AUG-067 69

DEPARTMENT OF THE ARMY
HEADQUARTERS 19TH ENGINEER BATTALION (COMBAT)(ARMY)
APO San Francisco 96493

EUACBB-OP 13 November 1969

SUBJECT: Operational Report - Lessons Learned for the 19th Engineer Battalion (Combat)(Army) for the Period Ending 31 October 1969 RCS CSFOR-65(R2)

THRU: Commanding Officer, 35th Engineer Group (Construction), APO 96312

Commanding General, 18th Engineer Brigade, ATTN: AVBC-C, APO 96377

Commanding General, United States Army, Vietnam, ATTN: AVHGC-DST, APO 96375

Commander in Chief, United States Army, Pacific, ATTN: GPOP-DT, APO 96558

TO: Assistant Chief of Staff for Force Development, Department of the Army (ACSFOR-DA), Washington, D.C. 20310

1. Section 1, Operations: Significant Activities.

The 19th Engineer Battalion, organized under TOE 5-36G, consists of Headquarters and Headquarters Company and four (4) line companies. Until 5 September 1969 the 73rd Engineer Company (Construction Support) was attached to the battalion. On that date the 19th Engineer Battalion officially transferred from the 45th Engineer Group to the 35th Engineer Group and Company C was placed under the operational control of the 39th Engineer Battalion. This transfer involved the complete movement from I CTZ to II CTZ, the dismantling of two established engineer base camps, a prolonged split of unit assets, assumption of a new area of operations, and the turn-in and/or lateral transfer of the bulk of unit property. On 5 September 1969, the 572nd Engineer Company (Light Equipment), the 547th Engineer Platoon (Asphalt), the 23rd Engineer Detachment (Well Drilling), and the 40th Engineer Detachment (Well Drilling) were attached to the 19th Engineer Battalion. The move to the new area of operations had the expected detrimental effect on construction; however, the extensive prior planning and smooth execution minimized lost time.

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Changes in the command and staff of the 19th Engineer Battalion during the reporting period were as follows:

8 August - Major Michael B. Ash replaced Captain Frederick J. Smith as Operations Officer.
8 August - Captain Jack R. Bishop replaced Captain Karl R. Snyder as B Company Commanding Officer.
24 August - Captain Robert W. Lane Jr. replaced Captain George Whitfield as A Company Commanding Officer.
1 September - Captain Stephen Borg replaced 1st Lieutenant Donald R. Huckeby as Headquarters Company Commanding Officer.
26 September - Captain Raymond A. Gajewski replaced 1st Lieutenant Dan O. Turner as Intelligence Officer.
10 October - 2nd Lieutenant Phillip J. Caruso replaced 1st Lieutenant George W. Pinkston as Platoon Leader of 547th Engineer Platoon (Asphalt).
16 October - Major Dan A. Conner replaced Major Charles G. Marvin as Executive Officer.
17 October - Captain John B. O'Neill replaced Captain Raymond A. Gajewski as Intelligence Officer.
17 October - Captain Raymond A. Gajewski replaced Captain John B. O'Neill as Adjutant.
22 October - Captain Maury Maurel replaced Captain Edward D. Haggerty as Maintenance Officer.
22 October - Captain Edward D. Haggerty replaced Captain Maury Murrell as Commanding Officer of 572nd Engineer Company (Light Equipment).
23 October - Captain Juventino N. Lopez, Battalion Surgeon, departed leaving his position vacant.

At the end of the reporting period, the total assigned strength was 890 of 1033 authorized. During the reporting period, 47 replacement personnel were assigned while 205 personnel completed their tours of duty. Personnel shortages are critical in the 12B MOS. Currently the battalion is authorized 447 personnel in this MOS but only 273 are assigned. Other significant personnel action included 65 extensions, 6 reenlistments, 4 field grade article 15's, and one special courts martial. In August, September, and October personnel of the 19th Engineer Battalion were recommended for 2 Silver Stars, 30 Bronze Stars (14 with "V" device), 100 Army Commendation Medals (23 with "V" device), and 42 Purple Hearts.

During the reporting period the intelligence collection and dissemination efforts of the Battalion S-2 were augmented by receipt of daily intelligence summaries. In I CTZ these summaries were collected from the 173rd Airborne Brigade, the 11th Light Infantry Brigade, as well as from MACV advisors in Duc Pho and Tam Quan. In II CTZ intelligence summaries were provided by MACV Advisory Team 38, Lam Dong Province.

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The intensity of enemy activity in the present area of operations is considerably less than the battalion experienced in I CTZ. Although the battalion spent approximately two-thirds of the reporting period in II CTZ, 87 of 114 enemy incidents occurred in I CTZ. Ambushes, sniper fire, B-40 rocket attacks, and mortar attacks accounted for 55 of these incidents. Equipment, vehicles, and personnel detonated a total of seven mines ranging from the plastic M-14 mine to the average 35-40 pound mine. Thirty three mines and booby traps were detected. The battalion detected an average of 79% of enemy mines placed. The enemy constructed eight (8) obstacles ranging from random piles of rocks on the road to elaborate rock walls and large boulders. These enemy activities resulted in 3 US KIA, 38 US WIA, 34 VC/NVA KIA, 1 NVA CIA, 1 NVA Chieu Hoi. The battalion also captured 9 AK-47 rifles, 3 B-40 rocket launchers, and quantities of ammunition, supplies, and documents. In I CTZ units of the 19th Engineer Battalion performed a daily minesweep over 35 kilometers of QL-1 and LZ access roads. In addition, Company A and Company D continued to be reorganized as infantry and conducted infantry sweeps while in I CTZ.

