish it (p. 34).

In September, 1973 a Drilling-DCW special report (9) emphasized that in the face of an energy crunch, "The U. S. simply has very few rotary rigs--and scarcely enough men to run what it has" (p. 24). The report states:

> The No. 1 hurdle in the path of the men who must actually implement any U. S. drilling upsurge, clearly, is manpower--manpower to build the rigs in the first place and manpower to run them after they're built (p. 24).

In another section of the report entitled "How Can We Whip the Manpower Problem?" industry representatives reflect the manpower problem in terms of work ethics, accordingly:

> 'Work on a rig is hard and dirty', says Wendell Wampler in Elberfeld, 'and the younger men don't want to learn that trade.' Fortune Drilling's H. W. Green in San Angelo cited 'a critical shortage of people wanting to work 8 hours for 8 hours pay' and resulting frustration of drillers and toolpushers who must hire and supervise crewmen. 'Not enough people want to work,' noted Hank Harkins in Alice.
>
> 'At the rate we're going,' says J. E. Hiller in Pleasanton, 'it will be impossible to have crews by the end of this year. Too many men would rather be on relief. Make no mistake, they know exactly how long to work to be eligible for a dole and, believe you me, they don't stop until they're lined up for the full employment insurance treatment. When ordered to perform a task, some of them just stand there and grin. I'm about ready to check it to them.'
>
> 'We have the most deteriorated manpower will power I've seen in my lifetime,' says Glyn Grimmett in Shreveport. 'Live it up today and to hell with tomorrow. People had better wake up and go to work. Stop the giveaways. Cut big government down so people will have something to work for.'
>
> 'Get rid of unemployment compensation and food stamps,' suggests Ohioan Frank Dever. 'Make people get out of the bars and go to work instead of living off their working, tax-paying neighbors' (p. 30).

The report suggests: "However they may feel about people who will and won't work, contractors are being hurt by their manpower problems . . . and the manpower crunch is nationwide" (p. 30).

One industry spokesman who views the contractor's manpower problems somewhat differently is O'Brien (3), who states: "Drilling contractors have been telling us for years that they cannot keep experienced people to run their rigs efficiently" (p. 7). He observes "the industry continues doing a halfway job, poorly managing the supply of often unqualified people it does have" (p. 7) and declares:

> The situation starts with the drilling contractors' people. The industry has created conditions under which employment on drilling rigs is no longer desirable. It once was common practice to pick up help off the street, even to drag 'winos' from under railroad trestles to man drilling and workover rigs. Some contractors still do, but even in this day of full rig utilization, such methods of recruitment are costly both to the contractor and well operator.
>
> The industry must make employment on rigs desirable. We can no longer hide behind our old complaint that the price of our product is too low. Most of us make a profit in spite of our management methods. We ask people to work under conditions and at a wage scale that is well below that for comparable skills, and then we ask them to drive up to 200 miles a day to and from work (p. 7).

O'Brien's views are supported, at least in part, by the following excerpt from the Drilling-DCW report (9, p. 30).

> 'A completely undated work program is the only possible solution,' says Sonny Eatmon in Kimball. 'We are losing too many good men--not to competitors, but to other industries. During the last year, an operator with nine years seniority left to become a carpenter's helper. A man with 18 years of rig-running experience, two of them with us, has gone back to the farm. A very promising young man, who has been with us for three years and who has been running a rig for six months left to work for the highway department.
>
> 'The reasons were pretty much the same in each case. They were tired of working every Sunday. Pay was satisfactory but, as one of them put it, he could see no change in the future years--just a lot of work and very little time with his family. After nine years with our company, he was getting out while he was young enough (34) to break loose.
>
> 'What we need is a workable solution that will enable my competitors and me to hire, train, and keep employees. If we can do that, we can solve the rest of our difficulties like equipment and financing.'

Another industry spokesman, Ed McGhee, Executive Vice-President of the International Association of Drilling Contractors in an Associated Press article (10), entitled "Drilling Rig Critics 'Unfair'" offers the following perspective concerning the manpower problem:

> The comeback did not gain momentum until late 1974, but more than 1,750 rigs have been at work throughout November, the highest average since 1962. 'Put yourself back into the shoes of the 1970 contractor,' McGhee suggests. 'Only 1,000 rigs are working and the count is still headed downward. Rigs are being stacked at so fast a rate the men displaced from them exceed normal attrition. Trained men are actually leaving the industry for lack of jobs. Naturally, you have experienced people in all positions.'
>
> All this McGhee said, is in sharp contrast with the situation today. 'You find 1,750 rigs working and the count still rising,' he said. 'You have too few experienced men and can hire none. You overpromote the men you've got and try to train new ones' (p. B-10).

Other differences among industry sources are reflected by Sheffer (11), who takes exceptions with an industry report, by stating:

> . . . it's ironic that the 212-page report prepared by the National Petroleum Council, "Availability of Materials, Manpower and Equipment for Exploration, Drilling and Production of Oil--1974-1976" has only two paragraphs dealing with this problem--perhaps the most important facing the drilling industry. The NPC report concluded in one paragraph that 'manpower is not believed to be a critical constraint in most areas of drilling . . . .' The other (and conflicting) sections state that 'the high turnover of personnel and the start-up of previously inactive rigs during 1974 has lowered the overall efficiency of the drilling industry, due partly to manpower problems. Intensive training is expected to relieve the drilling manpower constraint by 1976' (pp. 67-68).

Outside of the industry, two manpower information sources that do not reflect increasing needs for drilling rig crewmen (namely, drillers) are the Oklahoma and Texas Employment Commissions. Specifically, the December, 1974, Oklahoma report (12, p. 16) and a February, 1975 Texas report (13, p. 81) both reflect steady declines in the employment of drillers over the period of 1970 through 1980. The applicable data from the two reports are combined and presented in Table I.

TABLE I

ANNUAL AVERAGE EMPLOYMENT EARTH DRILLERS 1970-1980
OKLAHOMA AND TEXAS

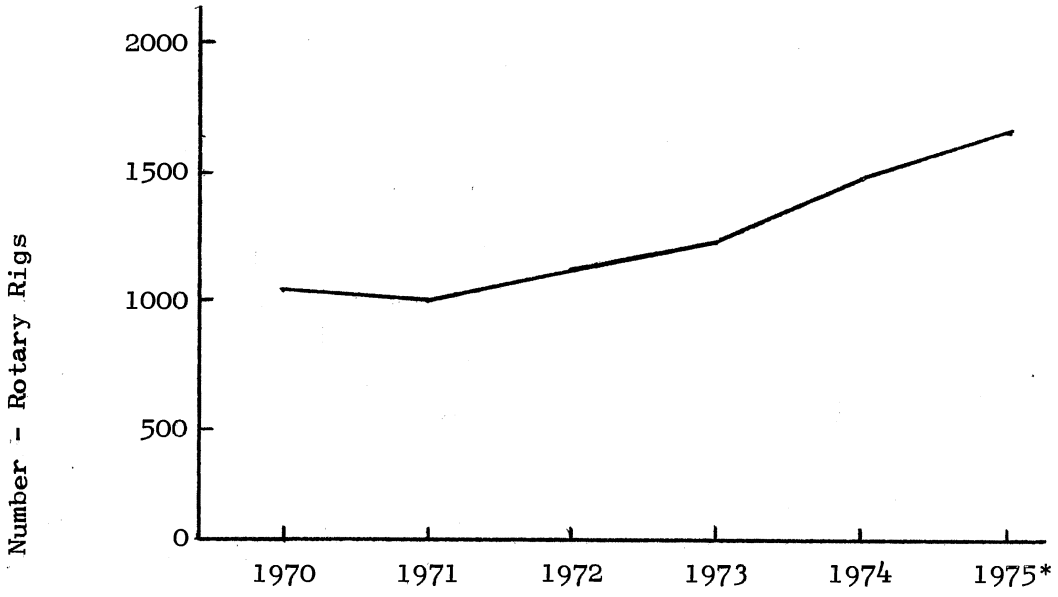
State Reporting	1970 Empl. Number	1975 Empl. Number	1976 Empl. Number	Proj. 1980 Empl. Number	Change 1970-80 No.	Per Cent Change
Oklahoma	1590	1530	1510	1460	130	-8.22
Texas	5300	--*	4800	4500	800	-15.1

*Not reported

These reports gain added significance when it is noted that the combined rotary rig activity of these two states represented 49 per cent of the total United States rig activity for the first half of 1975 as derived from data in the "Midyear Report" published in the Oil and Gas Journal (14, p, 105).

