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employed in this sustained operation, the basic elements of coordination and control required more attention than they would under ordinary operational circumstances. From the Air Commander's point of view, the objective was to provide optimum airpower within the boundaries established by the tactical situation and the resources available to him -- while assuring maximum conditions of safety and effectiveness for participating air forces. A major consideration, of course, was that this not be accomplished at the expense of other tactical situations which were developing throughout the theatre tactical zones.

The responsibility for optimum application of air resources in Operation NIAGARA rested clearly with the 7AF Commander, as directed by COMUSMACV. In accordance with COMUSMACV directive, the 7AF Commander, in his role as Deputy COMUSMACV for air operations, would "coordinate and direct the employment of the tactical air, Marine air, diverted air strikes from out of country air operations, and such Naval air that may be requested." B-52 operations were to be coordinated through him. One exception with regard to the control of tactical air was made. Although III MAF was directed to make available to 7AF all tactical strike sorties not required for direct air support of Marine units, III MAF was authorized to retain control of the effort in direct support of its own units. ^{170/} This exception left the matter of control of Marine air assets open to interpretation at the beginning of NIAGARA operations, with the end result being a negative impact on air planning and application of air resources in the area of concern during the first few weeks.

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III MAF's interpretation of command and control for NIAGARA air operations was reflected in a message to 7AF on 24 January. This message defined specific control and coordination zones which were meant "to ensure that the ground commander can employ all supporting arms in his area of responsibility and that air support assets are most effectively utilized." These zones were defined as follows: (Fig. 17)^{171/}

Zone Alpha: Restricted fire area coordinated and controlled by the Marine FSCC/DASC at Khe Sanh. Air support was required to be under positive control of FAC, MSQ, or TPQ.

Zone Bravo: A controlled area in which air strikes and artillery were coordinated by the Marine FSCC/DASC at Khe Sanh. DASC clearance was required for entry. Air strikes could be executed under flight leader control upon approval of FSCC/DASC Khe Sanh.

Zone Charlie: Restricted fire area coordinated and controlled by Marine FSCC/DASC at Dong Ha. Air support was required to be under positive control of FAC, MSQ, or TPQ.

Zone Delta and Echo: These were free strike zones. Military targets could be struck as required under flight leader control. CG I Corps granted blanket clearance for strikes of military targets in these areas. There were no known friendly forces operating therein. Air strikes in these zones were under control of 7AF ABCCC. FSCC/DASC Clearance not required.

III MAF further advised that Marine air strike sorties would be conducted primarily in Zones A and B, which were to be controlled by the Marine control agencies at Khe Sanh.^{172/} This implied that III MAF would concentrate its total air effort -- including reconnaissance, FAC, strike

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and targeting -- in one area under its own control. Furthermore, it implied that 7AF could apply its major effort around the III MAF effort, while of course contributing sorties as required in the areas under Marine control. By applying its total effort in one area considered to be "in direct support of its own unit," III MAF's actions were not in consonance with the spirit and intent of the COMUSMACV directive that the 7AF Commander would "coordinate and direct the employment of the tactical air, Marine air, diverted air strikes from out of country air operations, and such Naval air that may be requested." Moreover, it created a confusing control situation whereby airspace congestion and non-availability of aircraft became a common occurrence. Not only did cycling of sorties become a problem, but the planning cycle for target assignments and ordnance selection was severely weakened.^{173/}

Most of the coordination and control problems encountered in NIAGARA during the first few weeks were directly attributable to the fragmented control arrangements involved in the management of the air program. Thus, this experience brought sharply into focus the long standing requirement for a single manager of tactical air assets in Vietnam. This does not imply that all problems in coordination and control would be immediately resolved by the establishment of centralized control under a single manager. It does mean, however, that coordination between participating forces could be accomplished more smoothly and effectively, and the optimum cycle of air planning and application of resources could be realized.^{174/}

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The sustained weight of effort required in Operation NIAGARA could not be upheld by air resources organic to III MAF. This included both the operations and intelligence capabilities required for successful air application. It was not a question of mere augmentation of III MAF air resources to be applied at the discretion of the III MAF Commander. For an undertaking of this magnitude, the III MAF command and control system could not have effectively absorbed the full input of necessary operations and intelligence assets. Optimum management of the program could be applied only by COMUSMACV through his Deputy Commander for Air and the 7AF TACS which was both doctrinally and functionally designed to manage the total air effort. ^{175/}

COMUSMACV's Deputy Commander for Air -- the 7AF Commander -- had the staff expertise and control system that was required to effectively manage NIAGARA operations. The 7AF TACS was designed to provide the real-time interface between intelligence and operations in the scope required for NIAGARA. Around the clock daily management could assure optimum cycling of sorties into the area of concern -- to include cohesive targeting, tactical response, and traffic control. ^{176/}

Absence of centralized control at the beginning of NIAGARA created a situation whereby two separate air forces were conducting independent air operations in a compressed area of concern. This situation was compounded by the input of a large number of Navy tactical sorties and B-52 sorties into the same area. Problems of coordination between air

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and artillery were very small in comparison to those involving the different air elements. 7AF had liaison teams collocated with the Marine control agencies at Dong Ha and Khe Sanh to coordinate air matters, and all participating forces had mutual liaison at headquarters levels. These efforts at coordination, while required, in no way compensated for the lack of centralized management of the tactical air effort ^{177/}

As previously mentioned, the lack of centralized planning for the total effort resulted in the inadequate cycling of aircraft. ABCCC mission reports continually emphasized that there were certain periods of air congestion, while FACs continued to report many instances when "no strike aircraft were available" to strike perishable targets. There was an obvious impact on ordnance planning. Ordnance was frequently reported incompatible to targets and terrain being struck. Other factors such as diversions and ordnance requirements for radar-directed strikes also had an impact on this problem; however, much of the inadequacy could be attributed to the lack of centralized management. ^{178/}

Some specific problems reported by 7AF FACs, who were contributing by far the greatest FAC capability in NIAGARA, and the ABCCC were as follows: ^{179/}

ABCCC was not kept informed on the amount of air activity in the "Alpha" and "Bravo" sectors of NIAGARA -- to include FACs. This contributed to a distorted picture of the overall air situation.

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There were isolated instances in which Marine aircraft struck targets outside the "Alpha" and "Bravo" areas without ABCCC knowledge or coordination.

There were also instances when ARC LIGHT strikes and TPQ and MSQ strikes were made without ABCCC and FAC knowledge. This created a hazardous situation for the FACs who often found themselves flying in the areas where these strikes were being conducted.

FACs also reported isolated instances of transport aircraft flying through areas where they were directing air strikes in the "Alpha" and "Bravo" zones.

Two targeting systems in the area created confusion. Frequently one control agency was hindered in assisting the other control agency in conducting strikes against lucrative targets because it was involved with its own targets.

Further, the application of two targeting systems could conceivably result in a duplication of the strike effort, while allowing the status of other targets to remain active.

In one instance on 10 February, the Marine control agency would not give the ABCCC strike clearance in the NIAGARA "Charlie" area until the source of target information was provided. The source was required so the Marine control agency could determine its validity and authenticity.

Although the ABCCC and the Marine TPQ attempted close coordination, there were times that the TPQ was saturated with Marine flights and could not accept Air Force flights for radar control. Some of these flights had to depart the area without expending their ordnance because of bingo fuel.

To improve the command and control situation in NIAGARA, COMUSMACV gave the 7AF Commander full responsibility for the overall air effort for the defense of Khe Sanh. Accordingly, the 7AF Commander advised the CG III MAF and other participants on 13 February that the ABCCC would

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assume the immediate coordination and handling of the air effort associated with the Khe Sanh area of operations. He advised participants: ^{180/}

"Specific instructions and procedures for targets and TOTs will be contained in the daily frag order issued by the 7AF TACC. To achieve success it is expected that the following forces will be committed to this effort: 7AF - 150 sorties; CTF-77 (carrier task force) - 100 sorties; III MAF - 100 sorties; and, SAC ARC LIGHT - 48 sorties. In addition to these strike aircraft there will be numerous FAC aircraft, airlift aircraft, and helicopters operating in the immediate vicinity and/or landing at Khe Sanh. In consideration of effective traffic control and mission accomplishment it is essential that efficient control be established and adhered to by all participants. Targeting and timing details for all aircraft including USN and USMC will be covered in 7AF TACC daily frags.