In southern I CTZ, personnel from the medical section accompanied all minesweeps in order to provide rapid assistance to casualties.

The number of malaria cases in the new area of operations has decreased; however, hepatitis has occurred with increased frequency. Skin infections remain the majority of cases treated. Emphasis is given to the quality of water, both potable and non-potable, in use in the battalion. Dental care is provided by the 934th Medical Detachment with a full-time dentist and dental technician stationed at Camp Smith. Injections to keep the battalion personnel current in their immunizations are part of the continuing program of preventive medicine.

The battalion communications section worked daily against natural and enemy forces to maintain constant communications within the battalion and with higher headquarters. In order to maintain links between the two areas of operations, the battalion communications section installed an AM hookup to bridge the 600 kilometer gap between CP's. Working to build morale within the battalion, the communications section placed approximately 400 MARS calls for battalion personnel. This was of great significance during those periods that weather closed air facilities, thus delaying mail for several days.

Morale within the battalion community is one of the major concerns of the Battalion Chaplain. During this quarter, services were coordinated with the Chaplain of the 173rd Airborne Brigade so that elements in both

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AO's received weekly spiritual guidance. In the II CTZ area the Battalion Chaplain conducts Protestant services for MACV, LSA, MILPHAP and other small units in the area. A Vietnamese priest from Bao Loc conducts Catholic services. A program of character guidance has been implemented.

During this quarter the battalion maintenance section continued its mission of support to the battalion units by providing constant maintenance assistance, central evacuation to direct support units, and an overall inspection and supervision of company maintenance programs. The battalion maintenance section was also heavily committed to the unit move. Extensive inspections of vehicles and equipment had to be conducted prior to lateral transfer of the property. In the II CTZ the battalion maintenance section was responsible for the construction of an expedient mosquito control device. Coordination with the battalion medical section developed an effective dispenser of spray to be used in troop areas (see Lessons Learned, Section 2).

The Battalion S-4 section was responsible for the greatest percentage of the unit move. Through careful prior planning and continuous supervision during the move, the mission was accomplished with minimum delays. Transportation units from Qui Nhon were utilized to move asphalt products, conex containers, and other unit property to the port and depot at Qui Nhon. Sea transport was utilized on three occasions to move TOE equipment to Cam Ranh Bay and Phan Thiet. Further transportation from Cam Ranh Bay to Bao Loc and B'Sar was accomplished by convoy. The majority of personnel were transported by air from LZ English to Bao Loc and Phan Thiet airfields. Some critical equipment and records were airlifted.

During this quarter the 19th Engineer Battalion utilized approximately 80,000 board feet of lumber, 4,000 pieces of culvert ranging in size from 12" to 72", 3,000 pounds of nails and spikes, and 2,400 barrels of asphalt products. Shortages of critical TOE equipment continue to hamper operational capability as the following chart will show.

NOMENCLATURE	AUTH	O/H	SHORT
Compressor, 600 CFM	2	0	2
Crane, rough terrain	5	3	2
Crane, 20 ton	3	2	1
Distributor, bituminous	5	2	3
Distributor, water	4	2	2
Kettle, bituminous	2	0	2
Roller, 5-8 ton	2	1	1
Roller, 10 ton	1	0	1

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NOMENCLATURE	AUTH	O/H	SHORT
Rock drill	2	0	2
Roller, towed 7½-50 ton	1	0	1
Roller, 9-11 ton	1	0	1
Semi trailer, 60 ton	1	0	1

Since the current mission of the 19th Engineer Battalion is the upgrade of QL-20, the above shortages will have a detrimental impact upon construction progress and quality control. The steel-wheeled rollers are extremely critical. The long haul distance between Cam Ranh Bay and Bao Loc over some extremely difficult roads is a major supply problem. Plans are in progress to attempt resupply from Long Binh and reduce the travel time which is now being experienced.

The primary mission of the 19th Engineer Battalion in I CTZ was the upgrade of 30 kilometers of National Highway QL-1 to class E standards from the I/II CTZ border through Duc Pho. All units of the battalion participated in this effort by providing equipment support for the base course work, shoulder upgrade, and asphalt haul. This mission was brought to its successful completion by Task Force Highboy to which Company C and the 73rd Engineer Company (Construction Support) were assigned. Company C was given additional assets and was tailored to accomplish the mission of the upgrade of QL-1. Additional equipment attached included 35 5-ton dump trucks, 2 front loaders, 2 graders, 1 RT crane, and 1 D7E dozer. Additional operators and mechanics were also attached for the duration of the mission.

Company D completed the last bridge in the AO, an 80' timber trestle bridge at ES814330, on 28 August 1969; paving was completed on 15 September 1969, and the final upgrade of the shoulders was completed on 29 September 1969. The 30 kilometers of QL-1 was turned over to the Vietnamese Minister of Public Works on 14 October 1969.