Industry Trend and Forecast

As succinctly stated in the "Midyear Report" (14, p. 110) "In the drilling business, the barometer everyone watches is the rotary-rig count;" and the rotary rig count has been rising since a 1971 low. This rise in rotary rig activity from 1971 to 1975 is illustrated by Figure 1 from data provided by the Drilling Contractor (15, p. 14).



*1975 data covers period from January 1 through October 31.

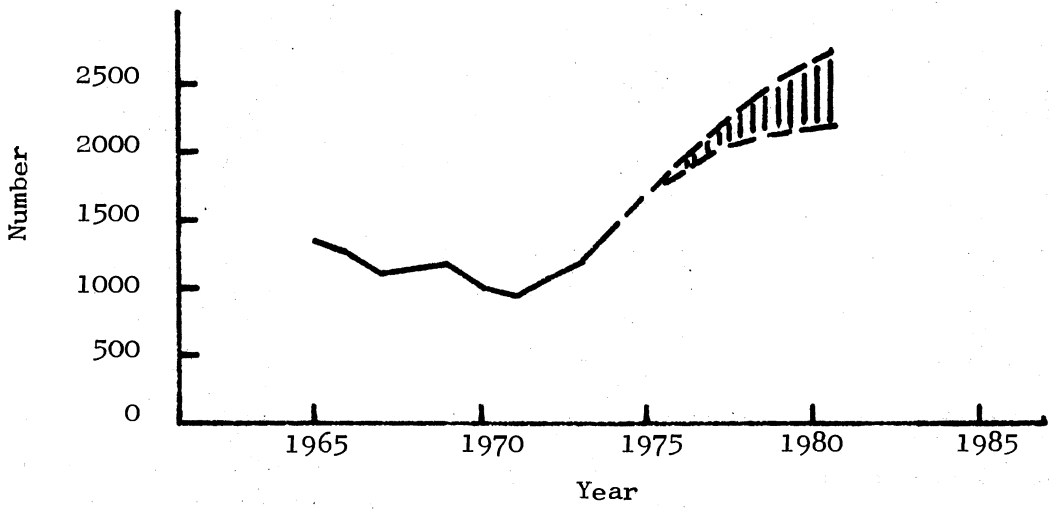
Figure 1. United States Annual Weekly Average of Active Rotary Rigs 1970-1975

However, during the last week of March, 1976 industry sources (16, p. 208) show the total number of active rotary rigs in Oklahoma, Kansas, and the Texas panhandle to be 262 as compared to 270 during the same period of 1975 for a decline of three per cent in rig activity.

Nevertheless, in looking toward the immediate future, the Midyear Report (14, p. 10) in an article entitled, "Industry Ready for Record Drilling Surge in Last Half," states:

> The industry poised for a second half drilling surge that should push completions to an 11-year peak.
>
> This is the message from operators surveyed for the Journal's special midyear report. It is also supported by the results of the first 6 months when U. S. completions exceeded the 20,000 mark in spite of a decline in the number of rotary rigs running. The industry drilled an estimated 20,527 wells during the first half, an increase over the 17,629 completed in that period last year. The good news of the first half will apparently spread throughout the last half of 1976, too. The U. S. industry expects to drill 41,817 wells this year, up 2,700 or 6.9% over the 39,097 drilled in 1975.

An extended industry forecast adapted from Langston (17, pp. 63-64 is shown in Figure 2:



Source: J. V. Langston, "Crew Training, The Need is Urgent, The Time is Now," Drilling-DCW (May, 1975).

Figure 2. Total United States Rigs

As he explains, "the shaded area represents an estimate based on the range in published predictions" (p. 63), and states further:

> As our effort toward national energy independence gathers momentum, the number of rigs must continue to grow. During the eight years between 1970 and 1978, they will have doubled. This is not the complete picture though because many of the new rigs will be on the deeper complex wells and some (possibly 120) will be larger mobile rigs for service in offshore U.S.A. Every factor we consider tells us the need for skilled employees trained in their job is going to reach a new high.
>
> We can no longer place our major emphasis on on-the-job training. This has served us well in the past and will continue to be important in the future. We cannot wait, however, for the new personnel to be trained by the slow process of experience alone. Our need is now (pp. 63-64).

Training

Training of industrial workers has long been a forte of the American industry; especially, in times of national emergencies and critical needs. In recent years, this nation's pressing energy needs have prompted an upsurge in drilling activity with a consequent need for training as expressed by Langston (17, p. 64):

> Training of drilling crews is assuming a sharply increased importance that will continue into the foreseeable future. This new emphasis is caused by a number of factors. Most important: the increasing complexity of drilling operations, a large increase in cost--particularly offshore, and the critical shortage of trained people at a time of rapid expansion in total rigs. A new and substantially increased effort is needed to keep pace with changing technology and the demands of the social climate in which we work. The new training required is the joint responsibility of the operator, the contractor, and industry organizations. Its cost will be repaid manyfold through improved efficiency, improved safety and a further reduction in major contingencies.

The return on the investment in training is further elaborated by Langston, accordingly:

> The contractor and operator alike will benefit by fulfilling the need for comprehensive crew training. The first dividend paid by a well-trained employee is to his employer, the contractor. He benefits through a safe and economic operation. Of similar importance are the dividends which accrue to the operator and to the industry as a whole.
>
> The operator pays for the cost of inefficiencies resulting from using untrained people. Crew training will produce an employee of wider capabilities. Fundamentally, it is easier to motivate a trained worker; therefore, training will produce an employee who can rapidly assume the growing responsibilities of his job. The operator usually bears the major burden of errors caused by improper operational procedures. The costs and consequences of a catastrophe on one well can overshadow thousands of safe wells. Our industry is known by its people and their performance. The additional indirect costs to the industry of the reaction to a few of our more spectacular accidents would pay for training to increase rig crew proficiency for many years to come (p. 65).

In a summary of recommendations, Langston (17, p. 63) proposes the following:

1. The need for accelerated crew training, very strong at present, will increase rapidly in the future.

2. The establishment of a formal program for the training of drilling crew members is the responsibility of the operator and the contractor.

3. Crew training has served us well in the past. The facilities and course material from our past effort are ready to be used as a foundation for a comprehensive program of the future.

4. The money to be saved, and the intrinsic benefits of an integrated training program, will more than pay its cost.

5. The training program should be monitored and administered by industry, via the API.

6. A charge should be given to API to:
   a. Establish guidelines for the operation of a crew training program in cooperation with other key industry organizations.
   b. Approve the suggested curriculum for crew training.
   c. Monitor the program on a continuing basis.
   d. Select standard tests to be given to those completing each course.
   e. Provide for maintenance of permanent records of diplomas.

In a February, 1975 article with primary emphasis on the offshore drilling industry, Sheffer (11, p. 68) comments:

> Inside the industry, certain new developments also are being forced.
>
> The American Petroleum Institute has initiated a new program, much to the chagrin of the drilling contractor, of writing recommended procedures for various phases of the drilling operation which eventually may be accepted or adopted by the USGS as the guideline for qualifying offshore rig personnel. This probably will lead to some form of training and testing program, which will qualify or certify a person for a specific job on a rig. The drilling contractor feels the API is usurping his training role. The oil company, a member of the API that bears the ultimate responsibility for any pollution accident or other disasters occuring on an OCS lease, wants to be sure that certain prescribed procedures are carried out and that only qualified people are performing the jobs on the rig that is drilling on his lease.

He further observes:

> The industry as a whole has been highly fragmented in its approach to recruit and train personnel. The International Association of Drilling Contractors' beginners' training schools have not really become centralized or a leading force in the training of new hands, although the association's 'Home Study Lessons' are selling at an all time high. Through mid-November, the association had sold almost 21,000 copies (compared to 12,000 sold for the entire 12 months the year before). In addition, the University of Texas (which collaborates with the IADC in the training schools) has sold almost a like number of these home courses. The problem is, however, the lack of proof to substantiate that the "Home Study Lessons" are read or completed or whether the recipient absorbed what he read (p. 69).