Procedures: All strike, FAC, support and airlift forces will contact ABCCC prior to entering the area of operations for confirmation of the primary mission and for hand off to the appropriate control agency. Exception: Helicopters operating in the Khe Sanh area will effect safe separation from other traffic and artillery in accordance with existing procedures.

ABCCC will effect direct coordination and control of operations within presently defined NIAGARA area..."

Many of the same coordination and control problems continued to hinder the NIAGARA effort over the next few days. This was primarily the result of delays in the effective integration of Marine air resources into the TACS. CG III MAF took the position that Marine air would adhere to the established control procedures until "modified as a result of concurrence between CG III MAF and Cdr 7AF". ^{181/} In the meanwhile, the ABCCC reported: ^{182/}

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14 Feb: Marine flights did not check in with Hillsboro ABCCC but worked with Carstairs II (Marine control at Khe Sanh). ARC LIGHTs did not check in. Only fraged information was available. TPQ saturation and target area congestion forced diversion of some aircraft but most fraged targets were struck at some time during the period.

15 Feb: Marine aircraft were not checking in with Moonbeam (night) ABCCC and were going directly to Carstairs control. Resulting congestion required stacking over Channel 85. For approximately one hour Carstairs did not put aircraft on targets requested by Moonbeam.

16 Feb: Hillsboro reported that continuous ARC LIGHT missions prevented MSQs from directing Sky-spot strikes the entire time on station. This denial of MSQ-77 facilities (one was out of commission) restricted the ABCCC capability to strike NIAGARA targets and had it not been for the visual capability in western NIAGARA at least a dozen sorties would have had to return to base with their ordnance.

17 Feb: ABCCC had no prior knowledge of ARC LIGHT strikes after midnight which caused a confusion factor when the controlling agency requested target confirmation.

17 Feb: Marine flights still not checking in with ABCCC although AF strikes were applied to Carstairs targets for approximately two hours when he had troops in contact and declared an emergency condition.

18 Feb: Hillsboro controlled AF, Navy and airlift traffic. Marine flights did not check in with Hillsboro, but went direct to Carstairs II.

19 Feb: Moonbeam reported several unsuccessful strike aircraft due to MSQ sites supporting Arc Lights and the Marine TPQ site down due to maintenance.

21 Feb: AF strikes were provided to Carstairs II for lucrative targets in the Khe Sanh area. When arriving on station, ABCCC was advised by Carstairs II that it would not be able to accept AF targets since the TPQ was needed to support resupply missions.

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The daily control and coordination problems experienced by the ABCCC continued to reflect the same pattern. ABCCC Commanders strongly recommended that if the ABCCC was to be the prime control for all strikes in the NIAGARA area, the Marine strikes should check in with them prior to working targets. This would facilitate a smoother flow of strike traffic in the area and allow for more efficient control. ^{183/}

Another recommendation: ^{184/}

"Immediate steps must be taken to review the requirements for MSQ-77 sites to devote their entire efforts toward ARC LIGHT missions. The concept is completely unrealistic for the loss of Carstairs Bravo would have brought all air strikes in the NIAGARA area to a complete standstill except for one ARC LIGHT approximately every 90 minutes. If MSQ-77 sites cannot be made more available for tactical air strikes, then the tactical air sortie rate must be reduced."

Later, in early March, many of the coordination and control problems were resolved through integrated planning and a more centrally controlled air effort. Integrated frag teams were established, and the planning and operational cycle for air application became more responsive to tactical requirements. However, many tributaries of control appeared to remain clogged with functional confusion. This was obviously the result of having to make continuing adjustments in the command and control system throughout the execution phase of an air operation, especially one of the force magnitude and time frame constituted by Operation NIAGARA. Of course, under any management concept, operational procedures are continuously reviewed for possible improvement; however, had single management

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of air assets in Operation NIAGARA been clearly established prior to the execution phase, most potential problems could have been resolved during the operational planning

A final discussion of control experience in NIAGARA concerns tactical airlift at Khe Sanh. Inclement weather conditions and the hazardous terrain around Khe Sanh required special procedures for all weather delivery of supplies to the besieged Marines. Aircraft supplying Khe Sanh during weather conditions were handed off from Hue Control to the GCA unit at Khe Sanh which was used to guide aircraft to a predetermined point at the approach end of the runway. At that point, because the aircraft came too near to the GCA location for precise direction, a system involving radar reflectors on the runway, the aircraft doppler system, and stopwatch timing was used to guide the aircraft to the proper release point. When the GCA unit was malfunctioning, or when it was ~~knocked out~~ by enemy fire, the Marine TPQ-10 at Khe Sanh supplemented operations.

Operations Summary

The tactical situation in the NIAGARA area during the month of March was characterized by a continuing high level of enemy activity around Khe Sanh. Incoming artillery, rocket and mortar rounds at Khe Sanh in March were of a greater number than in February. 5,181 rounds of mixed ordnance impacted on the base in March, while 4,710 rounds were received in February. Friendly forces at Khe Sanh suffered 45 KIA and 195 WIA (evacuated)

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in March. In February, they suffered 48 KIA and 205 WIA (evacuated). ^{186/}

Enemy trenchwork around Khe Sanh also continued to expand during March. In one report on the trenches in mid-March, Nail FAC 62 observed:

"Trenches from the south are close to the perimeter; many are within 200 meters of the outer fence, and a few go right up to the outer fence. There are now fresh trenches perpendicular to the approach trench forming a 'T' (parallel to the runway). Many foxholes and bunkers are located to the north. South perimeter is covered by trenches and tunnels; foxholes can be seen within the trenches suggesting the presence of personnel on a full time basis."

Some of the heaviest action at Khe Sanh in March began on the night of the 22nd. Intelligence officials later estimated that the enemy had planned to stage a major assault against Khe Sanh on 22-23 March. Nail 35 who flew in the Khe Sanh area during the daylight hours of 22 March reported "working several flights within 400 meters of the Khe Sanh perimeter." Each bomb that hit a trench produced several secondaries which were believed to be rockets. The FAC also noted "small holes", which he said were not foxholes. These were about 200 feet from the perimeter and dug at an angle so the bottom could only be seen from the west, i.e. over the strip. Nail 35 suggested these might be mortar positions. He also reported no personnel to be seen anywhere near the area and the complete absence of ground fire appeared to confirm this. ^{188/}

At 1900 hours on the 22nd, Khe Sanh began receiving heavy incoming

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fire. The volume slacked off for a short period, and then increased in tempo at 2045 hours. III MAF considered this to be a possible pre-assault barrage, and the III MAF Commander passed the following request to 7AF. "Khe Sanh receiving heavy incoming. Request 7th AF be aware of possibility of request for tactical air support at Khe Sanh." By 2400 hours of the 22nd, Khe Sanh had been subjected to a barrage which included 300 artillery rounds, 92 rockets, and 250 mortar rounds -- a total of 642 rounds. Six personnel were killed, and 28 wounded. One ammunition bunker was destroyed, and several artillery pieces were damaged. On the following day, Khe Sanh received another barrage of 636 rounds of mixed ordnance. Thirty-nine friendly personnel were wounded in action, with 17 evacuated ^{189/}

Tactical air responded with 1,074 sorties between 22 - 24 March in the defense of Khe Sanh, with the largest number being flown on the 23rd -- 438 sorties. The B-52s totalled 138 sorties into the area over the three day period, with 51 of these being flown on 23 March. If an enemy attack was planned, it did not materialize, and the enemy shelling dropped off ^{190/} The ABCCC reported that on the night of 22 March, Carstairs II had requested specifically that the AC-130 weapon system (Spector 05) be provided for suppression of enemy fire. This request was made at 2200 hours during the heaviest period of enemy shelling. Moonbeam was unable to comply because of AC-130 crew rest, and a Spooky AC-47 was provided instead. No additional air was requested by Carstairs II, and afterward the area was relatively quiet. Moonbeam recommended:

