1956 Corvette Racing: Chevrolet Inter-Organization Letters

Below are several Chevrolet Inter-Organization Letters showing meeting minutes to discuss the details of putting together a competitive factory-backed racing effort with the 1956 Corvette:

INTER-ORGANIZATION LETTERS ONLY

CHEVROLET

TO	Mr. E. N Cole	ADDRESS	A-172, GM Bldg.
FROM	Mauri Rose	ADDRESS	3-312, CEC
SUBJECT	Minutes of Corvette Road Race Meeting at P. G. with Briggs Cunningham and John Fitch.	DATE	December 13, 1955

cc: P. A. Collins, H. F. Barr, Arkus-Duntov, R. S. Sanders, M. S. Rosenberger, W. R. Mackenzie, Nelson Farley, Geo. Brundrett

1. Subject meeting was held at P. G. on 11-30-55 after driving evaluation of 1955 Corvette V-8 and Mercedes-Benz on P. G. ride road and track, also after witnessing Duntov speed test of Corvette 5951 on track.

2. The following men were present: Messrs. Briggs Cunningham, John Fitch, E. N. Cole, P. A. Collins, M. S. Rosenberger, Nelson Farley, George Brundrett, Z. Arkus-Duntov and Mauri Rose.

Mr. Cole opened meeting by stating he would like to have 2 or 3 Corvette cars run Sebring Road Race in stock sport car class, and requested B. Cunningham to furnish map and layout of Sebring course.

4. Remarks on Corvette:

John Fitch:

1. The Corvette is a far cry from a competition sport car as compared to foreign sport cars.

2. Corvette requires a 4-speed gear box for road racing but could be improved with better ratio coverage in 3-speed box.

3. Could use low gear of 4-speed box on short corners at Le Mans course.

4. Suggested changing ratio of our Corvette 3-speed transmission to provide 80 LPH in low gear, 100 in second without overspeeding engine. Low gear to be synchronized also. (This would take approximately 1.83 low and 1.22 second gear ratios).

5. All U. S. Manufactured gear boxes are difficult to engage in low gear.

E. N. Cole:

1. We have had two ZF gear boxes on order for six months with no results. We would have to utilize 3-speed gear box with synchronized low. An overdrive unit would not be suitable due to added weight.

INTER-ORGANIZATION LETTERS ONLY

CHEVROLET

TO ADDRESS

FROM ADDRESS

SUBJECT Minutes of Corvette Road Race Meeting at P. G. with Briggs Cunningham and John Fitch. DATE December 13, 1955

B. Cunningham:

Stated Sebring is a wide course and that one could run 150 MPH on the straights.

J. Fitch:

Stated he feels Corvette could do 135-140 MPH on straights.

E. N. Cole:

Stated that our best bet would be to compromise on high straightaway speeds by good driving and performance on turns.

B. Cunningham:

1. Stated that Corvette steering is light - requested ratio - answered 16-1. Felt that faster steering might help, but that steering felt good, except that steering wheel is too close to body. Furnish shorter steering post.

2. Stated that although Mercedes factory has withdrawn from racing, several Mercedes 300 SL model cars would be raced at Sebring with some factory support. These cars would do 155 MPH on Sebring straights, 300 SL cars weight - 2950 lbs. ready to run.

3. Stated rules would allow Corvette to run stripped - no W/S or accessories.

4. Corvette needs stiffer springs and shock absorbers, needs anti-dive characteristics as headlights dip badly at night on braking down.

J. Fitch:

Stated he feels Corvette oversteers; that rear end breaks out too early and quickly - nothing vicious and is controllable. Also feels that 50/50 weight distribution not satisfactory for road racing, feels that Corvette should have more weight on front end. However, it was brought out by group discussion that Mercedes Benz 300 SL has 40% front, 60% rear distribution and DB-3 has 50/50 distribution. Asked gas tank capacity - stated to be 16 gallons. Le Mans rules to be obtained from Alex Uhlman for Chevrolet.