In the late 1975 article (18, pp. 49-50) Lejeune Wilson, Chairman of the Education and Training Committee of the International Association of Drilling Contractors (IADC) observed:

> IADC, through its Education and Training Committee, has long encouraged and sponsored development of specialized schools to train people in the drilling business at all levels. The Committee further serves the purpose of monitoring the activities in these schools and from time to time suggesting changes and improvement. Also, as a support effort, the Committee has the responsibility to see that appropriate printed material, such as the IADC Home Study Courses and audio visual aids, are prepared to meet the growing needs of the drilling contractors all over the world.

Wilson further expressed the industry's training need and the IADC participation:

> . . . dramatic increases in the number of active rigs in the last few years have made it abundantly clear that additional training schools and materials were needed, and this need has been documented in a variety of ways already. However, from the standpoint of personnel development some statistics might be in order. From the middle '50's until 1971 the rig count in the United States declined steadily until it reached a level slightly below 900. In 1972 there was a reversal of this trend, and in the last 3 years there has been a dramatic increase. In fact, at the present time there are over 1700 rigs representing an increase of more than 800 over the low in 1971.
>
> In round numbers this means that the industry has developed a need for roughly 13,000 skilled drilling personnel. Of these, by far the most critical were in the realm of toolpushers and drillers, skills that normally require years to develop. Also in round numbers, there was a need for an additional 1,000 toolpushers and 3,000 drillers to simply meet the demand brought on by the additional rigs picked up in the last 4 years.
>
> Many of the member contractors in the IADC have started their own in-house programs to meet the needs of their increased activities. At the same time, IADC has not only strengthened the traditional schools, many of which have been running successfully for years, but added seven new schools to help meet the demand (p. 50).

A listing of the present (1975) IADC co-sponsored schools with related information as reproduced from Wilson's article (18, p. 49) is presented in Table II.

One company's experience in using an entry level, IADC co-sponsored school during a period of rapid expansion is expressed by C. D. Summitt (19) of the Zapata Off-Shore Company, as follows:

> . . . after interview, 45 were selected, hired, processed and indoctrinated. The next three classes of the Floorhand School at Nichols State University were booked for 15 men each. This school was very beneficial in preparing these men for work on the rig. By participating in this school they were able to commence work on the rig knowledgeable in the equipment, the routine of work, and well schooled in safety. We repeated this interviewing, hiring, and training process several times over several months, taking in over 100 personnel in this manner (p. 1).

Langston (17) in commenting on the present level of training, reports: "A survey which seeks to determine the level of experience and training is in progress" (p. 64). The preliminary results shown on Figures 3 and 4 are adopted from Langston's report; and, as he explains:

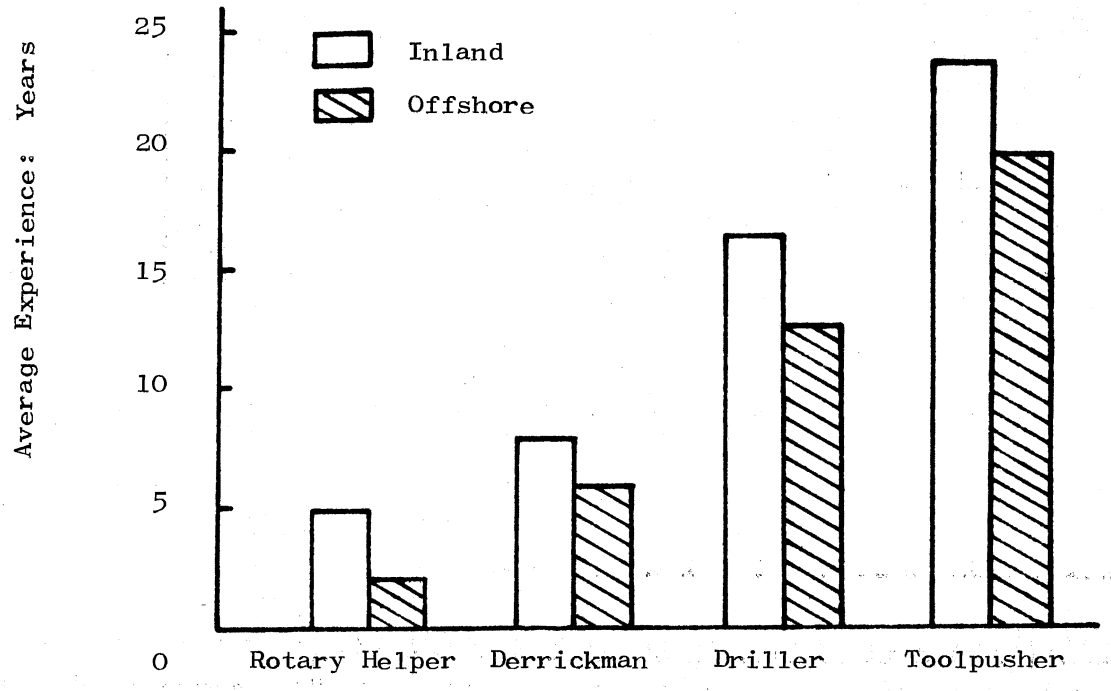
> The experience level, as measured by total time on a rig, is averaged for each crew member on Figure 3. The results received to date cover a total of 360 crew members, most of them on land rigs. The average experience of the rotary helper is five years on land and two years offshore. Experience increases progressively upward through the other positions until it is about 23 years onshore and 19 years offshore for the toolpusher. This may give us a bit of confidence until we notice, on Figure 4, that only one out of every two rotary helpers has had a training course of any kind. The record is only slightly better for the other crew members onshore with the land rig toolpusher having attended 2.3 courses. The average for all positions onshore is about one course for every ten years of work.
>
> The data for offshore is based on a very limited sample at present. It is similar. Drillers and toolpushers average 1.6 and 2.3 courses, respectively. These