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"Spector 05 remains the most effective weapons system against ground troops and movers. Recommend that more of this type aircraft be provided to the theater." ^{191/}

The stream of tactical air sorties flown in NIAGARA during March remained constant at a daily average of 301. The daily average for the sustained operation between 22 January and 31 March was 300. B-52 sorties increased considerably during March with a daily average of 41, as compared to a daily average of 33 during the first 38 days of NIAGARA operations. Bomb Damage Assessment (BDA) for tactical air showed increased results in March. For instance, there was a daily average of 87 secondary explosions and fires reported in March, compared to a daily average of 65 prior to March. In this comparison, the weather factor must be considered. Although weather was still bad in March, more visual sightings could be made and more visual BDA obtained. ^{192/}

NIAGARA operations ended on 31 March, with a total of 24,449 tactical air and B-52 sorties having made strikes against the enemy. An additional 1,598 FAC sorties and 1,398 Reconnaissance sorties were flown. Over 100,000 tons of bombs were dropped in the NIAGARA area, and over 100,000 rounds of artillery and mortar ammunition were also fired in support of the combat base at Khe Sanh. ^{193/} Combat Sky Spot permitted the campaign to proceed without interruption by darkness and bad weather; 62 per cent of NIAGARA air strikes were conducted under Sky Spot control.

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156. (U) Ltr, Commanding Officer, 4th Marines, 3d Marine Division, FMF, APO 96602, Signed: William L. Dick (rank not listed), to Comdr 7AF, subj: Appreciation for Combat Support, 9 Feb 68.
157. (C) Material provided by Hq 7AF DCS/Intelligence.
158. Ibid.
159. Ibid
160. Ibid.
161. (U) Airlift statistical data recorded by the Airlift Control Center, Tan Son Nhut AB.
162. (C) Interview with Covey FAC #251, Capt Joseph P. Johnson, at Da Nang AB, 20 Feb 68 Doc 7
163. (C) "History of Airlift at Khe Sann," by 834th AD History Section
164. Ibid
165. Ibid.
166. (C) Interview with Maj Milton G. Hartenbower, 7AF ALO at Khe Sanh at Da Nang AB, 20 Feb 68 Doc 6
167. (C) Msg, CG III MAF to COMUSMACV, subj: Resupply of Khe Sanh, undated.
168. (C) Msg, CG III MAF to Comdr 7AF, subj: Khe Sanh Resupply, 26 Feb 68.
169. (C) Hq 7AF TACC logs; Mission Commander Reports, 834th AD; Interview by Capt Edward Vallenty 7AF DOAC with Col William T. Phillips, Dir Airlift Command Center, 834th AD, 17 Apr 68.
170. (S) Msg, COMUSMACV to Comdr 7AF, CG III MAF, CJCS, CINCPAC, CMC, CSAF, PACAF, FMFPAC, subj: Air Support of I Corps, 22 Jan 68.
171. (S) Msg, CG III MAF to Comdr 7AF, subj: Air Support Control Operation Niagara, 240548Z Jan 68.
172. Ibid
173. (C) Review of ABCCC Mission Reports and Tigerhound/Tally Ho DISUMS, 22 Jan-13 Feb 68; Docs. 13-50. Interviews with Covey FACs, and discussions with 7AF TACC officials.

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174. Ibid.
175. Ibid.
176. Ibid.
177. Ibid.
178. Ibid.
179. Ibid.
180. (C) Msg, 7AF to Tiger Hound, Tally Ho Addressees, CG III MAF, CTG 77, and other Niagara participants, subj: Air Support in Defense of Khe Sanh, 13 Feb 68.
181. (S) Msg, CG III MAF to Comdr 7AF, subj: Air Effort for Defense of Khe Sanh, 140852Z Feb 68.
182. (C) ABCCC Mission Reports, Docs 13-50.
183. Ibid.
184. (C) Msg, OLB 1 6250th Spt Sq ABCCC Udorn RTAFB Thai to 7AF, subj: Moonbeam ABCCC Mission Report, 160241Z Feb 68.
185. (C) "History of Aircraft at Khe Sanh," by 834th AD History Section.
186. (U) Statistical Data sheet released by MACV on Khe Sanh, 11 Apr 68. Doc. 51.
187. (C) Hq 7AF TACC Logs, 15 Mar 68.
188. (C) ABCCC Mission Report by OLB 1, 6250th Spt Sq to Hq 7AF, 22 Mar 68.
189. (C) MACV COC Logs, 22-23 Mar 68.
190. (C) Sortie Statistical Data compiled by Hq 7AF DOSR for tactical air sorties and Hq MACV for Arc Light Sorties.
191. (C) ABCCC Mission Report by OLB 1, 6250th Spt Sq to Hq 7AF, 22 Mar 68.
192. (C) Sortie Statistical Data compiled by Hq 7AF DOSR for tactical air sorties and Hq MACV for Arc Light Sorties; BDA recorded daily by Hq 7AF DIS.
193. (C) Ibid.; artillery data from MACV Fact Sheet. Doc. 51.

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194. (C) BDA recorded daily by Hq 7AF DIS.
195. (C) Msg, COMUSMACV to DIA, subj: Effects of B-52 Strikes on VC/NVA Forces in the Khe Sanh Area, 201206Z Apr 68. Doc. 52.
196. Ibid.
197. Ibid.
198. (S) Memorandum for COMUSMACV, subj: An Analysis of the Khe Sanh Battle, by MACEVAL, 5 Apr 68. Doc. 53-68.
199. Ibid.
200. (S) Msg, COMUSMACV to CINCPAC, subj: Operation Niagara, 29 Mar 68.
201. (C) MACV COC Logs, 1 Apr 68.
202. (C) MACV COC Logs, 31 Mar - 3 Apr 68.
203. (C) MACV COC Logs, 4-5 Apr 68.
204. Ibid.
205. Ibid.
206. (C) MACV COC Log, 12 Apr 68; Interview by Lt Col W. O. Ramey, Hq 7AF DIPA with Marine officers at Dong Ha in Apr 68.
207. (C) MACV COC Logs, 1-17 Apr 68.
208. Ibid.
209. (C) Statistical Data by Hq 7AF DIS.

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APPENDIX I

NIAGARA DAILY SORTIES* 23 Jan - 31 Mar

<u>DATE</u>	<u>7AF</u>	<u>SAC</u>	<u>USN</u>	<u>USMC</u>	<u>TOTAL TAC</u>
22 Jan	92	17	19	117	228
23 Jan	249	49	119	245	613
24 Jan	271	32	76	80	427
25 Jan	241	33	133	106	480
26 Jan	226	33	138	127	491
27 Jan	217	32	88	94	399
28 Jan	219	30	25	108	352
29 Jan	204	24	51	107	362
30 Jan	240	45	153	86	479
31 Jan	184	39	161	57	402
1 Feb	131	39	93	59	283
2 Feb	122	36	24	64	210
3 Feb	104	39	56	48	208
4 Feb	106	45	48	71	225
5 Feb	98	39	98	52	248
6 Feb	96	39	58	74	228
7 Feb	83	36	37	51	171
8 Feb	106	40	70	77	253
9 Feb	70	39	67	17	154
10 Feb	112	38	91	47	250
11 Feb	87	33	78	79	244

* Source: Hq 7AF TACC and Hq MACV

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<u>DATE</u>	<u>7AF</u>	<u>SAC</u>	<u>USN</u>	<u>USMC</u>	<u>TOTAL TAC</u>
12 Feb	100	27	65	62	227
13 Feb	138	45	83	66	287
14 Feb	182	36	64	92	338
15 Feb	181	30	27	89	297
16 Feb	210	39	73	68	351
17 Feb	217	40	66	37	320
18 Feb	198	30	78	58	334
19 Feb	168	41	107	56	331
20 Feb	162	39	46	42	250
21 Feb	138	30	65	82	285
22 Feb	114	29	59	55	228
23 Feb	199	32	47	58	304
24 Feb	125	32	38	47	210
25 Feb	111	34	34	73	218
26 Feb	162	19	11	87	260
27 Feb	145	32	63	83	291
28 Feb	115	54	62	108	285
29 Feb	131	45	106	124	361
1 Mar	75	42	52	73	200
2 Mar	127	42	76	44	247
3 Mar	95	41	71	22	188
4 Mar	129	36	28	150	307
5 Mar	133	41	43	159	335
6 Mar	101	42	88	142	331