The movement of the 19th Engineer Battalion began on 5 August 1969 and was completed on 12 October 1969. Initial planning began on 28 June 1969 at 18th Engineer Brigade Headquarters. General guidelines and a tentative schedule were established. The initial operations order was published on 13 July 1969. The advance party of fifty-six (56) personnel proceeded to Bao Loc in II CTZ on 5 August 1969. The advance party familiarized themselves with the new area of operations, operating procedures, and current projects; accomplished transfer of the 116th Engineer Battalion's property, and prepared for the arrival of the main body on 16 August 1969. The property belonging to the 19th Engineer Battalion in I CTZ had

to be turned in or transferred since the battalion was assuming the property of the 116th Engineer Battalion in II CTZ. The bulk of the property was laterally transferred to other engineer units. The balance of property was either utilized to fill shortages in the 116th Engineer Battalion's TOE or turned in to the Qui Nhon depot. This requirement heavily taxed the battalion maintenance section and S-4. In addition, tactical bridge, construction materials, and barrier materials were transferred to both the 39th Engineer Battalion and the Qui Nhon depot. During the period 16 August 1969 to 21 August 1969 Company A, Company B, one platoon from Company D, and thirty-two personnel from the Headquarters Company were airlifted to the new area of operations. A forward command post with the Battalion Executive Officer in command was established on 20 August 1969 at Bao Loc. This organization worked on current projects with the 116th Engineer Battalion in order to establish continuity and continued other operations to effect an orderly transistion of the AO from the 116th Engineer Battalion to the 19th Engineer Battalion. On 5 September 1969 the Battalion Commander, the remainder of Company D, and 37 additional personnel from Headquarters Company moved to the new area of operations. That portion of LZ Debbie occupied by Company D was turned over to the 4/21st Infantry of the Americal Division; the portion of LZ Debbie occupied by Company B was dismantled prior to that unit's departure. Structures at LZ Highboy, the main base camp of the 19th Engineer Battalion in I CTZ, were systematically dismantled and the materials salvaged during the month of September 1969. After the upgrade of QL-1 was complete on 29 September 1969, the units of Task Force Highboy removed the entire base camp during the period 1 October 1969 to 10 October 1969. Company C closed into the new area of operations on 12 October 1969 along with the remainder of Headquarters and Headquarters Company, completing the 19th Engineer Battalion movement. The salvage of construction materials which could be utilized toward other construction projects resulted in a savings in excess of $100,000.

The new area of operations assigned to the 19th Engineer Battalion required that the battalion be split. Headquarters and Headquarters Company, B Company, the 572nd Engineer Company (Light Equipment) and the 547th Engineer Platoon (Asphalt) are located at Camp Smith, Bao Loc, RVN. Company A and Company C are located at Camp Brown near B'Sar some 24 kilometers from Camp Smith. The primary mission of the 19th Engineer Battalion is the upgrade of eighty-one (81) kilometers of National Highway QL-20, from the II/III CTZ border to Di Linh. Company D is located at LZ Betty near Phan Thiet some 200 kilometers from the Battalion Headquarters. This unit has its own area of operations at that location and is discussed on page 7 of the report.

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Because of monsoon rains during the quarter, the majority of this unit's effort has been directed to maintenance of QL-20. In excess of 64" of rain fell during the last two months of the quarter causing two washouts along QL-20. An 80 foot double-single panel bridge was installed at ZT143764 and a by-pass was constructed at AN759808. Extensive improvement of drainage facilities along QL-20 prevented further washouts and reduced the requirement for maintenance of the road.

In preparation for the upgrade (restoration) of QL-20 the 572nd Engineer Company (Light Equipment) was issued a new Cedar Rapids 250 ton per hour rock crusher. Planning and construction of the industrial site, which includes an area for the rock crushers of the 572nd Engineer Company and the asphalt plant of the 547th Engineer Platoon, has been thorough and continuous since the battalion moved into Bao Loc. A China Wall and concrete pads were built to accomodate the new crusher; storage bins 60'x60'x24'4" are nearing completion. These rock bins have a total storage capacity of 2650 cubic yards. A shelter was constructed for the heater complex at the 547th Engineer Platoon asphalt plant and the Chi Cong Quarry has been developed. The result of these preparations is a functional industrial site designed for efficient operation (see figure 3).

Company D is responsible for maintenance of 83 kilometers of QL-1 and 19 kilometers of LTL-8B. During the monsoon season major effort was expended in keeping both roads open. A total of 11 bridges and culverts were washed out in early September, soon after the unit moved to the new location. Since no rock was easily available for work on LTL-8B, a rock quarry was put into operation at AN913102. In addition to replacing culverts, it was necessary to construct a 50' single-single panel bridge and an improvised 30' steel stringer bridge in order to open LTL-8B. On QL-1, fill was taken from sites along the road side to cut down the haul distance. A seventy (70) foot double-single panel bridge was erected and a thirty (30) foot timber bridge was reinforced to aid in the opening of QL-1. Preparations were made to repair a panel bridge on QL-1 south of Phan Thiet which had a forty (40) foot section destroyed by the enemy. In order to reach this location two by-passes and a bridge had to be repaired. In order to speed the opening of these two roads, a platoon was relocated in each case. QL-1 was opened on 16 October 1969 and LTL-8B was opened on 31 October 1969.