TABLE II

INTERNATIONAL ASSOCIATION OF DRILLING CONTRACTORS CO-SPONSORED SCHOOLS FOR THE OIL AND GAS DRILLING INDUSTRY

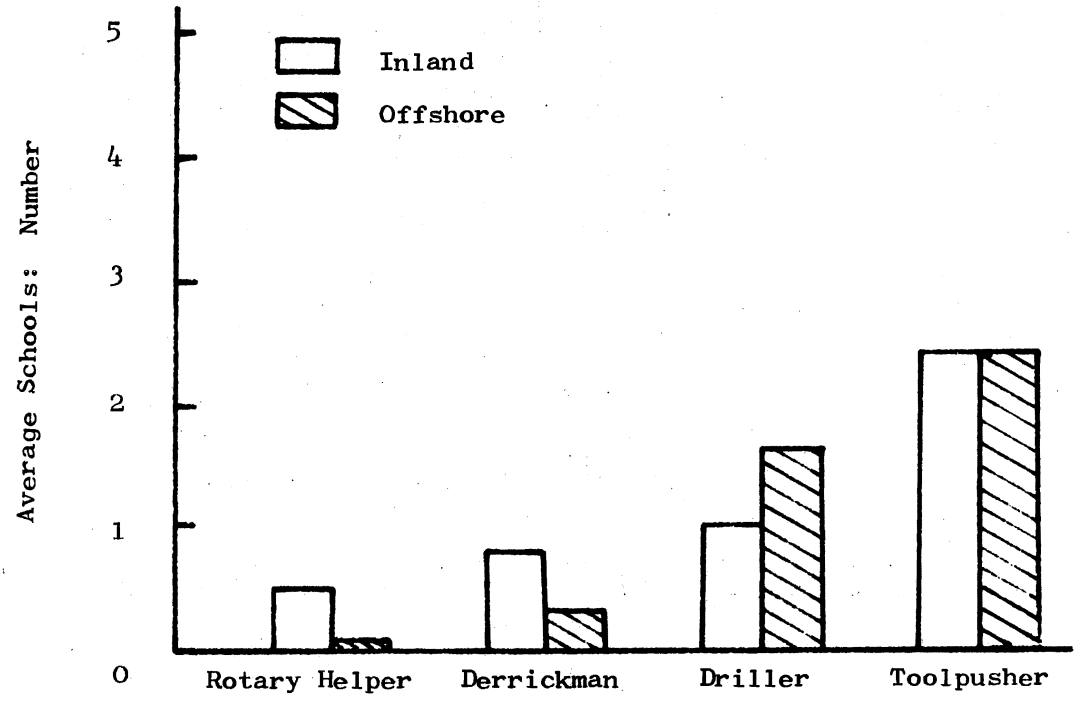
Schools	General Subject	Location	Tuition	Length	Prerequisite	When Held	Contact
BASIC DRILLING							
Elementary Drilling Technology	Basics-Exploration through well completion	Odessa TX	$125	1 week	None	Three times yearly	Petroleum Extension Service, Box S, University Station, Austin TX 78712
Introduction to Offshore Operations	Basics-Drilling and Offshore operations	Kilgore TX or where requested	$125	1 week	None	Semi-annually or when requested	Petroleum Extension Service, Box S, University Station, Austin TX 78712
ENTRY LEVEL FLOORMEN							
Entry Level Floormen Training	Beginner floormen training	Thibodeaux LA	None	4 week	None	Monthly	George Dupont, Nicholls State University, Thibodeaux LA 70301
Oil and Gas Drilling Institute	Beginner floormen training	Beaumont TX	$300	6 week	None	Every 6 weeks	Joe Reho, Director of Continuing Education, Lamar University, Box 10008, Beaumont TX 77710
Drilling Personnel Training Program	Beginner floormen training	Corpus Christi, TX	$70	4 week	None	Monthly	M. E. Mauer, Del Mar College, Baldwin at Ayers, Corpus Christi TX 78404
INTERMEDIATE DRILLING							
School of Drilling Technology	Modern Drilling techniques and equipment	Odessa TX	$350	4 week	One Year experience and English proficiency	Quarterly	Petroleum Extension Service, Box S, University Station, Austin TX 78712
Gulf Coast School of Drilling Practices	Modern Drilling techniques and equipment	Lafayette LA	$250	4 week	None	Semi-annually	Gulf Coast School of Drilling Practices, Petroleum Engineering Dept., Box 635, U.S.L. Station, Lafayette LA 70501
ADVANCED DRILLING							
School of Offshore Operations	Operations peculiar to offshore drilling	Baytown TX	$250	2 week	Land drilling experience	Semi-annually	Petroleum Extension Service, Box S, University Station, Austin TX 78712
Advanced Drilling Engineering	Drilling engineering	College Station, TX	$400	2 week	Engineering degree and year drilling experience	Annually	Texas A&M University, Petroleum Engineering Department, College Station TX 77843
School for Drillers and Toolpushers	Basic drilling engineering	Odessa TX or where requested	$175	1 week	Experienced drillers or toolpushers	Quarterly schedule and when requested	Petroleum Extension Service, Box S, University Station, Austin TX 78712
BLOWOUT PREVENTION							
IADC Blowout Control Center	Classroom and hands-on kick control	Baton Rouge LA	$375	3 days	Drilling experience	Twice/week	Reg Hibberts, Louisiana State University, Blowout Control Center, Baton Rouge LA 70803
Oilwell Blowout Prevention Systems	Classroom and hands-on kick control	Norman OK	$380	3 days	Drilling experience	Twice/week	A. N. Griffith, IADC Oilwell Blowout Prevention School, The University of Oklahoma, 865 Asp Ave., Room 221, Norman OK 73069
Blowout Prevention Refresher Course	Kick control with simulator	Lafayette LA	not set	2 days	Attendance at LSU or OU Center	Not set	Gulf Coast School of Drilling Practices, Petroleum Engineering Dept., Box 635, U.S.L. Station, Lafayette LA 70501
SUPERVISION							
Field Level Supervisory Course for Drilling Contractors	Fundamentals of supervision	Norman OK	$100	1 week	Drilling experience	Semi-annually	W. I. Hartman, University of Oklahoma, Business and Industrial Services, 1700 Asp Ave., Norman OK 73069
Management Seminar	Fundamentals of management	Dallas TX	$175	1 week	Management level	Annually	The Institute of Management, P.O. Box 319, Southern Methodist University, Dallas TX 75275
SAFETY							
Field Level Supervisors Safety Course	Fundamentals of safety	Norman OK	$100	2 days	Driller or above	Semi-annually	W. I. Hartman, University of Oklahoma, Business and Industrial Services, 1700 Asp Ave., Norman OK 73069

Source: Lejeune Wilson, "IADC Sponsored Training Schools Grow in Number, Quality," The Drilling Contractor (November-December, 1975).



Source: J. V. Langston, "Crew Training, The Need is Urgent, The Time is Now," Drilling-DCW (May, 1975).

Figure 3. Rig Crew Experience



Source: J. V. Langston, "Crew Training, The Need is Urgent, The Time is Now," Drilling-DCW (May, 1975).

Figure 4. Rig Crew Training

> numbers hardly need discussion. Their message is clear. The immediate and pending needs dictate we train our crews as rapidly as possible. We no longer have 15 to 20 years to train top rig crewmen (p. 64).

In reporting on training facilities, Langston recognizes "the IADC and many contractors acting individually, have long had some formalized training programs for crew personnel" (p. 64); and believes these schools "will continue to be a strong and valuable influence" (p. 64). Figure 5 presents a map from Langston's report, which indicates the geographic locations of both public and private institutions providing crew training.

As Langston (17, pp. 64-65) explains:

> These schools by-and-large are easily accessible to most drilling operations. It is apparent, however, additional schools must be established in some areas or industry must be willing to bear the expense of sending their people long distances for training. The scope of the work ranges from training of rotary helpers in the basics of their job to training and refreshing the toolpusher and other supervisory people in the fundamentals of well control. These latter facilities ordinarily include both classwork and hand-on practice. There is a shortage of each category of school to handle the anticipated volume of training. The more basic courses can be established rapidly at public or private facilities around the country. A start already exists in approximately six institutions. The more specialized facilities required for hands-on practice in well control also exist at two public and four private installations.

However, in looking to the future he points out:

> At first glance, the above activity may look good; but, when compared with the training level on existing rigs and in view of the expected increase in number of rigs, it is obvious a large expansion is required. The facilities currently in existence and those planned for the near future can meet only a fraction of our immediate demand for trained people. The expansion need not wait for teaching material. This material is already available in the form of literature from the API, the I.A.D.C. service companies, contractors, and operating companies. Much

Source: J. V. Langston, "Crew Training, The Need is Urgent, The Time is Now," Drilling-DCW (May, 1975).

Figure 5. Schools Conducting Crew Training

> of it is up to date, available, and ready to use; some of it needs updating, but that will be a continuing need as it is in any progressive industry.
>
> The operator and the contractor share the responsibility of supporting a comprehensive crew training program. The operator on his part should be ready to financially assist the initial effort. The contractor bears the responsibility of encouraging his people and insuring their participation. The immediate costs to both parties will be repaid through the benefits of having well-trained people on the job.
>
> What, then, should be our next step or steps? There are two. First, industry as a whole simply must get behind the effort. It is needed, it is worthwhile, we should make it go. Second, we must provide high-quality training throughout the country on a continuing basis. A uniform minimum coverage must be established and administered for each category of training . . . . The skills and responsibilities of drilling crew members now require that we have the best people available. They then deserve to be trained in their jobs like any other worker in a progressive and complex industry (p. 65).

In a summary of the on-shore, drilling industry's employee training needs and recommendations for meeting these needs, Helmerich and Payne International Drilling Company's Ted Warren (20) explains:

> In conclusion, the motives and degree of need for employee training and education will vary with the environmental operating and financial circumstances within which a contractor works. These factors will vary as greatly as the size and personalities of the companies in the contract drilling industry. Correspondingly, the best training program for a contractor will be a unique combination of the internal resources and the outside schools and material available. An effective program for meeting the training needs of a company or an entire industry requires that explicit answers be made as to why, what, who and when training is needed, and that these answers be continually updated to meet new demands.
>
> Currently, Helmerich and Payne and most domestic land drillers do not have the need for nor have they developed the sophisticated in-house programs of the larger foreign operating offshore contractors. It appears that domestic land contractors can benefit by jointly participating in the IADC sponsored schools rather than developing extensive in-house programs at this time. To do their part, they need to bring well-defined needs representing their segment of the

> industry before the IADC and be willing to participate in the associations working committees. In this way, onshore operators can be assured of schools to meet their present requirements, they will be better prepared to respond to changes in regulations made within their area of operations and they can better anticipate personnel problems if they choose to expand into new fields (p. 3).