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<u>DATE</u>	<u>7AF</u>	<u>SAC</u>	<u>USN</u>	<u>USMC</u>	<u>TOTAL TAC</u>
7 Mar	149	41	109	134	392
8 Mar	123	27	94	121	338
9 Mar	126	21	85	108	319
10 Mar	128	33	86	70	284
11 Mar	126	32	82	123	331
12 Mar	140	36	37	97	274
13 Mar	191	42	86	133	410
14 Mar	90	39	57	126	273
15 Mar	135	35	98	130	363
16 Mar	165	38	117	119	401
17 Mar	132	31	64	118	314
18 Mar	114	32	59	128	301
19 Mar	133	39	67	103	303
20 Mar	92	30	16	68	176
21 Mar	101	42	52	123	276
22 Mar	117	42	73	112	302
23 Mar	146	51	183	109	438
24 Mar	122	45	112	100	334
25 Mar	93	50	84	57	234
26 Mar	106	54	78	111	295
27 Mar	90	29	110	125	325
28 Mar	61	35	85	129	275
29 Mar	118	27	88	118	324
30 Mar	97	48	90	110	297
31 Mar	75	33	20	70	165

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APPENDIX II

RECONNAISSANCE OBJECTIVES* (PROGRESSIVE)

<u>22 January - 29 January</u>	<u>Fragged</u>	<u>Successful</u>
Black & White	627	282
Color	34	19
Camouflage Detection	39	21
Infra-red	345	115
High Acuity	27	5
 <u>22 January - 5 February</u>		
Black & White	784	397
Color	54	32
Camouflage Detection	59	34
Infra-red	526	191
High Acuity	75	30
 <u>22 January - 12 February</u>		
Black & White	940	424
Color	89	40
Camouflage Detection	95	41
Infra-red	83	29
High Acuity	142	30

* Source: Hq 7AF DIS

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<u>22 January - 19 February</u>	<u>Fragged</u>	<u>Successful</u>
Black & White	1,169	486
Color	150	72
Camouflage Detection	176	76
Infra-red	805	239
High Acuity	205	30
<u>22 January - 26 February</u>		
Black & White	1,474	568
Color	185	83
Camouflage Detection	286	122
Infra-red	934	278
High Acuity	232	36
<u>22 January - 4 March</u>		
Black & White	1,796	647
Color	216	103
Camouflage Detection	332	137
Infra-red	1,010	312
High Acuity	250	36
<u>22 January - 11 March</u>		
Black & White	2,093	797
Color	236	113
Camouflage Detection	349	146
Infra-red	1,132	365
High Acuity	276	40

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<u>22 January - 18 March</u>	<u>Fragged</u>	<u>Successful</u>
Black & White	2,334	907
Color	253	118
Camouflage Detection	370	154
Infra-red	1,219	388
High Acuity	309	67
<u>22 January - 25 March</u>		
Black & White	2,598	1,026
Color	253	118
Camouflage Detection	373	157
Infra-red	1,317	407
High Acuity	334	88
<u>22 January - 31 March</u>		
Black & White	2,839	1,122
Color	253	119
Camouflage Detection	385	162
Infra-red	1,389	444
High Acuity	345	79

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APPENDIX III

TACTICAL AIR CUMULATIVE BDA* (PROGRESSIVE)

<u>22 January - 29 January</u>	<u>7AF</u>	<u>Navy/Marines</u>
Secondary Explosions	149	56
Secondary Fires	106	35
Killed by Air	176	55
Trucks (Dest/Dam)	11/7	5/0
Gun Positions (Dest/Dam)	11/2	7/1
Bunkers (Dest/Dam)	11/0	18/10
Structures (Dest/Dam)	110/35	71/30
<u>22 January - 5 February</u>		
Secondary Explosions	269	119
Secondary Fires	326	103
Killed by Air	223	94
Trucks (Dest/Dam)	59/11	13/0
Gun Positions (Dest/Dam)	15/4	33/6
Bunkers (Dest/Dam)	34/2	180/11
Structures (Dest/Dam)	181/35	149/30

* Source: Hq 7AF DIS (Collected as of 31 March through visual sightings only)

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<u>22 January - 12 February</u>	<u>7AF</u>	<u>Navy/Marines</u>
Secondary Explosions	327	156
Secondary Fires	367	205
Killed by Air	284	218
Trucks (Dest/Dam)	62/11	17/2
Gun Positions (Dest/Dam)	18/4	39/6
Bunkers (Dest/Dam)	43/4	202/11
Structures (Dest/Dam)	303/38	386/54
Tanks (Dest/Dam)	3/0	2/3
<u>22 January - 19 February</u>		
Secondary Explosions	1277	397
Secondary Fires	396	252
Killed by Air	304	240
Trucks (Dest/Dam)	66/13	20/5
Gun Positions (Dest/Dam)	33/7	48/6
Bunkers (Dest/Dam)	44/4	243/12
Structures (Dest/Dam)	328/38	371/54
Tanks (Dest/Dam)	4/0	2/3
<u>22 January - 26 February</u>		
Secondary Explosions	1321	422
Secondary Fires	434	285
Killed by Air	339	256
Trucks (Dest/Dam)	78/14	22/7
Gun Positions (Dest/Dam)	44/12	51/8
Bunkers (Dest/Dam)	57/4	251/12

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	<u>7AF</u>	<u>Navy/Marines</u>
Structures (Dest/Dam)	332/38	381/84
Tanks (Dest/Dam)	4/0	3/3
<u>22 January - 4 March</u>		
Secondary Explosions	1461	464
Secondary Fires	546	329
Killed by Air	417	285
Trucks (Dest/Dam)	89/15	26/8
Gun Positions (Dest/Dam)	54/12	54/8
Bunkers (Dest/Dam)	73/6	258/12
Structures (Dest/Dam)	406/43	394/84
Tanks (Dest/Dam)	4/0	4/4
<u>22 January - 11 March</u>		
Secondary Explosions	1651	687
Secondary Fires	703	415
Killed by Air	490	399
Trucks (Dest/Dam)	102/18	36/10
Gun Positions (Dest/Dam)	74/13	79/15
Bunkers (Dest/Dam)	98/8	373/32
Structures (Dest/Dam)	419/45	459/96
Tanks (Dest/Dam)	4/0	4/4

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<u>22 January - 18 March</u>	<u>7AF</u>	<u>Navy/Marines</u>
Secondary Explosions	1795	770
Secondary Fires	1019	519
Killed by Air	570	468
Trucks (Dest/Dam)	93/15	92/17
Gun Positions (Dest/Dam)	151/27	38/11
Bunkers (Dest/Dam)	122/9	449/32
Structures (Dest/Dam)	524/45	481/96
Tanks (Dest/Dam)	4/0	5/4
 <u>22 January - 25 March</u>		
Secondary Explosions	2179	1040
Secondary Fires	1116	593
Killed by Air	641	566
Trucks (Dest/Dam)	164/33	44/14
Gun Positions (Dest/Dam)	135/18	144/21
Bunkers (Dest/Dam)	153/12	563/79
Structures (Dest/Dam)	563/51	487/100
Tanks (Dest/Dam)	4/0	5/4
 <u>22 January - 31 March</u>		
Secondary Explosions	2215	1128
Secondary Fires	1173	651

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	<u>7AF</u>	<u>Navy/Marines</u>
Killed by Air	650	638
Trucks (Dest/Dam)	204/37	49/15
Gun Positions (Dest/Dam)	135/18	165/25
Bunkers (Dest/Dam)	216/19	675/80
Structures (Dest/Dam)	564/52	497/106
Tanks (Dest/Dam)	4/0	5/4

