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Oral history interview with General F. P. Koisch
[full name of interviewee]

about Corps of Engineers as MSC Construction
[main focus of interview]

Agent

Title: 1969 - Director of Civil Works, Corps of Engineers
[interviewee's current and/or former title and affiliation]
1961 - Dep. Dir for Military Construction, CE

Interview conducted by Robert B. Merrifield - Staff
[interviewer's name/position]

Historian at ~~MSB~~ Corps of Engineers?
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design concept; utility & road layouts; excessive
change orders during construction; Bechtel ^{Co} & STSL design; ^{MSC} pot. estimates & bids; Changing
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for bidders; ^{testing} hurricane-proof windows; Corps
main^{tenance} equipment procurement; on-site Corps engineering
office; local labor relations

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General F. P. Koisch
Director of Civil Works, Corps of Engineers
9-11-69

My first involvement with NASA came in 1961, when I was Deputy Director for the Military Construction in the office of Chief of Engineers. At this time the engineers were deeply involved in construction for the Air Force missile sites and were the construction agent for most Air Force work connected with missiles. We were also the construction agent for the Army Ballistic Missile Command then at Huntsville. As a result we had a familiarity in the type of things in which NASA had a great interest. In late 1960 and early 1961 the Corps approached NASA with an offer to become their construction agent, in the same sense we were a construction agent for the Air Force. We offered to provide complete service--design supervision through construction contracting and procurement service necessary to provide a finished product. We finally negotiated an agreement between the two agencies that we would be NASA's construction and real estate agent. It was a discretionary arrangement and NASA didn't have to give us every one of their projects or all of their real estate deals.

NASA knew from the start that its construction program would be spread over a 5-year period and in order to build up an in-house capability equivalent to that of the Corps, it would have had to go through the usual bureaucratic process of obtaining personnel spaces and hire competent people to fill them, with the full knowledge that within about 5 years that part of the organization would have to be shifted to other duties or undergo a reduction in force. To further complicate

NASA's problem, it was going to have to ask for authority to hire a large number of employees, most of whom would have to be devoted to what we might call engineering and development work. I believe that this was the principal factor that led NASA to use the Corps as its construction agent.

The Clear Lake site had already been picked, but the initial tract of land which had been obtained by lease from Rice University turned out to be too small, so one of the first things we had to do was to obtain additional land. This was accomplished through some purchase and some exchange in order that NASA could have the acreage required for the size facility they had in mind. Then of course came what you might call architectural concept. And this was rather difficult because they needed this architectural concept in order to get on with the design work. The only guidance from NASA was it wanted a campus-like atmosphere and they wanted it to reflect the NASA mission. The Corps, along with NASA, hired some competent architectural firms, among them was Luckman and Company, who more or less headed the team effort to determine what this Center would look like. Luckman also made the presentation of the type of buildings that now exist at NASA and this concept then was agreed upon. The brick industry of the U.S. couldn't understand why some of the buildings couldn't be brick. There were a great number of presentations and arguments of cost estimates of the type of construction that was actually decided upon versus brick construction.

While this design concept was being laid out, the utility features were already beginning to appear and a certain amount of design work

went into what you might call the utility and road layouts. As a result, the utility and roads were the first things constructed. This was an ideal arrangement because it permitted orderly site development and avoided all of the mud and mess when the roads and grounds are put in last. The space plan for a college campus layout called for construction which allows the frame of buildings to go up very quickly. These buildings could be enclosed in a very short period of time, with paneling which had been constructed off the site, in a proper type of prestressing plant in which quality control could be exercised. This also permitted relatively uncluttered construction and did away with most of the scaffolding, the ironwork was essentially clean, and the building was enclosed rapidly. These two features permitted more rapid construction than ordinarily and an uncluttered area. Since buildings were occupied as completed, NASA could work with relative freedom from the normal construction mess.

The Corps handled the utilities contract for NASA with the local utility companies for gas and electricity and provided them the same types of contracts that we normally use in military service.

Insofar as relationships are concerned, obviously the Corps was not to operate without NASA supervision. The facilities engineering group within NASA came into being and represented our contact point with the NASA people. In the initial phases of construction, we had very little trouble with the user of the facility, the scientist or technical group to work within the building. They were scattered all over Houston and did not make many site visits during construction.