Summary

This review of the literature has revealed a wide diversity of opinion, ranging from declining needs to a continuing long term demand for rotary rig drilling crewmen. Overall, the evidence seems to weigh in favor of increased needs, over an extended period, for these personnel.

Generally, an overall manpower expansion within industry is predicated on the training resources available for entry level workers. The industry appears to have recognized such a need and is responding in a number of ways. In addition to the individual companies' methods of on-the-job training, home study courses and formal company training programs, three entry level floorman IADC co-sponsored schools are now in operation.

Overall, this review of the literature has documented that a problem does exist; and, the review has provided insight and direction toward conducting a study of the problem.

CHAPTER III

METHODOLOGY

The purpose of this study was to evaluate selected IADC members' position with regard to entry level, rotary rig crew personnel. Toward this purpose, a preliminary investigation in late 1975 involving meetings and telephone conversations with petroleum industry representatives along with the review of various published reports and documents, revealed a concern over the availability of entry level, rotary drilling rig personnel. This was followed by a series of formal meetings with drilling contractor representatives who were also members of the International Association of Drilling Contractors (IADC) in Tulsa, Oklahoma City, and at Oklahoma State University, Stillwater, Oklahoma. Throughout these sessions, there was a reiterated concern regarding the need for entry level, rig crewmen with discussions centering upon the potential of a school for these personnel within the area. Further, a general consensus evolved that any study of the need and subsequent development of a school should be closely coordinated with the IADC.

Early in 1976, a decision was made at Oklahoma State University to conduct a study seeking answers to the following questions:

1. What is the anticipated need through 1978 for entry level, rotary rig crew personnel within the regional area of Oklahoma, Kansas, and the Texas panhandle?

2. What is the interest and potential for employers' support of an entry level school within this regional area?

Further, it was resolved that the development and administration of a questionnaire would be coordinated with the Education and Training Committee of the IADC.

Definitions

For the purpose of this study, the following definitions are applicable.

Drilling crew - A driller, derrickman, and two or more helpers (generally floormen) make up a drilling crew to operate a rig for one tour each day.

Entry level - A beginner's level; for one who is just beginning to do or learn something. The entrance level for an inexperienced rig crewman.

Entry level school - A training program to prepare beginners for more efficient and effective performance as entry level rotary rig crewmen.

Floorman - A member of the drilling crew whose work station is about the derrick floor. Normally, the first level of proficiency for a beginner.

IADC - The International Association of Drilling Contractors, 7400 Harwin Drive, Suite 305, Houston, Texas 77036. Founded in 1940 as the American Association of Oilwell Drilling Contractors, the association is principally concerned with research, education, safety, and other matters of interest to drilling contractors.

Inexperienced crewman - One who is at entry level. In the vernacular of the industry a "boll weevil" or a "weevil."

Rig crew - A driller, derrickman, and two or more helpers (generally floorman) make up a drilling crew to operate a rig for one tour each day.

Rotary Rig - A derrick, drawworks, and attendant surface equipment which employs a rotating bit for the drilling method.

Weevil - One who is at entry level.

Selection of the Subjects

Following discussions with Donald G. Davis, Vice Chairman - United States of the IADC Education and Training Committee and other IADC representatives, a decision was made that the subjects would involve the drilling contractors with operations in Oklahoma, Kansas, and the Texas panhandle. The decision for the final determination of the subjects to be included was to be made by Davis.

Development of the Questionnaire

A preliminary questionnaire was developed to assess the industry's present and projected position regarding drilling rig crewmen. The questionnaire items involved the areas of personnel recruitment, attrition, salary, age of workers, experience level, present employment level, employment needs--present and projected, rig activity--past, present and projected, and the evaluation of the interest and support of the industry in an IADC co-sponsored, entry level school in the region. The original questionnaire format incorporated a matrix-cell concept for the major part of the data response.

Following a review of the questionnaire draft by the IADC Education and Training Committee in a Houston meeting, a revised version with item reductions and elimination of certain areas was recommended by the Committee (see Appendix C). These recommendations were generally incorporated. Later, in a regional IADC meeting at Oklahoma City, the questionnaire was again overviewed and further revised in response to the comments and suggestions received at this meeting.

The final questionnaire was the result of a concensus that a lengthy, detailed questionnaire would not be favorably received by the industry on the basis of time required for completion and possible encroachment of privacy. Moreover, most items concerning quantitative predictions were revised to provide for an estimate in the general terms of "increase, decrease, or remain the same." The questionnaire used for the study is provided in Appendix A.

Collection of the Data

In early March, 1976 the questionnaire forms were delivered to Donald G. Davis for his subsequent delivery with instructions to the IADC office in Houston. Davis advised the mailing list was being compiled and the material would be forwarded to Houston.

The questionnaires were mailed by the IADC office in Houston in mid-March, 1976 with a cover letter (see Appendix B) encouraging a response from the recipients. In mid-April, 1976 it was determined by the IADC office that the survey was completed and the responses were being forwarded to Oklahoma State University. The respondents' questionnaires were received approximately one week later.

Analysis of the Data

The characteristics of the study and necessary format of the questionnaire involved response data that were nominal in nature. As a result, it was determined the data would be more meaningful if analyzed and summarized by frequency, percentage, and/or a weighted technique dependent upon the nature of the particular questionnaire item. Further, the data were arranged and analyzed within three major categories as follows:

I. Regional rotary rig activity

II. Rotary rig crew personnel

III. Entry level school

Within category I, regional rotary rig activity, the number of present active rigs as compared to the number of active rigs 12 months prior were analyzed as a per cent of change in activity. Whereas, the responses to the prediction of anticipated rig activity through 1978 were weighted, accordingly:

Response	Weight
Increase	1
Decrease	-1
No Change	0

By this method, a weighted mean was obtained as a quotient of the sum of the weighted responses divided by the number of respondents.

In category II, rotary rig personnel, the present total number of crewmen were compared to the total number of new hires during the same period 12 months earlier on a percentage basis. By the same method, the total number of new hires was compared to the total

number of inexperienced new hires. The predictions concerning an anticipated need for entry level personnel through 1978 were analyzed utilizing the same method and response weight values as used in category I for anticipated rig activity.

Selected data from categories I and II, namely the present number of crewmen and present number of rigs, were utilized to provide a quantitative analysis of the relationship of crewmen to rigs. By this analysis, the average crew size was determined; whereby, personnel increases or decreases might be correlated to rig count variance.

For category III, the questionnaire items requiring a "yes" or "no" response were analyzed on a percentage basis of those responding "yes." Regarding the recommended duration of a training program in weeks, the responses were evaluated to provide a duration mean and range. Finally, the number of students the respondents indicated they would expect to send during 1976, 1977, and 1978 were summed by the respective years.

Assumptions and Limitations

The following assumptions concerning the analysis of this study are deemed appropriate.

1. As all responses were dated within a ten-day interval, such intervening variables as economic and political influences were assumed to be reasonably consistent over the reporting period.

2. It was assumed that each respondent's interpretation of the questions and considerations in response was sufficiently similar to provide a meaningful analysis.

The results of this study are limited in that all respondents were members of the IADC. While the IADC does represent the majority of the industry, it does not represent all drilling contractors within the area comprised by this study.

CHAPTER IV

RESULTS

Since the purpose of this study was to evaluate the IADC members' position with respect to entry level, rotary rig crew personnel, the study was closely coordinated with the IADC. As a result, the questionnaire reflected the recommendations of several IADC members and their education and training committee; the selection of the subjects was made initially by a vice-chairman of the IADC Education and Training committee; and the collection of data was directed by the IADC office in Houston, Texas.

Return Rates

The initial selection of subjects to be included in the study was made by Donald G. Davis, Vice-Chairman - United States of the IADC Education and Training Committee. This listing of selected drilling contractors with operations in Oklahoma, Kansas, and the Texas panhandle, and the questionnaire forms were forwarded by Davis to the IADC office in Houston, Texas in mid-March. The data collection was conducted by the IADC office and the responses were returned to Oklahoma State University in late April.