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Duntov:

Stated Fitch's objections on handling could be satisfied with 1956 Corvette chassis changes. Also it was felt that the U. S. XP-140 tires were not good. That Firestone Super Sport would have given better handling and impression on ride road.

B. Cunningham:

Stated that Jaguar cars ran 6 hours at Sebring on Firestone Super Sport tires and were only 50% worn - could run race with one tire change.

M. Rose:

Asked if Hi-tork or compensating R/A differential would reduce tire wear. All agreed it was necessary to use some type of R/A compensating differential. Mr. Cole requested to obtain sample for tests.

J. Fitch:

Requested we sstup handling and cornering tests with various weight distributions. (Use P. G. skid pad suggested by E. Cole).

B. Cunningham:

1. Stated that Sebring race should be planned on two (2) stops. One driver going four (4) hours, being replaced, gas up and serviced; run four (4) more hours, stop for service, change driver and finish. One driver is not allowed to go all the way, but cannot drive less than four (4) hours or more than eight (8) hours.

2. Stated he carried 55 gallons of gas (330 lbs.) in his Cunningham (C-4's) cars. Stated perhaps side mounted tanks to avoid weight distribution change during race. Refueling done with 5 gallon cans and funnel of 20 gallon capacity with shut-off valve.

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E. N. Cole:

Stated Chevrolet engine would run approximately 20 gallon of gas per hour at 200 HP at constant output. It was felt that at least a 50 gallon gas tank should be worked out for Corvette for Sebring race. Course is 5.2 miles per lap. Approximately 80 MPH average speed of race.

B. Cunningham:

1. Not allowed to use power wrenches for wheel changing. OK to use spring-loaded (mechanical) wrench and socket.
2. Must run same width rim all around car.
3. Must carry all spare parts for race in car, i. e., spark plugs - fan belts - light bulbs - etc. Also must carry spare tire in car but can put on spares in pits.
4. Corvette requires better headlights - for night driving, new GE or Auto-Lite?
5. Sebring race sponsored by "Amoco" gas. Laboratory tests on engines to use similar fuel.
6. Brakes are major item. Test of metal linings to be made.
7. Sebring race preparations should include a complete practice car with same number on car as that entered in competition. Obtain final fuel consumption answer on practice car prior to race for planning.
8. Sebring race is tough on cars mechanically; also on gears and brakes.

Mauri Rose

Mauri Rose
Engineering Department

MR:Mc

Burnell 1-248

INTER-ORGANIZATION LETTERS ONLY

CHEVROLET

TO Mr. H. F. Barr
Mr. E. Gray
Mr. B. H. Holmes

ADDRESS

FROM Mr. R. F. Sanders

ADDRESS

SUBJECT

DATE January 9, 1956

cc-Messrs. E.N. Cole
P.A. Collins
M.S. Rosenberger
J.T. Rausch
C.M. Rubly
N.H. McCuen
J.B. Burnell
G.C. Aitken
W.R. Mackenzie
Z. Arkus-Duntov
M. Rose

To participate in Sports Car Events at Sebring during the middle of March, Chevrolet must release for production and build at least 25 Corvettes - Model S.R. The engineering designation has tentatively been set as 2934 S.R. but has not been officially announced. (Mr. Holmes will confirm).

These 25 Corvettes S.R. will be made saleable through dealers, accompanied by paper listing and advertising (Mr. Mackenzie).

Corvette S.R. is the same as 2934 except that it incorporates:—

1. Duntov Camshaft.
2. Halibrand Spot Disc Brakes & Associated Equipment.
3. Semi-Locked Differential with optional ratios.
4. 37 Gallon Fuel Tank.
5. Seat Belts.
6. Auburn Clutch.
7. Quick change Wheels.

Mr. Frank Burrell has the information on the above items.

The engineers under Messrs. Rubly, Rausch and McCuen will issue E.C.R.'s as necessary to initiate the releases. Mr. Holmes will decide on how the releases are to be made -- that is, whether it will be an Exception Parts List or not; in any case it must result in a new model and not R.P.O. or Kits.