As these users began working in the area, they began to insist on greater voice in construction and we began to have a great deal of trouble in matching funds with the end product. NASA's funds, like all other agencies, were limited. And when a building was under construction and the dollar limit was known, to make any changes upset the whole funding procedure. NASA had relatively little flexibility. The constant interference of the actual user was a headache and we spent a great deal trying to maintain this proper channel so that the user went to Facilities group and the Facilities group came to us and changes in fund allocation and costs could be taken care of at that time. This did not work well in practice, since the user had greater influence with MSC management and then we were on the defensive. There were far too many change orders during construction, an indication that the design did not reflect what was exactly wanted, once the customer could actually see what was being produced. Since the buildings were highly technical facilities and, in effect, one of a kind, we tried to control their design through conventional contracts where an architect engineering firm with scientific ability would produce, in effect, concept drawings. These are a great deal different than contract drawing with specifications. We would then hire someone else to transfer the concept into a concept drawing with specifications to be constructed by either some manufacturing firm for the mechanical facility itself or some construction firm for the building. This did not work well, and one of the primary reasons why it didn't, was that the Corps itself lacked this scientific talent that

could translate that concept so we were unable then to properly supervise the manufacturer who attempted to produce this device to be located within a building. We leaned on NASA very heavily for this in between contact, but it didn't quite work out. In my opinion, if this sort of thing had to be done over again, we should use a three-stage process of conception, design, and construction. Since the manufacturers furnishing the technical equipment were not used to fix-price bidding, they failed to conceive an end product that would stay with the funding limitations which had been agreed upon beforehand. Their general attitude was that when funds ran out, please send more.

Overall when one considers the fact of the number of buildings constructed and the great amount of sophisticated equipment that went into them, there were a great number of change orders to the contract but actually not very many claims. By claims, I mean those occasions when the contracting officer has denied a request for money and then the decision is appealed through administrative channels to be adjudicated by some special board or by a court. A settlement at the contractor's officer level is not a true claim.

The SESL was designed by Bechtol Company. Bechtol Company had sublet the chamber portion to Chicago Bridge and Iron, who supposedly had a great deal of expertise in this type of work. This chamber was one of a kind and very large. Somewhere in the design stage wrong parameters were used. These were not discovered until the tank actually was being tested. Subsequently, a few thousand dollars were spend to

hire expert consultants to determine what had gone wrong and what was necessary to repair it properly. The Government still holds Bechtol responsible for this design deficiency. Here again the method of contracting was a complicating feature as Bechtol was hired on a design contract, a portion of which was subcontracted to Chicago Bridge and Iron. The actual construction was a different contract also with Chicago Bridge and Iron, and the erection of the tank was Chicago Bridge and Iron inside a building being constructed by other contractors. Obviously, this led to a great deal of intermixing, slowdown in construction, while attempts were being made to keep administration of each of the separate pieces separate.

Government estimates of cost of construction computed during design and specification stage were pretty much in line with bids. Problems developed later in trying to hold to this cost level when change orders were added. We were dealing with technology and that's changing everyday. A design that had certain criteria in 1962 would be entirely different in 1964 when the construction was really underway, and, in order to keep up with this changing technology, many many changes were made during the construction phase. The attempt to masterplan the site and develop criteria simultaneously was nothing new for the Corps. It's a headache; it's difficult to manage; it leads to some errors, and yet it happens all the time in military construction. Translating concepts into dollars is much more difficult than translating an actual design into dollars. This was a real problem for NASA. We assisted but they had to make up

their budgets and defend them before the Congress and the Bureau of the Budget. And I don't think they can be blamed too much for occasionally having missed because the concept drawing and the mental picture together with a brief description of what is wanted hardly translates well into dollars and cents. And yet this is the problem MSC continually faced, because there simply was insufficient time between concept and actual use of the building.

The MSC Facilities Division also had its problems. At the same time it had to serve as liaison with the Corps, prepare to take over use of the buildings, and operate the facilities to the satisfaction of its customers. Some Corps people and some of the MSC people thought it would be better without a Facilities Division. I honestly don't think so and since I had the major chore of dealing with them and attempting to translate its concepts and funding limitations into actual construction; it did an exceedingly fine job. There were occasional personality clashes, but these will be found anywhere. Engineers don't always agree on exactly how to translate from the word to the drafting table.

There were some people in the Facilities Division and within the rest of MSC who believed that the Corps was not sufficiently hard on the contractors. Yet we did the same things with NASA that we do with other customers. Interpreting the contract is a job for the contracting officer. Where we may not have agreed with the NASA people, the responsibility still rested on the Corps to make these decisions.