Twenty-five completed questionnaires were received and it was immediately determined that seven of the respondents did not have drilling operations in the region specified by the study. This fact

was evident by those respondents' who indicated no rig activity in the region and/or comments to this effect.

Through a series of telephone conversations and meetings with IADC representatives, the IADC office and others concerned with the study, it was determined that the mailout inadvertently included some IADC members without operations in the region specified by the study. However, through the assistance of the IADC office, a complete listing of the mailout was provided and it was confirmed by reference to the 1976 IADC membership directory (21) that all members within the specified region were included. Specifically, 61 companies appropriate to the study were involved and 18 applicable responses were received for a return rate of 29.5 per cent.

Results of Analysis

The data obtained from the responses were analyzed in accordance with the analysis treatment described in Chapter III. The characteristics of the study and evaluation of the questionnaire produced response data that were nominal in nature. The results of the analysis of these data, in terms of the elements of the questions this study sought to answer, are reported accordingly.

An analysis of the regional, rotary rig activity is summarized in Table III. An increase of 5.3 per cent in the number of active rigs over the past 12 months up to the end of March, 1976 is indicated. The anticipated rig activity through 1978 is reflected as a weighted mean of 0.17 that was derived by using the following weighted values:

Increase 1

Decrease -1

No Change 0

TABLE III

REGIONAL ROTARY RIG ACTIVITY - OKLAHOMA, KANSAS, AND THE TEXAS PANHANDLE

A	B	$\frac{A-B}{B}$ (100)	No. of Rigs Per Company (A)		Anticipated Rig Activity Through 1978
Present No. of Rigs	No. of Rigs 12 Mos. Ago	Per Cent Change	Mean	Range	Weighted Mean
79	75	5.3	4.4	1-14	0.17

The results of the rotary rig crew personnel analysis are shown in Table IV. Quantitative values in terms of the present number of crewmen, the number of new hires in the past 12 months, and the number of new hires that were inexperienced are indicated with their associated percentage values. The anticipated need for entry level personnel through 1978 resulted in a weighted mean of 0.11 as determined by the weighted response method.

An integration of certain data from Tables III and IV are used to reflect the relationship of the rig crewmen to the rotary rigs in Table V. This table shows an average of 14.7 crewmen were used by the contractors' to man the 79 active rigs in the region. On this basis

TABLE IV

ROTARY RIG CREW PERSONNEL - OKLAHOMA, KANSAS, AND THE TEXAS PANHANDLE

A	B	$\frac{B}{A}(100)$	C	$\frac{C}{B}(100)$	
Present No. Crewmen	No. New Hires - Past 12 Mos.	Per Cent	No. New Hires - Inexperienced	Per Cent	Anticipated Need: Entry Level Personnel Through 1978 Weighted Mean
1161	548	47	227	41	0.11

TABLE V

RIG CREWMEN/ROTARY RIG RELATIONSHIPS

A	B	$\frac{A}{B}$	C	$\frac{A}{B}$ (C)
Present No. Crewmen*	Present Number Rigs**	Mean	Net Increase No. Rigs***	Required Crewmen
1161	79	14.7	4	59

* From Table IV
** From Table III
*** From Table III (A-B)

an additional 59 rig crew personnel would have been required for the net increase of four rigs during the last week of March, 1976 as compared to the same period in 1975.

Table VI contains an analysis of the responses concerning an entry level school. The percentage of favorable responses with regards to interest in a school, preference to graduates, and participation in a cooperative program (i.e., alternate students between the school and their rigs) are shown. As shown by the footnotes associated with Table VI, some respondents omitted these particular questionnaire items. As such, only the declared responses, "yes" or "no", were used in determining the results. The respondents' recommendations concerning the number of weeks such a school should require are reflected by a mean value of 3.2 weeks and as a range from one to six weeks. Again, with regard to how many students they would expect to send if such a school were available, the responses are shown as totals for the years 1976, 1977, and 1978, respectively, as 50, 62, and 63. Seven of the returns did not respond to this question.

While other techniques in analyzing and presenting the data do exist, the preceeding methods and format are considered appropriate to the questions stated in this study. The results of this analysis, in terms of selected conclusions and recommendations are presented in the following chapter.

TABLE VI

ENTRY LEVEL SCHOOL EVALUATION

Interest in School* Per Cent-Yes	Preference to Graduates Per Cent-Yes	Participate in Coop. Program** Per Cent-Yes	Recommended Length of Program - Weeks*** Mean	Range	No. of Students Expect to Send**** 1976	1977	1978
81	94	73	3.2	1-6	50	62	63

* No response on 2 returns
** No response on 3 returns
*** No response on 5 returns
**** No response on 7 returns

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This study emerged from a national concern over energy needs and the growing dependency on other nations to serve these needs. While a variety of energy resources and alternatives prevail, the oil and gas extractive industry is in an expansion mode with reported manpower needs. In view of its regional importance, this study was focused on the petroleum drilling industry and centered upon the International Association of Drilling Contractors (IADC) members' position concerning entry level, rotary rig crew personnel.

Summary

The purpose of this study was to evaluate the International Association of Drilling Contractors (IADC) members' position with respect to entry level, rotary rig crew personnel. The two questions the study sought to answer were:

1. What is the anticipated need through 1978 for entry level, rotary rig crew personnel within the regional area of Oklahoma, Kansas, and the Texas panhandle?
2. What is the interest and potential for employers' support of an entry level school for these personnel within this regional area?

These questions evolved from a series of discussions and meetings with drilling contractor representatives in late 1975 and early 1976. From these meetings, it was resolved that such a study would be more effectively conducted if coordinated with the IADC. As a result, the selection of the subjects, development of the questionnaire, and collection of the data was closely coordinated with IADC member representatives, its Education and Training Committee, and the Association's office in Houston, Texas.

From a mailout of questionnaires to 61 IADC members with operations in Oklahoma, Kansas, and the Texas panhandle, 18 responses were received for a return rate of 29.5 per cent. The nature of the study involved procedures which produced nominal data; hence, the data were analyzed accordingly.

An analysis of the results indicated a 5.3 per cent increase in the number of active rotary rigs in the region at the end of the 12-month report period with an anticipated increase in rig activity, reflected by a weighted mean of 0.17, through 1978. There were 1161 crewmen presently employed in the region by the respondents; and over a 12-month period they reported 548 new hires. Of the 548 new hires, 227 or 41 per cent were considered to be inexperienced. An anticipated need for entry level workers through 1978 was resolved to have a weighted mean of 0.11. With regards to an entry level school within the region, 81 per cent expressed an interest, 94 per cent indicated they would give an employment preference to the graduates, and 73 per cent were favorable toward alternating students between a school and their rigs. The respondents' opinions of how many weeks an entry level school should require ranged from one to

six weeks with a mean of 3.2 weeks. As to how many students they would expect to send, if such a school was available, provided a combined response of 50 in 1976, 62 in 1977 and 63 in 1978.

Conclusions

In this section, certain conclusions are based upon an analysis of the results in terms of the relationships between the variables determined by the study and the elements of the questions this study sought to answer. Other conclusions are stated in comparative terms between certain results and the review of the literature. The final two conclusions are a synthesis of the preceeding conclusions and directly address the questions that determined the purpose of this study.

There is a general concensus, that in the drilling business, the barometer that everyone watches is the rotary rig count. As such, this indicator was useful in providing various elements important to the study. In this respect, it is relevant that the respondents to the study reported a total of 79 of their active rotary rigs were operating in the regional area during the last week of March, 1976 as compared to the total industry's regional count of 262 during this same period. From this data, it was derived that, although the study involved only IADC member firms, the 29.5 per cent of those members responding to the study represented 30.2 per cent of the region's active rigs. Also the respondents represented a broad spectrum of rig activity with the individual count ranging from one to fourteen rigs for an average of 4.4 per company. On this basis, it is concluded, the proportion of IADC membership responding to this study is closely

proportionate to the total industry's activity in the regional area.