Mr. E. Gray should have the proper negotiations started by Purchasing so this assignment can be properly executed.

R. F. Sanders

R. F. Sanders
Engineering Department

INTER-ORGANIZATION LETTERS ONLY

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CHEVROLET

TO Mr. P. A. Collins ADDRESS

FROM Mr. E. J. Premo ADDRESS

SUBJECT SPECIAL BODY EQUIPMENT FOR RACE CORVETTE DATE January 16, 1956

cc:
Mr. E.N. Cole
Mr. H.H. Schroeder
Mr. H.F. Barr
Mr. R.F. Sanders
Mr. S.C. Richey
Mr. M.S. Rosenberger
Mr. F.C. Burrell
Mr. G.C. Aitken

In the interest of accomplishing the work required to provide special equipment for the Race Corvette with a minimum of paper work, the following procedure has been agreed to:

1. Mr. Frank Burrell will head the activity and will be responsible for obtaining approvals of proposals and initiating action.

2. When only a few sets of material are required and release for production is not necessary, the material may be improvised on the job. Mr. Burrell will request design assistance from Mr. Schroeder as required to accomplish this work.

3. When release for production is required, Mr. Burrell will advise Mr. Schroeder who will assign a design engineer to follow the design and release the material.

In all cases, Mr. Burrell will follow the building of material for experimental and special race cars. This will reduce confusion which exists when several different engineers are directing the activity.

We trust the above meets with your approval.

E. J. Premo

E. J. Premo
Assistant Chief Engineer

EJP/lef

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INTER-ORGANIZATION LETTERS ONLY

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CHEVROLET

TO Mr. E. N. Cole ADDRESS A-172 G. M. Building

FROM W. R. MacDonald ADDRESS 3-312 Engineering Center

SUBJECT DATE February 6, 1956

cc: Messrs. H. F. Barr
R. F. Sanders
M. E. Rosenberger
F. C. Durrell ✓
Z. Arkus-Duntov

At a meeting in Mr. Cole's office on Friday afternoon, February 3, 1956, the following action was taken with respect to the Stock Car and Sports Car special activities:

With respect to Stock Car activities, no change is contemplated. Our practice in the past has been satisfactory, and is based on the policy that Chevrolet does not participate directly in competitive events. The cars are owned and entered by individuals, and we are interested in the technical aspects and will and do offer technical assistance to such individuals as we feel deserve such assistance, and which would result in circumstances beneficial to Chevrolet.

The Corvette situation, whereby we get into the sports car racing field, is to be handled on a similar basis, as far as policy is concerned. It is particularly desirable to management that the dealers be used wherever possible, as the parties who own and enter the Corvettes in competition. This is more desirable even than outside private enterprises of any kind (at least in the initial stages of the new venture) because it must not be made to appear that such an outside firm or enterprise is merely being hired as a "front" by Chevrolet. Having a dealer in between, insulates the "factory" from such criticism.

With the above review of policy, next subject was the coming events at Daytona and Sebring.

Arrangements as scheduled for Daytona are satisfactory, and no changes need be made. This situation is less critical than Sebring because it is not a competitive car-against-car race, but instead is competition against time. The races that are competitive at Daytona are for sedans and convertibles and are well under control from a policy standpoint. No Corvettes are involved in these.

For Sebring, our three Corvettes will be sponsored and entered by a Chevrolet dealer. This is acceptable to the Sales Department, largely on the basis that the dealer selected has a national reputation as a racing car owner and enthusiast and becomes a natural individual to enter a string or team of Corvettes in competition. He already has licenses to run in NASCAR and USAC circuits, and is a member of the SCCA (Sports Car Club of America). This dealer will use John Fitch and his organization to handle and drive his entries, and we will provide technical assistance for the effort and will

Continued:

INTER-ORGANIZATION LETTERS ONLY

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CHEVROLET

O	Mr. E. M. Cole	ADDRESS	
ROM	W. E. Mackenzie	ADDRESS	
UBJECT		DATE	February 6, 1956

provide help in the same manner in which we have already been proceeding. Much engineering work is being and needs to be done, because it will be necessary to (a) develop special parts such as brakes, wheels, gas tanks and other things in order to assure a respectable showing in this race and other like events later, and (b) to release these items as RPO's so that they can be catalogued and offered for sale. These processes could not be handled, if we did not stay close to the operation as an engineering department.