While the Fort Worth District was in charge of construction the facilities of the entire Corps of Engineers were available.

Many problems were sent from Fort Worth to Washington to be resolved both from a technical viewpoint and from associations in funding standpoints.

Regardless of what comments may be made, the contractors that were utilized in NASA construction were the best in the Nation. We used pre-qualification procedures, that is, we required each contractor who was going to bid on the job to put forth his total qualifications, capabilities, financial standing, prior experience, etc. and through board action we determined whether he would be allowed to bid or not. Only pre-qualified contractors bid on the NASA construction. We did not maintain quite as tight control on our subcontractors, but we did require that they be approved by a contracting officer in every instance. Actually, we had the cream of the crop in construction capabilities. With regard to as-built drawings, they were supplied, the question of accuracy is the problem. For instance, there were times when the requirement for a utility entry at a certain location could not be met, for whatever reason, and this utility entry was changed. The change was noted on the as-built drawing by eye rather than by measurement. There were quite a few instances where the as-built drawings were inaccurate. It should be recognized, however, that as-built drawings are a part of the contract document and simply annotated to note the changes in construction. The question of knowing all the little things that went on in each job each day in terms of accurate measurements is very difficult to manage. People tend to forget that each building is custom built and with the traditional pattern of use of construction labor, the

finished product will still have some bugs in it. These can be worked out only by living in the building, utilizing its purpose, and ferreting out each deficiency as it shows itself. Design of the windows for the buildings at NASA was given special attention, because MSC is located in a hurricane area and window area is large and located at relatively great heights. These windows were put through actual tests to simulate hurricane conditions so that we could be sure they would not break, blow out, or leak.

Since I left the Fort Worth district I've heard many, many favorable comments about MSC. I think we accomplished the purpose of its concept. It is very pleasing in appearance; a pleasant place to be. I've heard many comments to the effect that it is good that this Government can do such construction instead of the institutionalized methods that we are so used to. If we had to do it over again in 1969, we would change a few things, but overall we'd stay with the master plan. The job was done within the established time frame, and done pretty much as NASA wanted it. I think the Corps served its purpose very well. There are many, many things done at MSC that were never tried before.

In June 1964 when MSC's facilities Division had taken on the maintenance chore, they needed a lot of equipment: fire trucks, utility trucks, maintenance trucks, lawnmowers, trailers, grass seeders, all of the equipment of that nature. The Facilities people were able to obtain a sizeable quantity of year-end money, that is, which had to be spent by 30 June or lose it. They asked the Corps to undertake this procurement

for them. It was a sizeable chore and it had to be accomplished in 30 days. It had all the problems of attempting to determine what type of equipment was needed, get a proper description, and then go through the standard procurement procedures governed by government regulations. We worked night and day on the mission. We got the job done, although deliveries of the equipment, of course, extended into the summer.

With regard to staffing the Corps construction office in Houston, in our work this is a normal thing; jobs start here and they come to an end in time and new jobs start on another location. We have a relatively mobile force in the field. As a result, we generally had no problems with staffing the office because of the workload in some areas goes down when the workload at NASA went up. We did do one thing at NASA, however, that is not normal to Corps construction. Within the resident office, we provided an engineering staff. This staff, I would say, was not adequate to the total job and, therefore, we had to lean upon the Fort Worth District for other specialties. We, in turn, when we needed other specialties, ^{which} were not available in Fort Worth would ~~we~~ request them from Washington, and these were made available. Maintaining the engineering force at Houston added to the overhead charges and yet this was a very important office because being on the job site, it could handle the day-to-day changes that were made necessary by changing requests and requirements, any changes that came from finding errors in design, quick improvements that were necessary--in other words a quick, responsive engineering office on the site. And I think in the end that

this was a very good idea and should be kept in mind for future construction of the same nature.

In the Houston area, at the start of construction, Houston was a labor surplus area with regard to construction workers. We put a labor relations man on site. We knew all the unions working on the job, and had a very good contact with the general contractors association in the area, who together with the unions, set labor prices and working conditions. There were only occasional minor flare-ups, and no general strikes. We did have some difficulty agreeing on which trade handled which item, but we were able to iron out these problems with the contacts that were maintained. Labor union officials, at the beginning of the job, said that they would cooperate 100% and they kept their word.