With regard to the anticipated regional rig activity through 1978, the contractor's opinion generally agrees with the majority of other industry sources in predicting an increase. However, based on the analysis of the results in this study, the conclusion is that the regional increase in activity may not be as great as the national level of increased activity forecast by the industry sources in the literature review.

Two significant results determined by the study concerning rotary rig crew personnel were the reported number of new hires over the 12-month period and the number of new hires who were inexperienced. Although the respondents reported an increase of 5.3 per cent in rig activity, the number of new hires over this same period was 548 or 47 per cent of their total present number of crewmen. However, it should be recognized that some of the 548 individuals may have changed employment among the reporting companies, one or more times, for geographical or other personal reasons during the report interval. In any event, 227 of the 548 or 41 per cent of the new hires were inexperienced or, in the vernacular of the industry, "boll weevils." Here again, the number and resulting percentage value appears high when compared to a drilling rig increase of 5.3 per cent. As is shown in Table V (p. 35) such a rig increase translates into a total of 59 additional crewmen, most of whom would be expected to be experienced.

A condition of high turnover of rig crew personnel is recognized as a problem in the National Petroleum Council report referenced by Sheffer in Chapter II. Perhaps the turnover rate may be explained,

at least in part, by O'Brien and the contractors' view expressed in the Drilling-DCW report in the review of the literature. For whatever reason(s), the conclusion is that the regional area of this study experienced a high turnover of crew personnel and a significantly high number of inexperienced personnel were employed during the period of this study.

A reasonably close relationship was found between the contractors' view of an anticipated increase in rig activity and need for entry level personnel. Whereas, the respondents' anticipation of rig activity through 1978 was resolved as a weighted mean of 0.17, the same methods reflected a weighted mean of 0.11 regards the need for entry level personnel through 1978. The conclusion of this finding is the regional area will experience an increase in the need for entry level personnel during this period though not likely as great as the national need expressed by Langston (17) and other industry sources.

In review of the contractors' attitude toward an entry level school, 81 per cent expressed an interest in such a school and a very high, 94 per cent, indicated that they would give an employment preference to graduates. With regard to alternating students between their rigs and the school, 74 per cent were favorable to such a plan. On this basis it is concluded that an interest and favorable attitude toward an entry level school exists.

In terms of the time required to conduct an entry level program, the respondents' opinions ranged from one to six weeks with an overall average of 3.2 weeks. Although, the interest and attitude toward a program were favorable, the number of students they indicated they would expect to send was quite low; specifically, the response was

50 in 1976, 62 in 1977 and 63 in 1978. With respect to the recommended program duration and student input, the conclusion is the student participation is too low to justify such a program.

The final and overall conclusions, in terms of the questions that determined the purpose of this study are:

1. The IADC respondents' needs for entry level, rotary rig crew personnel within the regional area of Oklahoma, Kansas, and the Texas panhandle will increase over the requirements of the past 12 months and will continue through 1978. It may be noted, any increase implies a number greater than the 227 inexperienced personnel employed by the respondents over the 12-month interval through the end of March, 1976.
2. A generally favorable attitude toward an entry level school in terms of interest, employment preferences to graduates, and a cooperative program of alternating students between their rigs and the school was expressed by the respondents. However, the support of a school in terms of the proposed number of sponsored students was considered to be inadequate.

Recommendations

The following recommendations are limited to those that may be logically derived from the conclusions of this study. These recommendations are:

1. The apparent need for entry level, drilling rig personnel should be articulated with the appropriate industry groups, educational institutions, state and federal agencies, and

prospective entrants. Future changes in this need are likely to be detected by the barometer of the industry--the active rig count.

2. Studies concerning the high turnover of rig crew personnel found by this study and as indicated in the review of the literature should be conducted.
3. Additional methods of eliciting information from the drilling industry should be investigated toward improving the response rate while achieving greater detail and breadth in the response data.
4. Other educational alternatives for entry level personnel that are not totally dependent on the contractors' sponsorship should be evaluated.

A SELECTED BIBLIOGRAPHY

(1) Exxon Company, U.S.A. Energy Outlook 1976-1990. Houston, Texas: Public Affairs Department, Exxon Company, n.d.

(2) "A Million Jobs Go Begging." Business Week, No. 2372 (March, 1975), 44.

(3) O'Brien, T. B. "People--The Drilling Problem." (Paper No. SPE 5167 presented to A.I.M.E. Deep Drilling and Production Symposium, Amarillo, Texas, September, 1974). Dallas, Texas: Society of Petroleum Engineers of AIME, 1974.

(4) U. S. Department of Labor and Department of Health, Education, and Welfare. Manpower Report of the President. Washington, D.C.: Government Printing Office, 1975.

(5) Federal Energy Administration. What is Project Independence? Washington, D.C., 1974.

(6) Energy Research and Development Administration. A National Plan for Energy Research, Development and Demonstration: Creating Energy Choices for the Future, Vol. 2: Program Implementation. Washington, D.C.: Government Printing Office, 1974.

(7) U. S. Department of Labor. Secretary of Labor's Report on the Impact of Energy Shortages on Manpower Needs. Washington, D.C.: Government Printing Office, 1974.

(8) Long, Mike. "Drilling Outlook Bright: But Watch Out for Increasing Manpower, Equipment Shortages." Drilling-DCW, Vol. 34, No. 12 (September, 1973), 34-36.

(9) "A Drilling-DCW Special Report, Part III: Can We Marshall the Rigs and Keep Them Running?" Drilling-DCW, Vol. 34, No. 12 (September, 1973), 23-24.

(10) Skelton, Max B. "Drilling Rig Critics 'Unfair'." The Daily Oklahoman (November 30, 1975), Section B, 10.

(11) Sheffer, Loran. "Mr. (and Mrs.) Worker We Need You." Drilling-DCW, Vol. 36, No. 4 (February, 1975), 67-71.

(12) Oklahoma Employment Security Commission. Manpower Projections Phase II: Oklahoma Occupational Employment, 1970-1980. Oklahoma City, Oklahoma: Research and Planning Division, Oklahoma Employment Security Commission, December, 1974.

(13) Texas Employment Commission. Changing Horizons: A Profile of Jobs to 1980. Austin, Texas: Texas Employment Commission, February, 1975.

(14) "Midyear Report: Drilling, Demand Up; Production Down." Oil and Gas Journal, Vol. 74, No. 30 (July, 1976), 105, 110.

(15) "Annual Range in U. S. Rig Activity and Drilling Rates Since 1948." The Drilling Contractor (November-December, 1975), 14.

(16) "Statistics--Hughes Rig Count." Oil and Gas Journal, Vol. 74, No. 13 (March, 1976), 208.

(17) Langston, J. V. "Crew Training: The Need is Urgent, The Time is Now." Drilling-DCW, Vol. 36, No. 8 (May, 1975), 63-65.

(18) Wilson, Lejeune. "IADC--Sponsored Training Schools Grow in Number, Quality." The Drilling Contractor (November-December, 1975), 49-52.

(19) Summitt, C. D. "Advancement Training Program" (Paper No. 76-2E presented at the 1976 IADC Rotary Drilling Conference of the IADC, Dallas, Texas, March, 1976.) Houston, Texas: Zapata Off-Shore Company, 1976.

(20) Warren, Ted. "Variable Responses to Different Training Needs." (Paper No. 76-2C presented at the 1976 IADC Rotary Drilling Conference of the IADC, Dallas, Texas, March, 1976.) Tulsa, Oklahoma: Helmerich and Payne International Drilling Company, 1976.

(21) International Association of Drilling Contractors. 1976 Membership Directory, Houston, Texas.

APPENDIXES

APPENDIX A

QUESTIONNAIRE

DRILLING PERSONNEL REGIONAL SURVEY
OKLAHOMA, KANSAS, AND TEXAS
PANHANDLE (Dist 10)

Oklahoma State University
Stillwater, Oklahoma

International Association
of Drilling Contractors

Company Name: _____

Your Name: _____

Your Title: _____

Date Survey Completed: _____

Instructions:

Please provide data applicable to your company's operations within Oklahoma, Kansas, and the Texas Panhandle.

Where exact data is not available, provide your best estimate.