In the line of miscellaneous small tasks in the battalion's two areas of operations the following missions were undertaken:

a. Relocation of the 568th Medical Detachment: On 26 August 1969 Company B was assigned the task of relocating the 568th Medical Detachment

to include all organic equipment. The mission consisted of disassembling eight TO buildings at Camp Rock, Bao Loc and assembling six of these at Camp Smith. The remaining two buildings were transported to Camp Smith intact. Although the buildings were of standard TO construction, the original foundations were of concrete slab, which necessitated implementing a stringer system to include the wooden flooring for each of the buildings to be reconstructed.

b. Dismantling of Camp Rock: The construction and leveling of the entire Camp Rock compound relates directly with the relocation of the 568th. The objective was to dismantle and ship as much usable material to the 173rd Airborne's new location at LZ Uplift as was possible. The remaining material was brought to Camp Smith and stored in the 19th Engineer Battalion S-4 yard for further use. The total amount of reusable material salvaged was as follows: 3/4" plywood - 49 sheets; 3"x6" lumber - 1800 LF; 6"x6" lumber - 2800 LF; 4"x6" lumber - 200 LF; 4"x4" lumber - 150 LF. Outside of the manual labor involved in the dismantling of bunkers, the leveling and clearing work was accomplished by heavy equipment.

c. Maintenance of Bao Loc Airfield: Maintenance of Bao Loc airfield has been the responsibility of Company B since its move to Camp Smith. Initially the airfield was designed for heavy duty aircraft of the C-130 type; however, the number of actual landings made as opposed to the number of landings for which the runway was designed was excessive. This resulted in potholes in the subcourse under the matting which made landing a hazard. Stockpiling of needed materials began on 24 September 1969. 800 cubic yards of 3" minus rock was stockpiled before actual work began on 1 October 1969. From 1 October 1969 to the close of this quarter, 2100 pieces of M8A1 matting and 1000 gallons of RC-800 had been expended.

d. POL Pipeline, Phan Thiet: Work began on 4660 feet of 4-inch Victualic coupled pipeline for POL tanks on 13 October 1969. Construction efforts were delayed for lack of proper couplings for the 20' sections of pipe. The pipeline was completed and tested on 27 October 1969.

e. Aircraft Revetments, Phan Thiet: Two (2) O-2A aircraft revetments were constructed at LZ Betty. Some modifications to aprons and taxiway were necessary to make the revetments usable.

f. Construction of Helipad at Camp Smith: A new helipad was constructed outside the main gate of Camp Smith. Lights were erected to aid in defense and night landings.

g. Maintenance of Phan Thiet Airfield: Continuous repair of an

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M8A1 matting runway was conducted nightly with crews working under lights to replace and weld cracked and weakened matting.

h. General Support in Phan Thiet Area: Hauling approximately 100,000 gallons of water to the nearby ARVN hospital; supporting the 497th Port Construction Company with equipment, living and eating facilities, and fill; assisting the 637th Land Clearing Company retrieve a D7E, 10-ton tractor and lowboy from a river when it fell through the bridge it was crossing; and technical assistance and support to units at LZ Betty, LZ Sandy, LZ Sherry, LZ Alamo, MACV, MACV Navy, and ARVN.

An ARVN training program was implemented by this unit on 6 October 1969. Company A, Company B, and the 572nd Engineer Company performed the actual training of 11 ARVN personnel. The program was divided between 40 hours of classroom instruction and 120 hours of "on the job" training. The students were taught safety, nomenclature, maintenance, operating procedures, and actual operation of heavy equipment. The program provided instruction in the operation of the rough terrain crane, track drills with 600 CFM compressor, D7E dozers, and 2½ cubic yard front loaders. Training for this first group concluded at the end of the quarter. Results of this first class of ARVN training showed the training valid and of value. A second cycle of training will begin in early November.

Civic action projects were undertaken by this unit in all areas of operations. In the Bao Loc area projects were undertaken concurrent with MACV Medcap missions. Headquarters Company, Company B, and the 572nd Engineer Company worked on numerous projects including the improvement of irrigation, the repair of a reservoir dam, leveling of a school yard playground, and constructing playground equipment. In the B'Sar area Company A constructed a foot bridge for a Montangard village and donated scrap lumber and food to an orphanage. In the Phan Thiet area Company D sponsored an orphanage of 150 children. In addition, 1st Lieutenant John B. Gay, a Platoon Leader, Company D, delivered a baby boy weighing 6 lbs 14 oz. After the child was delivered, he and the mother were taken to the local hospital where they were reported to be in very good condition. The child was born north of Phan Thiet on LTL-83.

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2. Section 2, Lessons Learned: Commander's Observations, Evaluations, and Recommendations.

a. Personnel: Troop Morale

(1) OBSERVATION: The 19th Engineer Battalion had a delay in mail service between members of this unit and their families when the unit changed areas of operations caused by a change in the APO. The problem was compounded by minimal flying weather, which prevented normal mail delivery for up to 5 days. Several men in the unit became extremely concerned about the welfare of their families. The MARS station could complete some calls but only on a sporadic basis.

(2) EVALUATION: Another communications link had to be utilized in order to lessen anxiety in urgent cases and to improve mail delivery from Cam Ranh to Bao Loc.

(3) RECOMMENDATION: This unit used the Red Cross system of health and welfare messages by reversing the process. Personnel at this location who had become worried about conditions at home were able to gain information which greatly alleviated their anxiety. The unit chaplain aided the individual in contacting the Red Cross, which was able to provide relativly quick service. This service seemed to raise morale and increase effectiveness. An investigation of the mail service at Cam Ranh was made to insure mail was being placed daily on a flight to this area. The MARS station was contacted to determine the best time for placing calls and personnel were advised of the new schedule. The service has shown a remarkable improvement.

b. Intelligence: None.

c. Operations:

(1) Expedient Crane (see figures 4 and 5):

(a) OBSERVATION: A shortage of cranes in this unit prevented availability on several of the smaller jobs.

(b) EVALUATION: The choice available was to stop higher priority projects or to find an expedient means to complete the smaller projects. This latter course of action was undertaken.