APPENDIX IV

PHOTO SIGNIFICANT ITEMS*
(PROGRESSIVE)

	29 Jan	5 Feb	12 Feb	19 Feb	26 Feb	4 Mar	11 Mar	18 Mar	25 Mar	31 Mar
Bunkers	173	180	190	243	258	258	262	282	292	301
Trenches	4	5	5	55	56	59	64	65	65	72
Strong Points	12	23	50	52	78	78	78	84	85	86
Gun Positions	101	144	143	151	172	180	211	230	236	238
POL Drums	136	136	136	136	136	136	136	151	151	151
Foxholes	576	636	661	661	1,042	1,254	1,544	1,544	1,544	1,544
Mortar Positions	23	31	31	36	36	55	55	66	80	80
Tanks	0	4	5	5	5	5	5	5	5	5
Troops	93	93	128	130	147	-147	147	147	147	147

TARGET STATUS 22 Jan - 31 Mar

	Targets Nominated	Targets Fraggd	Struck	Deleted	Active
Logistics	318	490	169	261	57
LOCs	84	74	19	81	3
Truck Parks	55	60	15	20	35
Weapons	566	663	291	389	177
Troops	547	617	253	420	127
Control/Comm	46	61	24	31	15
Fortifications	427	414	205	230	197
Miscellaneous	4	2	2	3	1

* Source: Hq 7AF DIS

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APPENDIX V

TOTAL ORDNANCE EXPENDED by 7th AIR FORCE

<u>AMMO</u>	<u>FIRE BOMB</u>	<u>FLARES</u>	<u>ANTI-MAT</u>	<u>INC-CLUST</u>	<u>ANTI-PERS²</u>
744,000	1,263	576	315	500	579
<u>FRAG-CLUST</u>	<u>INC-SMOKE</u>	<u>ROCKET</u>	<u>SPIKE</u>	<u>GLVB-30</u> <u>250</u>	<u>500</u>
64	118	1,390	8	36 794	21,621
<u>750</u>	<u>1000</u>	<u>2000</u>	<u>3000</u>	<u>BULL-PUP</u>	
15,362	120	33	30	20	

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APPENDIX VI

KHE SANH AIRLIFT SUMMARY

DATE	LAND	TONS	CDS	LAPES	TONS	LAND	TONS	DROP	TONS	TOTAL SORTIES	TOTAL TONS
<u>JAN</u>											
21						6	25.8			6	25.8
22						20	88.2			20	88.2
23	14	174.4								14	174.4
24	18	253.2				1	.3			19	253.5
25	13	156.9	4		55.0	1	1.4			18	213.3
26	13	225.3				1	.5			*16	*227.1
27	23	312.2				1	.4			*27	*318.7
28	8	111.0	1		12.0	2	9.4			*14	*126.0
29	24	289.7								24	289.7
30	18	250.7				2	3.5			20	254.2
31	24	288.9				6	25.5			30	314.4
<u>FEB</u>											
1	16	221.7				2	3.4			18	225.1
2	2	23.4				1	4.8			3	28.2
3	1	14.2								1	14.2
4	11	160.6								11	160.6
5	15	202.9				2	7.1			17	210.0
6	11	148.5								11	148.5
7	10	144.1				1	4.9			11	149.0
8	20	245.9				1	4.1			21	250.0

Source: 834th AD ALCC

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DATE	LAND	TONS	CDS	LAPES	TONS	LAND	TONS	DROP	TONS	TOTAL SORTIES	TOTAL TONS
FEB											
9	3	27.0				1	5.0			4	32.0
10	6	45.0								6	45.0
11	9	101.1								9	101.1
12						7	41.3			7	41.3
13			2		30.0	11	32.7			13	62.7
14			7		98.0	18	102.0			25	200.0
15			5		75.0	11	46.0			16	121.0
16			8	4	149.0	6	19.9			18	168.9
17			8		122.6					8	122.6
18			10		156.1					10	156.1
19			7	2	122.8					9	122.8
20			9		169.3	1	5.0			**10	**174.3

* Includes C-7As

** Totals include 8 C-7A sorties (13 tons)

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KHE SANH AIRLIFT SUMMARY

DATE	<u>C-130</u>				<u>C-123</u>				TOTAL SORTIES	TOTAL TONS	
	LAND	TONS	CDS	LAPES	TONS	LAND	TONS	DROP			TONS
<u>FEB</u>											
21			10	4	183.4	1	4.9			15	188.3
22			10		143.3	2	10.6			12	153.9
23			10		156.2	2	8.3			12	164.5
24			9		117.1	5	20.7			14	137.8
25			9		141.7	2	8.0	1	3.0	12	152.7
26	1	8.5	9	2	149.7	3	12.5	1	3.1	16	173.8
27	3	38.0	10	1	152.5	4	12.7			18	203.2
28	5	51.4	9		149.9	1	4.8			15	206.1
29	5	62.7	10		152.8	6	22.7	1	1.8	22	240.0
<u>MAR</u>											
1			5	1	79.9	7	32.8			13	112.7
2			10	2	169.8	1	4.0	1	3.2	14	177.0
3			10		152.2	1	1.9	1	1.8	12	155.7
4			10		151.1	3	14.0	3	7.5	16	172.6
5			10		138.1	2	7.3	2	7.8	14	153.2
6			8		121.3	5	20.6	3	9.5	16	151.4
7			10		150.6			1	1.4	11	152.0
8			10		151.0			2	3.6	12	154.6
9			7	3	128.2	3	15.1			11	143.3
10			11	1	167.1	1	1.2	3	8.0	16	176.3
11			11		164.3	2	6.7	2	7.4	15	178.4
12			10	2	157.3			2	4.0	12	161.3

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DATE	C-130				C-123				TOTAL SORTIES	TOTAL TONS	
	LAND	TONS	CDS	LAPES	TONS	LAND	TONS	DROP			TONS
MAR											
13			12	2	194.9			4	10.7	18	205.6
14			9		134.7			4	8.6	13	143.3
15			12		171.2	1	4.6	3	9.2	16	185.0
16			14	1	211.2	4	10.2	2	16.0	21	237.4
17			13		206.8	2	8.4	3	12.8	19	228.0
18			14	5	245.8	1	4.6	3	9.8	23	260.2
19			15	1	216.8	1	4.2	2	6.4	19	227.4
20			13	1	190.8	1	4.8	4	7.9	19	203.5
21			10	1	142.3			5	15.5	16	157.8
22			11	1	164.5	2	6.8	4	10.2	18	181.5
23			10	2	152.8	1	3.9	4	10.6	17	167.3
24			10	1	157.1	1	4.0	4	8.9	16	170.0
25			10	1	151.3					11	151.3
26			9	2	139.0			2	4.9	13	143.9
27			7		100.2	1	5.4	2	6.3	10	111.9
28			10	1	151.5			4	11.9	15	163.4
29			10	2	154.3	1	4.0	2	4.5	15	162.8
30		(1 GPES)	4	2	71.7	2	8.5	2	4.1	11	84.3
31			6	4	95.8	1	1.1	4	12.6	15	109.5
APR											
1		(1 GPES)	5	1	106.4	1	3.6	4	13.0	13	123.0
2			5	2	85.3			4	9.1	11	94.4
3			5		76.4			3	7.4	8	83.8

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DATE	<u>C-130</u>				<u>C-123</u>				TOTAL SORTIES	TOTAL TONS	
	LAND	TONS	CDS	LAPES	TONS	LAND	TONS	DROP			TONS
APR											
4		(3 GPES)	5		100.0	1	5.3	4	5.9	13	111.2
5		(3 GPES)	5		95.8	1	5.5	1	2.1	10	103.4
6		(4 GPES)	5		109.7	2	5.6			11	115.3
7		(3 GPES)	5		104.8			4	12.9	12	117.7
8			2		27.4	2	8.4	4	11.0	6	46.8
TOTAL:	273	3557.8 3558	496 (GPES 15)	52 7826	7825.8 7826	179	738.9 739	105	294.3 294	*1124	*12430.0 12430

GPES = Ground Proximity Extraction System

CDS = Container Delivery System

LAPES = Low Altitude Parachute Extraction System.