Return the completed questionnaire to:

International Association of
Drilling Contractors
7400 Harwin Dr., Suite 305
Houston, TX 77036

RIGS

1. Present number of active rotary rigs you have in the region. _____

2. Number of active rotary rigs you had in the region twelve months ago. _____

3. Anticipated rotary rig activity within this region through 1978 (as compared to present).

Check (✓) appropriate

_____ Increase _____ Decrease _____ No Change

PERSONNEL

4. Present number of rig crew personnel (Drillers, Derrickmen, Floormen) you employ in the region. _____

5. How many of these personnel (Item 4) were "New Hires" within the past twelve months? _____

6. How many of these "New Hires" (Item 5) were inexperienced (weevils)? _____

7. Your company anticipated need for entry level, rig crew personnel within the region through 1978 (as compared to present).

Check (✓) appropriate

_____ Increase _____ Decrease _____ No Change

ENTRY-LEVEL SCHOOL

8. Are you interested in an Entry level, Drilling School within the region? Yes _____ No _____

9. Would you give preference to hiring graduates of such a drilling school over untrained applicants? Yes _____ No _____

10. How many weeks do you think such a training program should require? Yes _____ No _____

11. Would you be willing to alternate students between the school and your rigs if that seemed appropriate? Yes _____ No _____

12. If such a school were available, how many students would you expect to send during:

1976 _____ 1977 _____ 1978 _____

Please add any comments or suggestions you may have.

APPENDIX B

COVER LETTER

INTERNATIONAL
ASSOCIATION OF
DRILLING CONTRACTORS

7400 HARWIN DR., SUITE 305
HOUSTON, TEXAS 77036
PHONE: 713/784-4090

To: Mid-Continent Members of IADC

Subject: Proposed Entry Level Drilling School
Oklahoma State University

Gentlemen:

After serious discussions with Messrs. Carl Young and Ted Warren of Helmerich and Payne, as well as Mr. Don Davis of Big Chief, Oklahoma State University has indicated a wish to survey for the potential interest and utilization of an entry level training school in Stillwater. As you probably know, there are entry level schools at Nicholls State University in Thibodeaux, Louisiana, and at Lamar University in Beaumont, Texas. Introductory classes are offered in Odessa at the IADC Drilling School. While these serve an admirable purpose in the areas where they operate, it has not been convenient for contractors in Oklahoma, Kansas and the Mid-Continent generally to send crew members to them.

This letter is a first step in attempting to find out just what the interest of each and every contractor in the Mid-Continent would be toward having a basic drilling school at entry level which would be co-sponsored by the IADC in the same manner that we co-sponsor some 25 other schools.

Please consider carefully and respond to each question in the attached survey so that we may reach accurate conclusions and set up a first class school if there is a suitable interest among the members. In addition, if you wish to request consideration of other types of training for drilling personnel at O.S.U., please include these comments and suggestions as well. We hope to have the replies from the survey in Houston by May 1st and the results summarized by mid May to advise you.

Thank you very much for your attention to this request, and we will look forward to an early response.

Yours truly,

Lejeune Wilson
Chairman
Education and Training Committee

LW/skw
Attachment
cc: Don Davis
Ted Warren

APPENDIX C

RELATED CORRESPONDENCE

BIG CHIEF DRILLING COMPANY
A SUBSIDIARY OF
ENTEX, INC.

January 19, 1976

Mr. Ed Darby, Research Associate
School of OAED
Classroom Building, Room 406
Oklahoma State University
Stillwater, OK 74074

Dear Ed:

The Education and Training Committee discussed, at our recent meeting in Houston, a proposed "flyer" which would appear on the IADC letterhead. Attached is a draft of the proposed "flyer" and incidentally please feel free to change this draft in anyway which you think would be helpful to the cause. Also enclosed, is a draft of Mr. Lejeune Wilson's, Chairman of the IADC Education and Training Committe, version of the survey questionnaire.

Please look this material over and possibly we can get together on Thursday of this week either before or after the Contractor's Meeting at the Petroleum Club in Oklahoma City and discuss this matter further.

Yours truly,

BIG CHIEF DRILLING COMPANY

Donald G. Davis

Donald G. Davis
Vice President

DGD:psg

Enclosures

P. O. BOX 14837, OKLAHOMA CITY, OKLAHOMA 73114 PHONE 405/843-5721, TELEX: 74-7150

INTERNATIONAL ASSOCIATION OF DRILLING CONTRACTORS

7400 HARWIN DR., SUITE 305
HOUSTON, TEXAS 77036
PHONE: 713/784-4090

February 4, 1976

Mr. Edwin S. Darby,
Research Associate
Oklahoma State University
Classroom Building 406
Stillwater, Oklahoma 74074

Ed,

I'm attaching our current list of schools. It won't tell you much you didn't already know. You'd done a lot more homework than I had realized when I spoke with you in Oklahoma City. And you've got plugged in at the right spots when you made contact with Lejeune Wilson and James Jay. Lejeune is the man who heads the group deciding which school gets IADC sponsorship and which does not. James has the most recent practical experience in getting a school started. We here at the IADC office will be of any help we can as your project develops.

Yours truly,

Ed McGhee

EMcG:es
Attachment

February 13, 1976

Mr. Don Davis, Vice President
Drilling
Big Chief Drilling Company
Box 14837
Oklahoma City, OK 73114

Dear Don:

Enclosed find the draft of a "survey instrument" we believe appropriate toward determining the mutual interests of O.S.U. and the industry regards an entry level, drilling school. We have endeavored to incorporate those items recommended by Mr. Lejeune Wilson as well as additional ones concerning "equipment and personnel." Through these twelve items, I believe we will obtain an adequate regional quantification of the industry and, a qualification of interest (or lack thereof) to make a decision. Also the "letter of endorsement" prepared by Mr. Wilson is excellent "as is" and very adequately describes the purpose of the survey.

I appreciate your recommendation that the I.A.D.C. office should handle the mailout and collect all responses to the survey. However, it is essential that we ultimately receive the returned responses (or copies of the originals) for our evaluation of the results. Certainly, the I.A.D.C. and the respondents may be assured of the maintenance of confidentiality by O.S.U. regarding company and personnel identification. Finally, we would appreciate a copy of the mailout and a listing of the recipients.

We surely appreciate the attention and assistance that you, Carl Young, Ted Warren and others have given to this matter.

Sincerely,

Edwin S. Darby
Research Associate

ESD/kp
cc: Carl Young

VITA 2

Edwin S. Darby

Candidate for the Degree of

Doctor of Education

Thesis: A SURVEY OF SELECTED DRILLING CONTRACTORS CONCERNING ENTRY LEVEL PERSONNEL

Major Field: Vocational, Technical and Career Education

Biographical:

Personal Data: Born near Wewoka, Oklahoma, October 11, 1932, the son of Mr. and Mrs. Willis F. Darby.

Education: Graduated from Stillwater High School, Stillwater, Oklahoma, in 1950; graduated from the School of Technical Training, Oklahoma A&M College, 1955; received the Bachelor of Science degree from Oklahoma State University in 1963 with a major in Technical Education; received the Master of Science degree from Oklahoma State University in Technical Education in 1970; completed requirements for the Doctor of Education degree at Oklahoma State University in December, 1976.

Professional Experience: Aeronautical Technician for the U. S. Navy, Central Airlines, and the Federal Aviation Agency, 1951-1957; Instructor, Aeronautical Technology Department, Oklahoma State University, 1957-1960; Department Head, Aeronautical Technology, Oklahoma State University, 1960-1963; Department Head and Assistant Professor of Aeronautical Technology, Oklahoma State University, 1963-1965; Department Head of Science Department, Technical Institute, Oklahoma State University, 1965-1967; Associate Project Director of Brazil Technical Education Program, Oklahoma State University, 1967-1970; Assistant Director, School of Technology, Oklahoma State University, 1970-1971; Associate Director and Associate Professor of School of Technology, Oklahoma State University, 1971-January, 1975; Assistant Director for Academic Affairs, Oklahoma State Tech, Oklahoma State University, Okmulgee, Oklahoma, January, 1975-August, 1975; sabbatical leave and Educational Professional Development Act Fellowship, August, 1975 to September, 1976.

Professional Affiliations: Oklahoma Technical Society and immediate past president; Oklahoma Adult and Community Education Association; American Technical Education Association; American Society for the Certification of Engineering Technicians; American Society for Engineering Education.