The general approach, under these circumstances, is that we don't have to go in with the idea that they (the Corvettes) will beat everything — just make a reasonably good showing. If our development work leads us to believe that we will not do well, we can withdraw at the last minute.

The management has indicated that they will be in accord with releasing RPO's to enable us to qualify as series production sports cars and that these can be "scheduled as ordered", if necessary.

INTER-ORGANIZATION LETTERS ONLY

CHEVROLET

TO	Mr. M. S. Rosenberger	ADDRESS	Engineering Department
FROM	Mr. R. N. Krieter	ADDRESS	Engineering Department
SUBJECT	S. R. Options	DATE	March 14, 1956

cc: Messrs: H. F. Barr, R. F. Sanders (2), W. R. Mackenzie, N. H. McCuen, C. M. Rubly, J. T. Rausch, W. C. Bunting, C. Brooker, File

The following is a list of the items which have been selected to assist the production Corvette in competition racing.

Items which are not covered under Regular Production Options or Corvette Production should be released as soon as possible.

U.P.C. Group 1 - Body
1. Canvas Cockpit Covers for Right and Left Hand sides.
2. Small Racing Windshields.
3. Special Plastic Rear Brake Air Ducts.

U.P.C. Group 2 - Frame
None

U.P.C. Group 3 - Front Suspension
1. Halibrand Front Hubs.
2. H. D. Spindles.
3. H. D. Steering Knuckles.
4. H. D. Front Wheel Bearings.
5. H. D. Front Coil Springs 340 Lbs/in.
6. H. D. 3/4" Front Stablizer Bar, with Steel Bushings at Frame Attachment.
7. H. D. 1 3/8" Front Shock Absorbers and Attaching Brackets.

U.P.C. Group 4 - Rear Suspension
1. Halibrand Axle Shafts and Rear Hubs.
2. Special Wheel Bearing Retainers.
3. 1 3/8" Shock Absorbers.
4. Special Racing Cam and Lever Auxiliary Shock Absorbers and attachment.
5. Heavy Duty Rear Springs and H. D. Spring Clips.
6. Rear Axle Vent relocated.
7. Wide Base Rear Spring Rear Shackles.
8. Rear Axle Ratios of the following:-

3.08:1
3.27:1
3.55:1
3.70:1
4.11:1

Rear Axles also incorporate Hy Torque Differential, Lubrited Gears, Eleco 28 Lubricant and Ring Gear Oil Baffle.

U.P.C. Group 5 - Brakes

1. Front and Rear Cast Iron Finned Drums.
2. 2 1/2" Metallic Facing on Fronts.
3. 2" Metallic Facings on Rears.
4. Vented Front and Rear Flange Plates.
5. 7/8" Diameter Rear Wheel Cylinders.
6. 1 1/8" Diameter Master Cylinder.
7. Reworked Parking Brake Idler lever.
8. Relocation of Parking Brake Cable to Frame Anchor.

U.P.C. Group 6 - Engine

1. Racing Type Air Cleaner
2. Heavy Duty Clutch (Load 1900 - 2200 lbs.)
3. Oil Pan Shelf Baffle.
4. Hard Rubber Engine Mounts.
5. R.P.O. #449 Engine Assembly.
6. 5.00" Generator Pulley and Dual Belt Drive Pulleys.

U.P.C. Group 7 - Transmission

1. Regular Production Corvette Close Ratio Transmission (2.2:1 Ratio) incorporating special Sealed Bearing, Rear Vent, and welded syncronizer ring.