* Totals Include Eight (8) C-7A Sorties (13 Tons)

<u>AIRDROPS</u>		<u>AIRLAND</u>	
C-130	7826	C-130	3558.0
C-123	294	C-123	739.0
		C-7A	13.0
TOTAL	8120	TOTAL	4310

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GLOSSARY

AA	Antiaircraft
AAA	Antiaircraft Artillery
AB	Air Base
ABCCC	Airborne Command and Control Center
AD	Air Division
ADVON	Advanced Echelon
AF	Air Force
AGL	Above Ground Level
ALCC	Airlift Control Center
ALO	Air Liaison Officer
AO	Air Observer
AP	Armor Piercing
APC	Armored Personnel Carrier
ARVN	Army of the Republic of Vietnam
AW	Automatic Weapon
BDA	Bomb Damage Assessment
CAP	Combat Air Patrol
CAS	Close Air Support
CBU	Cluster Bomb Unit
CDS	Container Delivery System
CG	Commanding General
CIDG	Civilian Irregular Defense Group
CINCPAC	Commander in Chief, Pacific
CO	Commanding Officer
COC	Combat Operations Center
COMUSMACV	Commander U.S. Military Assistance Command, Vietnam
CONUS	Continental United States
CP	Command Post
CSS	COMBAT SKYSPOT
CTZ	Corps Tactical Zone
DASC	Direct Air Support Center
DI	Director of Intelligence
DMZ	Demilitarized Zone
FAC	Forward Air Controller
FSCC	Fire Support Control Center
GCA	Ground-Controlled Approach
GPES	Ground Proximity Extraction System
HUMINT	Human Intelligence

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ICC	Intelligence Control Center
IDHS	Intelligence Data Handling System
IP	Initial Point
JCS	Joint Chiefs of Staff
KBA	Killed by Air
KIA	Killed in Action
LAPES	Low Altitude Parachute Extraction System
LOC	Lines of Communication
LZ	Landing Zone
MACV	Military Assistance Command, Vietnam
MAF	Marine Amphibious Force
MAW	Marine Air Wing
MIA	Missing in Action
NCO	Noncommissioned Officer
NVA	North Vietnamese Army
NVN	North Vietnam
NW	Northwest
OIC	Officer in Charge
PI	Photo Interpreter
POL	Petroleum, Oil, Lubricants
POW	Prisoner of War
SA	Small Arms
SAC	Strategic Air Command
SAM	Surface to Air Missile
SE	Southeast
SF	Special Forces
SLAM	Seek, Locate, Annihilate, and Monitor
SSE	South Southeast
SSW	South Southwest
STOL	Short Take Off and Landing
SVN	South Vietnam
TACC	Tactical Air Control Center
TACP	Tactical Air Control Party
TACS	Tactical Air Control System
TAOR	Tactical Area of Operational Responsibility
TASS	Tactical Air Support Squadron
TDY	Temporary Duty
TOC	Tactical Operations Center
TOT	Time Over Target

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USA	United States Army
USAF	United States Air Force
USMC	United States Marine Corps
USN	United States Navy
USSF	United States Special Forces

VC	Viet Cong
VR	Visual Reconnaissance

WAAPM	Wide Area Anti-personnel Mine
WAIS	Weekly Air Intelligence Summary
WIA	Wounded in Action

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Weather precluded accurate BDA of the air effort. Cumulative BDA reported for tactical air strikes in this study was derived from visual sightings and is obviously deflated. FACs had an extremely difficult time making strike assessments because of weather conditions, and post-strike BDA of Sky Spot strikes was negligible. Also, even under good weather conditions, definite BDA was often precluded by smoke, dust and dense foliage. Cumulative BDA gained from visual sightings was reported as follows for tactical air strikes: 4,705 secondary explosions and 1,935 secondary fires; 1,288 KBA; 253 trucks destroyed and 52 damaged; 300 gun positions destroyed and 43 damaged; 891 bunkers destroyed and 99 damaged; 1,061 structures destroyed and 158 damaged; and, nine tanks destroyed and four damaged.^{194/}

BDA information on B-52 strikes was also limited. Weather also restricted aerial observation of targets struck by the B-52s. When reconnaissance was possible, much of the damage observed could not be specifically attributed to B-52s because of numerous tactical air strikes and artillery fire in the area. A preliminary MACV study reported the following total number of destroyed/damaged B-52 targets in the Khe Sanh area for the period 15 January to 31 March obtained by visual and photo reconnaissance:^{195/}

Defensive Positions: 274 destroyed and 67 damaged.

Weapons Positions: 17 destroyed and 8 damaged.

Lines of Communication: 23 destroyed and 34 damaged.

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In addition, SAC aircrews reported approximately 1,362 secondary explosions and 108 secondary fires in the target areas. MACV interpreted: ^{196/}

"It is evident from the above figures that B-52 strikes have destroyed numerous enemy offensive/defensive positions and disrupted supply and storage areas. Other evidence shows that the enemy has also suffered many casualties to these attacks. Photo reconnaissance of an area near Cam Lo revealed twelve enemy bodies which can be directly attributed to B-52s. According to POW, rallier, and refugee reports, elements of the 304th Division have sustained heavy losses. The attacks were often a surprise to enemy units, and reportedly caused, in addition to KIA, numerous concussion type injuries which required evacuation. An entry in a notebook captured at Khe Sanh reads in part: 'From the beginning until the 60th day (the 60th day of the siege at Khe Sanh) B-52 bombers continually dropped their bombs in this area with ever growing intensity and at any moment of the day. If someone came to visit this place, he might say that this was a storm of bombs and ammunition which eradicated all living creatures and vegetation whatsoever, even those located in caves or in deep underground shelters'.

"Desertions apparently resulted from strikes. Reportedly, individuals often took advantage of the confusion immediately after a strike to leave their units. An extract from a captured document, dated 29 Feb 68, states that contingents of Dcom 926 suffered 300 desertions while enroute to Khe Sanh. Fear of enemy B-52 raids was given as the main cause for these desertions. The shock, confusion, and destruction brought by B-52s contributed to lowering the morale of the enemy. In one instance, a source said that nearly seventy percent of his unit's rice supply was destroyed by B-52 bombs, causing frustration and hunger. Another source stated that his men were afraid of the strikes because of the supposed high casualties inflicted on the 1st (9th Regt 304 Div).

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To lessen the fears of their troops, the NVA undertook a concerted propaganda effort, telling the men not to fear B-52 strikes because bombs had to fall within 3 meters to cause a casualty. Breu refugees were told that they should not fear B-52s, with implications that the NVA had an anti-B-52 device in the Khe Sanh area."

MACV advised on 20 April that although an accurate and comprehensive estimate of the extent of destruction could not be made at this time, it was almost certain that enemy losses, both personnel and equipment, greatly exceeded those reported.^{197/} With data available at the time this study was prepared, an accurate quantitative analysis of the impact of airpower on enemy forces and plans in the NIAGARA area could not be made. Several agencies were engaged in a continuing comprehensive collection and study of pertinent NIAGARA data, and indications were that a final analysis was a long way off. In the final analysis of the impact of airpower in the defense of Khe Sanh, the full scope of the air role must be considered. For instance, the effectiveness of air delivered gravel (anti-personnel mines) on enemy withdrawal routes must be considered. Also, an assessment of 7AF's total interdiction effort during this period and its impact on the Khe Sanh tactical situation would be an essential analytical study ingredient.

Conversely, there would appear to be a need to address the question of what impact a sustained air program of NIAGARA's magnitude might have on the functional response of the 7AF TACS to theatre-wide requirements -- both immediate and long range. This might be correlated with a study to detect any pattern of enemy reaction to predetermined patterns of

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airpower response in special air programs such as Operations NEUTRALIZE and NIAGARA whereby the Air Commander is required to concentrate a major portion of his air effort in one area to preserve the posture of a friendly ground force. In other words, once the tactical situation at Khe Sanh reached the point that a sustained SLAM-type effort was required to provide primary defense, there was no question of the validity of the sustained requirement nor that the commitment would be honored. However, it is logical to assume that the enemy's choice of alternatives could allow him to plan for and take advantage of a situation such as the one created at Khe Sanh.