(c) RECOMMENDATION: A bucket loader was outfitted with a 20 foot boom. The boom itself was a 3"x12"x20' timber, which when supported with cross members and chains was stable enough to lift up to 1500 pounds approximately 30 feet.

(2) Repair of POL Tanks:

(a) OBSERVATION: Repair of POL tanks which were leaking required quick repair because of safety considerations, and because of a critical need for storage space.

(b) EVALUATION: A repair team must be familiar with repair procedures that will enable rapid completion of the task. This unit experienced difficulty and resorted to trial and error, causing lost time and extra work.

(c) RECOMMENDATION: The following steps have proven effective:

1. Open the tank, drain out any POL remaining and remove sediment.

2. Dry the tank using an air compressor. The leaks will become apparent because of oxidation and decay of sealant after thorough drying.

3. Remove the sealant from around the leak utilizing sandpaper or steel wool. Clean the surface thoroughly.

4. Utilize Plastic steel or wood wedges for large leaks.

5. A rubber based sealant should be applied over the leaks and the Plastic steel or wood. This sealant should be put down in four coats, three thin coats (allowed to dry sixteen hours between coats) and a thicker coat (allowed to dry seventy-two (72) hours).

6. After drying is complete, a water test should be performed utilizing a strong dye. This test should be conducted over a three day period.

(3) Repair of Abutments Supporting Panel Bridge:

(a) OBSERVATION: This unit had a problem of the abutments of a panel bridge eroding, endangering the bridge.

(b) EVALUATION: This fact required rapid response to prevent the loss of the bridge. Extension of the bridge was infeasible because no additional bridge was readily available.

(c) RECOMMENDATION: This unit solved this problem by removing the decking, stringers, and treadway of the bridge, making it possible to dump blast rock directly into the area being eroded.

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d. Training: ARVN Training

(1) OBSERVATION: ARVN Engineers need additional training on heavy equipment.

(2) EVALUATION: US personnel can be of significant value in training of ARVN engineers when used in a conscienciously applied program of classroom work and regular on the job training.

(3) RECOMMENDATION: It is necessary to have an interpreter on hand during the classroom portion of the training. Safety must be stressed throughout the course of instruction. It was found best to disperse the class so that each company trained only 3 to 4 ARVNs simultaneously. Both operation and maintenance of heavy equipment must be covered. Training should be implemented in such a manner that the students may become proficient enough to act as instructors in their own units.

e. Logistics: None.

f. Communications: Critical Vehicles

(1) OBSERVATION: Certain emergency vehicles such as the contact truck and ambulance cannot be contacted when out on missions because radios are not authorized for these vehicles under our TOE.

(2) EVALUATION: It is often necessary to contact the above mentioned vehicles when in transit to and from a job site in order to redirect them. Radios are essential for this purpose.

(3) RECOMMENDATION: Short of altering the TOE, evaluate communication assets and make available radios for these vehicles.

g. Materials: None.

h. Other: Mosquito Control

(1) OBSERVATION: Complete spraying of a base camp is required for more effective control of mosquitos.

(2) EVALUATION: A mosquito control spraying device can be constructed using a 3 kw generator. A fitting is placed in both manifolds with a line from the fittings to a tee which is inserted into a five (5) gallon fuel can containing the control spray (three (3) parts diesel to one (1) part malathane). The flow of chemicals creates a thick fog to be

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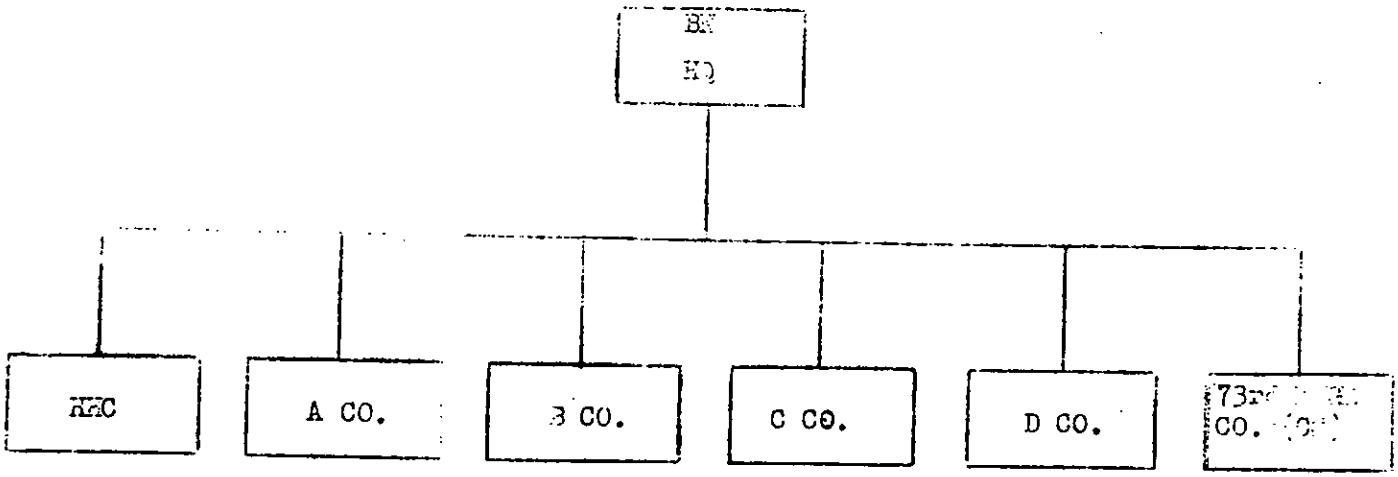
exhausted by the engine.