U.P.C. Group 8 - Fuel and Exhaust

1. Dual Exhaust System with larger tail pipes, less restricted Mufflers and tail pipes coming out ahead of rear wheels.
2. Large Gasoline Tank 37 1/2 gallon Capacity.
   Special Gasoline Cap
   Special Gasoline Tank Metering Unit.
   Folding Top is deleted.
3. Fuel Switch Pressure Light #1507276 and Wiring Harness #2967276.
4. Flexible Fuel Lines and Dual Electric Pumps.

U.P.C. Group 9 - Steering

1. Steering Gear and Mast Jacket assembly to be 3" shorter than production.
2. Heavy Duty Steering linkage such as Tie Rod Ends, Tie Rods, Pitman Arm, Drag Link, 3rd Arm and Bracket, etc.

U.P.C. Group 10 - Wheels and Tires

1. 15 x 5 1/2" Magnesium Wheels (sets of 5 - 8 or 12)
2. 7.10/7.60 x 15 Racing Tires and Tubes.

U.P.C. Group 11 - Sheet Metal and Hood

None

U.P.C. Group 12 - Electrical

1. Tachometer recalibrated for 5.00" Generator Pulley.
2. Auxiliary Driving Lights.

U.P.C. Group 13 - Radiator

1. Heavy Duty Tube and Fin Radiator.
2. 13 lb. Pressure Cap.
3. Heavy Duty Radiator Hoses.

U.P.C. Group 14 - Miscellaneous

1. Tool Kit and Tire Changing tools to be in car during race.
2. Remove Rear Bumpers.

U.P.C. Group 80 - Accessories

1. Seat Belts.
2. Hood Straps.
3. Trunk Lid Straps.

Rudolf N. Krieter
Engineering Department

RNK/mpk

INTER-ORGANIZATION LETTERS ONLY

CHEVROLET

TO	Mr. M. S. Rosenberger	ADDRESS	Engineering Department
FROM	Mr. F. C. Burrell	ADDRESS	Engineering Department
SUBJECT	Corvettes	DATE	April 9, 1956

The Corvettes as raced at Sebring, Florida, March 24, 1956 were deficient in many items which should be corrected.

The most noticeable item was carburetion. Due to the physical construction of the carburetors, the gasoline surges back and forth in the float bowl and causes extreme mixture variations. This condition is most noticeable on sharp turns and very critical when a sharp right is followed immediately by a sharp left. Also a poor condition exists on long high-speed turns. Various methods have been tried to correct this malfunction. These methods include changing float level, changing jet size, changing venting methods and changing air cleaners. Nothing effects a cure. Sometimes a change will correct one condition but make another worse. One perfect fix was discovered however. This was to remove the floats and make fixed level chambers of the float bowls. This eliminated all cornering problems and made the carburetion as near perfect as could be wanted. However, a problem was encountered at part throttle due to the excess fuel being flowed through the carburetors that had to be returned to the fuel tank. Many theories have been advanced as to how the poor carburetion can be cured. Some of these theories should be investigated and enough time taken to effectively cure the carburetion deficiencies.

Next to carburetion the transmission caused the most trouble. The standard transmission is entirely unsuited for racing, however, by correcting some things the transmission can be used until something better is available. The transmission weaknesses are primarily in the cluster shaft, thrust washers, the synchronizer and shifting mechanism. Using higher quality thrust washers will fix that problem. The synchronizer will require considerable work and the shift mechanism should be redesigned to be heavier. Considerable trouble was also encountered with oil leakage from transmission into clutch.

Other items needing attention are as follows:

The generators on all Corvettes are not properly positioned so that the drive pulleys are not in alignment. This causes the drive belts to come off. Even with the generators lined up the belts still come off at extremely high speeds. This was corrected by using 1/2" wide truck pulleys with the 3/8" wide belt. This causes the belt to ride deep in the groove and helps keep it in place.

The starter solenoid caused considerable trouble by sticking and allowing the starter to keep running after the engine was started. The trouble was caused by plastic insulation becoming soft and allowing the windings to short and cause the solenoid to stay engaged. Heat shields were in place but were not effective. Better insulation would correct this trouble or a complete fix would be to make up a mechanical linkage with a foot pedal and eliminate the electric controls entirely.