While stepping up infiltration into I Corps during the early part of NIAGARA operations, the enemy had also accelerated troop and supply movement through Laotian infiltration routes into the lower provinces of South Vietnam. Also, NVN and Pathet Lao hostilities against Royal Laotian forces and friendly Laotian villages and cities were on the rise -- especially along the eastern periphery of the NVN infiltration routes. It appeared that NVN strategy in this was not only to move friendly Laotian observers out of the area, but to widen his avenues of infiltration -- not only from Laos into South Vietnam, but through the highly motorable valley floors of Cambodia, for offensives in the lower Corps areas. Throughout NIAGARA, intelligence officials closely followed the enemy's reinforcement of his posture in the A Shau Valley, which was the target for Allied operations subsequent to NIAGARA. Enemy reaction had been much the same in the last part of 1967. While attention was focused on Operation NEUTRALIZE, they had begun moving their forces south for the Tet Offensive, which included Khe Sanh.

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There has been much speculation about the enemy's real intentions in the Khe Sanh area. One position has been that Khe Sanh was a diversion for the Tet Offensive. An opposite estimate is that the widespread Tet Offensive was an attempt to dilute airpower availability in support of Khe Sanh. This was not accomplished; however, there was an impact on all out-of-country operations, except those considered to be essential. A MACV post-analysis concluded that all evidence indicated "conclusively" that the enemy had planned "a massive ground attack against the combat base supported by armor and artillery". The analysis stated that the enemy's initial target date apparently coincided with the Tet Offensive. Subsequent target dates estimated by MACV were: ^{198/}

- . The last week in February. The enemy's heaviest attacks by fire at Khe Sanh occurred during the period 21-25 February.
- . 13-14 March and 22-23 March. These dates were obtained through intelligence sources.

It is possible that Khe Sanh was just one of a few important objectives in an overall enemy attempt to win both a military and political victory, the difference being that its location made it more vulnerable than other targets. Whether it was a major or minor target, the fact remains that Khe Sanh was effectively pinned down and could have been overrun under the existing circumstances had it not been for airpower. If the enemy planned to launch a major assault against Khe Sanh, it is likely that NIAGARA Operations completely disrupted his timetable. A

SECRET

logical assumption would be that airpower and artillery had done more than destroy enemy forces and supplies; they had probably kept the enemy from effectively massing his forces for an assault. The enemy also undoubtedly suffered heavy losses in manpower and supplies from the NIAGARA air effort; however, with existing data, it is much too early to assess the final results.

Epilogue

By the end of March, it appeared that the enemy had abandoned any immediate thoughts of overrunning Khe Sanh. Reportedly, one of the divisions had been redeployed out of the area towards Hue.^{199/} COMUSMACV directed that Operation NIAGARA be terminated on 31 March,^{200/} with a follow-on joint effort known as Operation PEGASUS/LAMSON 207 to be executed on the same day to reopen the supply routes to Khe Sanh.^{201/}

Continued enemy presence in the area was clearly evident on the last day of NIAGARA operations when Khe Sanh received 347 incoming rounds over the 24 hour period. Six U.S. Marines were killed and twelve wounded. The area was quiet for two days, and then on 3 April the base received 152 rounds of mixed artillery and mortar fire resulting in five personnel wounded. By this time, Operation PEGASUS forces were sweeping in close to Khe Sanh, and in seven separate small unit contacts on 3 April ground forces killed 14 enemy. At 1735 hours on the 3rd, gunships from the A/1/9 Cav engaged an estimated 200 enemy in the open, and reported 20 enemy killed.^{202/}

SECRET

On 4 April, elements of the 26th Marine Regiment secured Hill 471 to the south of Khe Sanh without enemy contact; however, artillery prep fires reportedly had killed 30 enemy soldiers on the hill. Also, after taking Hill 471, the Marines received approximately 120 rounds of mixed mortar, artillery, and rocket fire throughout the day. Seven Marines were killed and fifty were wounded, forty of whom were evacuated. Then, on 5 April at 0515 hours, Hill 471 received mortar and rocket fire followed by a ground attack from an estimated enemy battalion. After tactical air strikes and artillery were called in, the enemy broke contact at 0715 hours. Two U.S. Marines were wounded, 122 enemy were reported killed and three detained. Thirty-two individual weapons and 15 crew-served weapons were captured. ^{203/}

Other action continued throughout the area as friendly units moved out to secure other hills and landing zones and to reopen the supply routes. Many of the enemy were holed up in bunker complexes which required air strikes and artillery suppression in support of friendly sweeps. Several large ammunition and supply caches were discovered as friendly forces swept through the area around Khe Sanh. One situation was reported on 5 April which indicated poor battle discipline among the enemy ranks left behind. In the middle of the afternoon of the 5th, gunships from the 1/9 Cav observed 15 enemy in the open four kilometers southwest of Khe Sanh Village. The gunships engaged the enemy with machine guns and rockets, killing 15 enemy. In the same location ten minutes later, the gunships observed 35-40 enemy moving among the enemy dead from the previous attack. ^{204/}

SECRET

The gunships attacked again, and 35 additional KIA were reported. Oddly, the enemy although well armed did not attempt to fire against the gunships. Gunship crews reported the battle area strewn with enemy dead and weaponry. Later, a sweep of the area disclosed 28 enemy KIA, and 12 individual weapons and one crew-served weapon. ^{205/}

On 12 April, Route 9 from Ca Lu to Khe Sanh was open to friendly traffic. In addition to reopening the Khe Sanh supply routes, one objective of Operation PEGASUS was to obtain additional information on results in NIAGARA. Much of the evidence was still being gathered, sifted, and reviewed by joint service teams. Khe Sanh appeared to be out of immediate danger, although enemy forces still held much of the high ground in the area. This high ground had been considerably altered. As one Marine officer commented: "The hills are numbered according to their height in meters above sea level. After NIAGARA, those numbers will have to be lowered." ^{206/}

MACV COC logs contained the following entries after 31 March which related specific air results in PEGASUS, or which could possibly be tied to the NIAGARA air effort: ^{207/}

5 April: At 1300 hours, 3 kilometers east of Khe Sanh, 1/5 Cav engaged an enemy force in a bunker complex. Organic weapons and friendly artillery, gunships and tactical air supporting. Estimated enemy 4 KIA; friendly 2 KIA.

5 April: At 1500 hours, 4 kilometers south of Khe Sanh, D/1/8 Cav engaged an enemy force in bunker complex. Both tactical air and artillery

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supported. Enemy broke contact. There were no friendly casualties; the enemy lost 11 KIA, one detained, two individual weapons and one crew-served weapon.

6 April: One kilometer east of Khe Sanh, the 37th Ranger Bn (ARVN), in a sweep of the area, found 70 enemy bodies which were credited to tactical air strikes and artillery. Numerous weapons were also captured.

6 April: One kilometer south of Khe Sanh, a USMC unit found six enemy dead with weapons.

9 April: One kilometer southeast of Khe Sanh Village, D/2/5 Cav found mass grave containing 35 bodies. (Could be enemy refugees)

7 April: Four kilometers northeast of Khe Sanh Village, an element of B/2/7 Cav found 24 enemy bodies, one individual weapon and one crew-served weapon.

8 April: Four kilometers west of Khe Sanh Village, at 0350 hours the 3rd ARVN CP was probed by an unknown size force. Air and Artillery supported. Results: Friendly 11 KIA, 20 WIA; Enemy 74 KIA, five detained, and 39 weapons captured.

9 April: One kilometer northwest of Khe Sanh Village, B/1/12 CAV found 50 enemy dead killed by tactical air strikes or artillery.

10 April: Nine kilometers southwest of Khe Sanh Village, A/1/9 Cav reported three tactical air strikes destroyed a tank and killed 15 enemy.