(3) RECOMMENDATION: If a standard spraying apparatus is not available, this course of action may be considered. This expedient sprayer should be under the control of the medical section.

Wilson P. Andrews

WILSON P. ANDREWS
LTC, CE
Commanding

5 Incl
1. Figure 1 - 19th Engr Bn Organization
2. Figure 2 - 19th Engr Bn Organization
3. Figure 3 - 250 TPH Crusher and Asphalt Plant Complex
4. Figure 4 - Expedient Crane
5. Figure 5 - Expedient Crane



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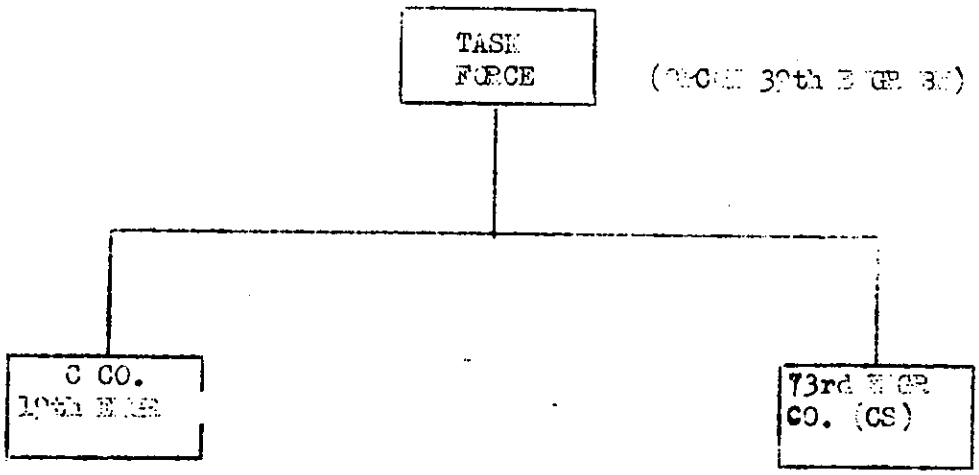