Considerable trouble was encountered with engine mounting bolts coming loose. Lock nuts and wire was necessary to keep them tight. Larger screws would be a help at rear mount on the transmission. The front engine mount is held in place by the water pump and any looseness causes loss of water. Tight fitting studs placed in the top two holes would help keep this mount tight and would also greatly facilitate assembly.

Hood latches will not hold. Hood is always coming loose. A different type latch with positive locking action should be adapted. The front hood hinges will not stay in adjustment and allows the front of hood to rise above front of body.

Accelerator pedal needs two fixes.

1. A wider pad with shoulder on each edge should be used to keep pedal from slipping off rod.

2. The hinge should be reinforced as it is too weak and gets sloppy after short usage.

Rear spring clips should be made from heavier material or should be bolt-on type of heavy construction.

Further development work should be done on rear suspension to improve axle hop and car handling. Elimination of the extra shock absorber if possible by relocating present shock to a better position.

Rear wheel bearings should be of heavier construction. Two failures were encountered by bearings splitting on ball race.

The Air Scoops on outside of rear fenders were very effective in putting air on rear brakes, however, they were very vulnerable to damage due to extending out from side of body. An alternate location should be worked out that would give best cooling with least possibility of damage and dirt pick-up.

Brakes were very effective but the large diameter master cylinder made the pedal pressure too high for a long race. The standard size master cylinder should be used and some method devised to make automatic or quick adjustments of brakes. Possibly, a power operated device could be developed to give low pedal with light pressure.

Faster steering would be an advantage. The present ratio gives about 3 1/2 turns of steering wheel lock-to-lock. Increasing the ratio to give 2 1/2 turns lock-to-lock would be much better. A shorter idler arm would help in this direction.

The Rear Main engine bearing thrust surface was not adequate to carry the load of continued clutch operation at high engine speed. Increasing the oil supply to rear thrust face helped considerably. Further investigation should be made to get proper amount of oil without excess.

Thermostat housing hose connections should have a bulge at edge to keep hose from sliding off.

Fuel line from fuel pump to filter should be 3/8 instead of 5/16.

Ignition wire bracket at generator needs redesign to reduce possibility of wire burning.

Flexible type dip stick gave incorrect readings. The truck type being rigid would be more suitable.

Temperature indicator for oil and water should be of precision type durable enough to stand rough usage.

Some objection has been raised to steering wheel location. Some people want the wheel further ahead, others want it back. A decision should be made and all wheels put in that location. A movable wheel would be very useful.

Self locking nuts were necessary on many places such as rear engine mount cross member, exhaust manifold studs, front engine mount screws, etc.

The rear spring front hanger I bolts had to be drilled and pinned to keep the nuts on.

Rear spring U bolts were double nutted.

Frank C. Burrell

F. C. Burrell
Engineering Department

FCB/mpk

INTER-ORGANIZATION LETTERS ONLY

CHEVROLET

TO	Mr. M. S. Rosenberger	ADDRESS	Engineering Department
FROM	Mr. F. C. Burrell	ADDRESS	Engineering Department
SUBJECT	Corvettes	DATE	April 9, 1956

The program at Sebring should be continued to prove out the following items:-

1. Carburetion (Engine performance, minor engine troubles)
2. Transmission durability.
3. Rear Axle and bearing durability.
4. Handling
   - Shock Absorber
   - Spring location
   - Spring rate
   - Stablizer bar
   - Spring clips & shackles
5. Brakes
   - Air Scoop location
   - Master cylinder size
   - Automatic Adjuster
   - Spot brakes
   - Engine brakes
6. Electrical faults
   - Starter solenoid
   - Generator drive
   - Ignition wiring
7. Lock bolts and nuts
   - Determine location of most critical
8. Hood lock
9. Steering ratio
   - Wheel location
10. Temperature indicators
11. Cooling
    - Check out HD radiator and hoses.

Frank C Burrell

F. C. Burrell
Engineering Department

FCB/mpk

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