14 April: Eight kilometers northwest of Khe Sanh Base at 1428 hours, the 3rd Bn, 26th Marines secured Hill 881-N after extensive artillery and tactical air prep fires. Results: Friendly 6 KIA, 4 WIA; Enemy 106 KIA, 2 detained, and 66 weapons captured.

17 April: 2/3 USMC found bunkers and one cave containing a total of 16 enemy dead and three weapons.

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Operation PEGASUS/LAMSON 207 was renamed Operation SCOTLAND II on 15 April. Cumulative results reported by MACV for PEGASUS/LAMSON 207 were as follows: Friendly 92 KIA (41 USA, 51 USMC), 667 WIA (208 USA, 459 USMC), 5 MIA (USA); Enemy 1,044 KIA, 9 detainees, 539 individual weapons and 184 crew-served weapons captured. ^{208/} 1,380 7AF, USN, and USMC tactical strike sorties and 210 B-52 sorties were flown in support of the operation. Cumulative results from the tactical air strikes were reported as follows: ^{209/}

- 68 secondary explosions and 43 secondary fires.
- 48 KBA.
- Five trucks and one tracked vehicle destroyed.
- 41 gun positions destroyed and seven damaged.
- 112 bunkers destroyed and 13 damaged.

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FOOTNOTES

1. (S) Memorandum for Record, by Gen William W Momyer, Comdr 7AF, subj: CIIB Meeting, 9 Jan 68 (Secret Material extracted from TS document); Memorandum by Gen William W Momyer to Maj Gen Gordon F. Blood, 7AF, DCS Operations, subj: Air Support of I Corps, 21 Jan 68, Doc. 1; Memorandum for TACT Hq 7AF, by Brig Gen Jones E. Bolt, Dep Dir TACC Hq 7AF, subj: Niagara Operational Planning, 16 Jan 68.
2. (S) Statistical Data compiled by Hq 7AF DOSR for tactical air sorties and Hq MACV MACCOC8 for Arc Light sorties.
3. (S) Statistical Data made available by Hq 7AF DIP.
4. (S) Memorandum for Record, by Gen William W Momyer, Comdr 7AF, subj: CIIB Meeting, 9 Jan 68. (Secret extract from Top Secret document)
5. (S) Msg, COMUSMACV to CINCPAC, subj: Operation Niagara, 151131Z Jan 68. (Secret extract from Top Secret document)
6. (S) Msg, Hq 7AF to Tiger Hound Addressees, subj: Operation Niagara, 20 Jan 68 (Secret extract from Top Secret document); Msg, COMUSMACV to CG III MAF, subj: Priority Arc Light Targeting, 6 Jan 68. (Secret extract from Top Secret document)
7. (S) Msg, COMUSMACV to CG III MAF, subj: Priority Arc Light Targeting, 6 Jan 68. (Secret extract from Top Secret document)
8. (S) Memorandum for Record, by Gen William W Momyer, Comdr 7AF, subj: CIIB Meeting, 9 Jan 68. (Secret extract from Top Secret document)
9. Ibid.
10. (S) Memorandum by Comdr 7AF to DCS Operations 7AF, subj: Air Support of I Corps, 21 Jan 68. Doc 1
11. (S) Msg, COMUSMACV to Comdr 7AF, CG III MAF, CJCS, CINCPAC, CMC, CSAF, PACAF, FMFPAC, subj: Air Support of I Corps, 22 Jan 68.
12. (S) Msg, COMUSMACV to CINCPAC, subj: Air and Naval Support for I Corps, 22 Jan 68. (Secret extract from Top Secret document.)
13. (S) Msg, CINCPAC to COMUSMACV, subj: Naval Air Support for I Corps, 23 Jan 68. (Secret extract from Top Secret document.)
14. (S) Memorandum by Comdr 7AF to DCS Operations 7AF, subj: Air Support of I Corps, 21 Jan 68. Doc 1

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15. (S) Msg, 7AF TACC to III MAF, subj: Operation Niagara, 19 Jan 68.
(Secret extract from Top Secret document)
16. (S) Memorandum by Comdr 7AF to DCS Operations 7AF, subj: Air Support
of I Corps, 21 Jan 68. Doc. 1.
17. (S) Msg, 7AF TACC to 504 TASC, 20th TASS, I DASC, and I Corps ALO,
22 Jan 68.
18. (S) Msg, Hq 7AF to Tiger Hound Addressees, subj: Operation Niagara,
20 Jan 68. (Secret extract from Top Secret document)
19. (S) Memorandum to Comdr 7AF, by Dep Dir TACC Hq 7AF, subj: Trip
Report, 24 Jan 68. Doc. 2.
20. Ibid.
21. Ibid.
22. Ibid.
23. Ibid.
24. (S) Memorandum for ACofS, J-3, by Col Marcus L. Hill, Jr., USAF,
MACCOC8, subj: Niagara Task Force Report, 9 Jan 68.
25. (C) MACV Combat Operations Center Log, 21-22 Jan 68.
26. (S) Msg, JANAF Attaches Vientiane Laos to DIA, subj: Situation Report,
Laos, Debrief of Lt Col Soulang, CO, BV-33, 20 Feb 68, Doc. 3;
Tigerhound/Tally Ho DISUMS, 23-24 Jan 68.
27. (S) Interview with Capt Charles Rushforth, and other Covey FACs, by
Mr. Warren A. Trest, Hq 7AF Project CHECO, at Da Nang AB, 19 Feb 68.
Docs. 4-8.
28. (S) Ibid; Hq 7AF DIS Logs.
29. (S) Msg, JANAF Attaches, Vientiane Laos to DIA, subj: Situation Report,
Laos, Debrief of Lt Col Soulang, CO, BV-33, 20 Feb 68. Doc. 3.
30. (C) Interview with Capt Charles Rushforth, Covey FAC #252, 19 Feb 68.
Doc. 4.
31. Ibid.
32. Ibid.

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33. (S) Msg, JANAF Attaches Vientiane Laos to DIA, subj: Situation Report, Laos, Debrief of Lt Col Soulang, CO, BV-33, 20 Feb 68. Doc. 3
34. Ibid
35. (C) Interview with Covey FAC #252, 19 Feb 68. Doc. 4
36. (C) Msg, AMEMB Vientiane to Sec State, subj: Situation Report, Laos, 21 Feb 68. Doc. 9
37. (C) Msg, OLB 1, 6250th Spt Sq ABCCC to 7AF CC, subj: Hillsboro ABCCC Mission Report, 24 Jan 68.
38. (S) Msg, JANAF Attaches, Vientiane Laos to DIA, subj: Situation Report, Laos, Debrief of Lt Col Soulang, CO, BV-33, 20 Feb 68. Doc. 3
39. (C) Interview with Covey FAC #252, 19 Feb 68. Doc. 4
40. (C) Interview with Covey FAC #252, 19 Feb 68, and other Covey FACs, Docs. 4-8.
41. (SNF) Msg, COMUSMACV to AIG 7051, subj: J-2 MACV DISUM 23-68 for period 220001 to 222400 January, 23 Jan 68. Doc. 10
42. (C) Msg, COMUSMACV to ZEN/NMCC, subj: Telecon, 24 Jan 68.
43. (C) TACC Duty Logs, 24 Jan 68.
44. (C) Interview with Covey FAC #252, 19 Feb 68. Doc. 4
45. (SNF) Msg, COMUSMACV to AIG 7051, subj: J-2 MACV DISUM 23-68 for period 220001 to 222400 January, 23 Jan 68. Doc. 10
46. (S) Memorandum for Record, by Comdr 7AF, subj: Employment of Forces, 24 Jan 68.
47. (S) Memorandum by Comdr 7AF to DCS Operations 7AF, subj: Tet and Niagara, 24 Jan 68.
48. (C) Sortie Statistical data compiled by Hq 7AF DOSR for tactical air sorties and Hq MACV for Arc Light sorties; BDA compiled by Hq 7AF DIS.
49. (C) Msg, COMUSMACV to VMAC, subj: Cancellation of Tet Offensive, 30 Jan 68.
50. (C) 7th Air Force TACC Logs, 29 Jan 68.