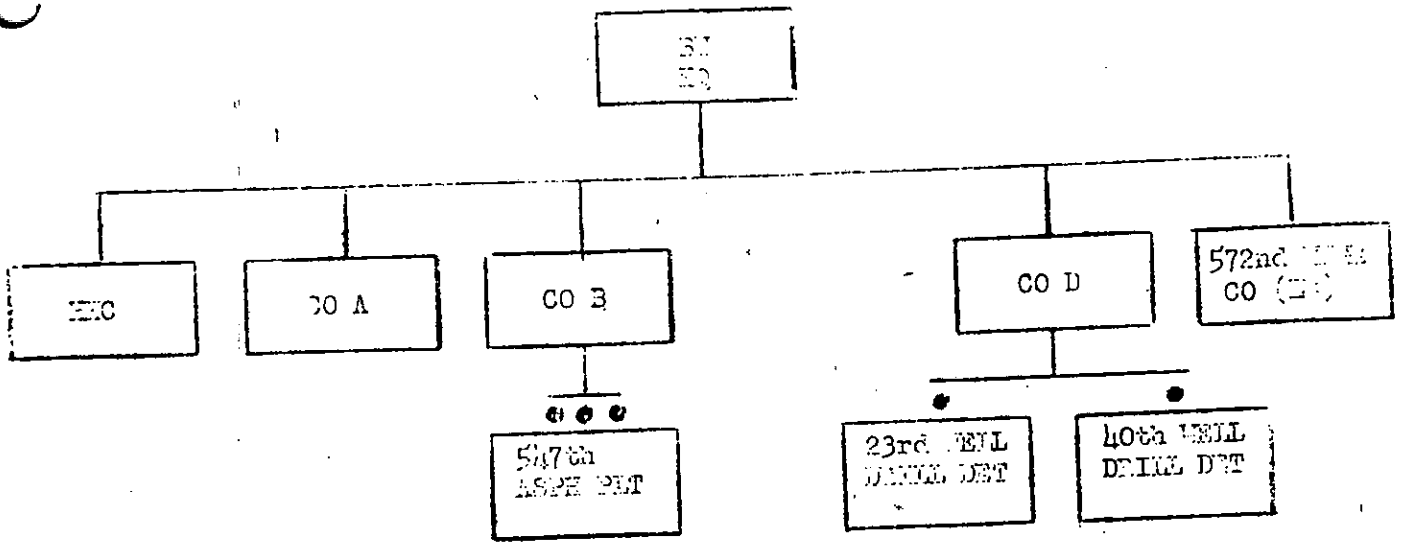

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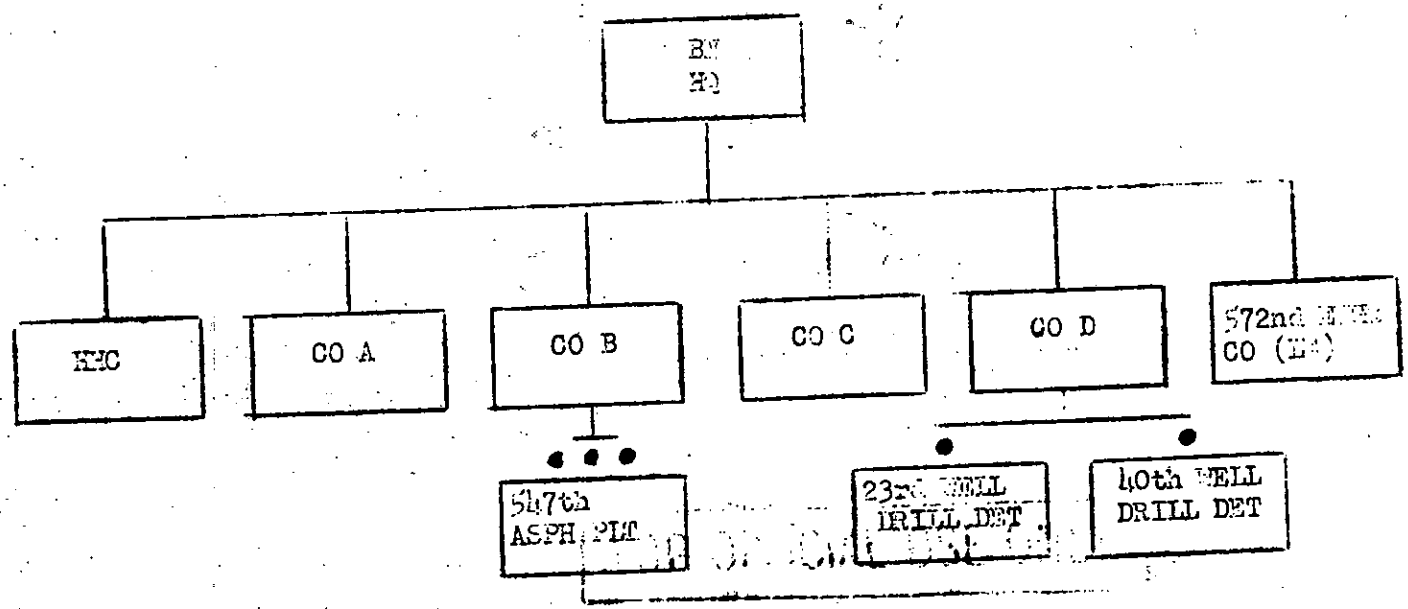

FIGURE 2

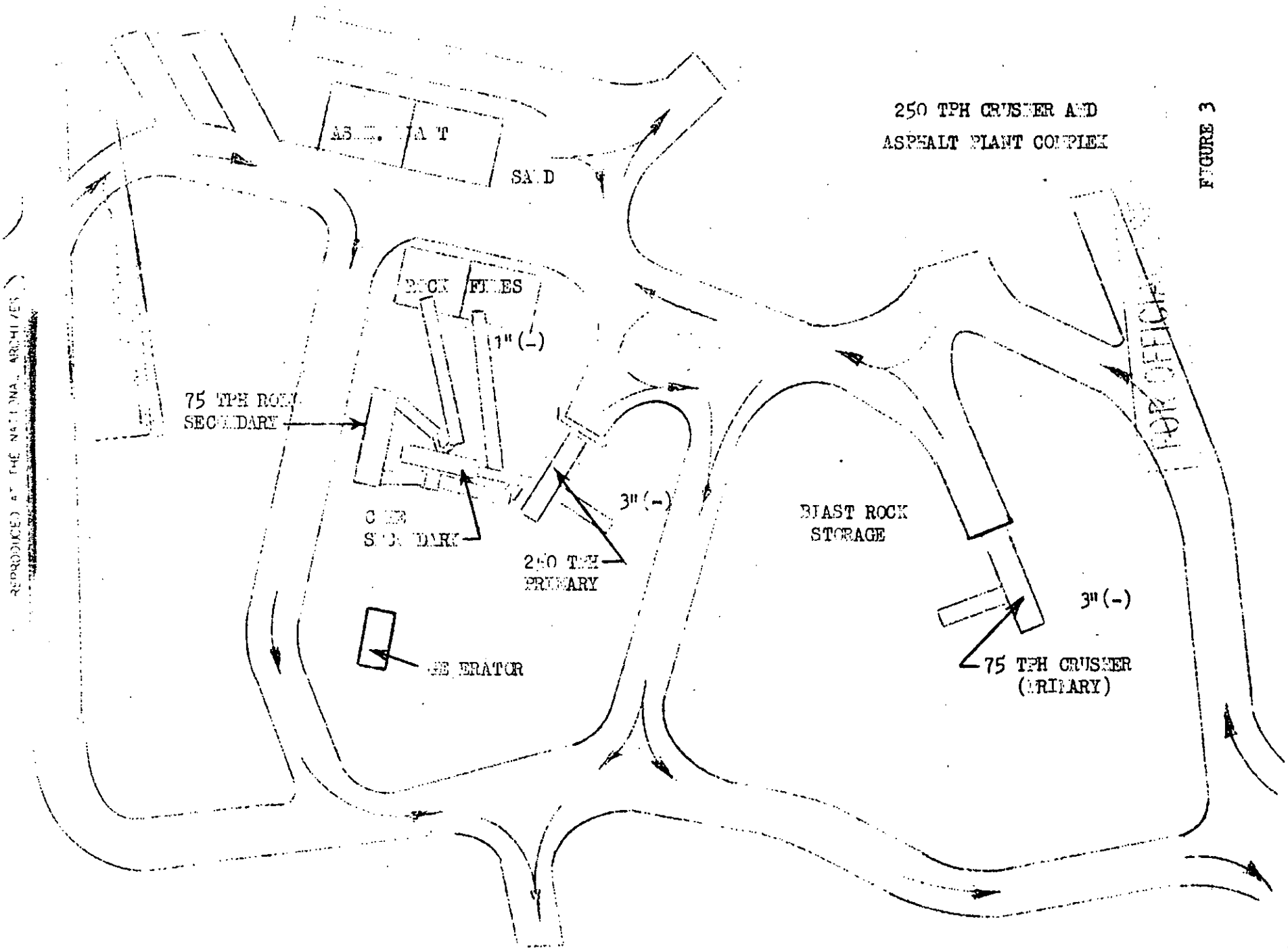

EXHIBIT C

20[illegible] Boom, Bucket Loader

NOTE:

1. [illegible] OPERATE THE [illegible] FROM VERTICAL [illegible] LINE [illegible]

2. A 1/2-inch CHAIN WAS USED TO SECURE BOOM TO ARMS OF LOADER

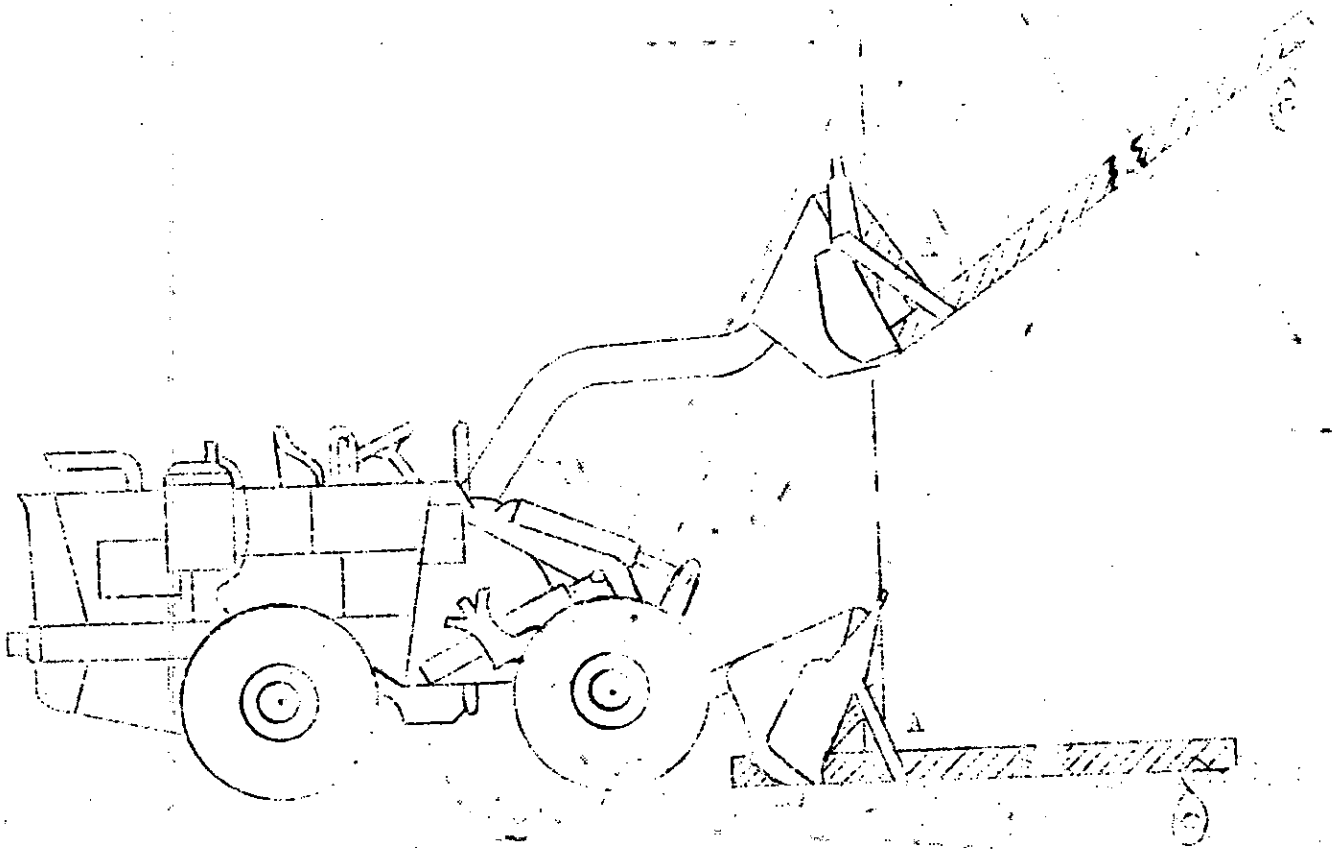

FIGURE 4

SCALE 1"=1'-0"

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DA, Headquarters, 35th Engineer Group (Const), APO 96312, 19 November 1969

TO: Assistant Chief of Staff for Force Development, Department of the Army (ACSFOR-DA), Washington, D.C. 20310

1. The Operational Report - Lessons Learned for the 19th Engineer Battalion (Combat) has been reviewed by this Headquarters and is considered to be an accurate account of the Battalion's activities during the reporting period.

2. This Headquarters concurs with the Battalion Commander's statement of TOE equipment shortages which the Battalion and attached units are operating with. All of the Group units have TOE shortages, however recent release of several of these items has alleviated some of the critical needs of the 19th Engineer Battalion. Also the presence of MCA LOC equipment in the 19th Engineer Battalion supplements their TOE and gives them sufficient capability to perform the mission.

HARRY A. GRIFFITH
COL, CE
Commanding

Protective markings may be cancelled when separated from basic.