



Oral History Interview Transcript  
(As modified by the Interviewee)

Interview Control Number: 10 - C26 (B)

Interviewee: C.R. Nixon

Interviewer: Gordon Smith

Date of Interview: 16 March 2010

Location of Interview: Ottawa, Ontario

Transcribed by: Joy Thatcher

**NOTE:** This transcript is an edited version of the original interview (No. 10 - C26(A)) conducted 19 March 2010. On reviewing the transcript of this interview the interviewee, Mr. C.R. Nixon, subsequently submitted this version of this transcript which he felt better reflected the points he wished to make. He offered the following explanation:

I had little problem with the first part of the interview which covered the two points about the DDH 280 program that I had wanted to discuss. But I found the latter part about the comparison of costs between the DDH 280 program and the CPF program so confusing that I felt it would be useless to anyone who knew anything about TOTAL PROGRAM COSTING of naval shipbuilding, and would be confusing if not highly misleading to those who were not familiar with that subject. I also felt that if the purpose of the interviews was to compile a history of naval shipbuilding programs then what was published should be of some historical benefit. That could not be achieved with the material from the latter part of the interview transcript. I therefore decided in your absence that it might help if I rendered a version of what I would have said had I been asked to discuss the differences in the way those two programs had been managed.

I have no problem with the first part of the interview as in the attachment which I feel follows quite closely to the content of the transcript. However, I doubt that it would be possible to produce from the transcript (as is) a version that I feel would give a credible comparison of the way the two programs were managed. If you feel that what I have produced, or some edited version thereof, is not helpful to the intent of the oral history project then I suggest that the latter part of the transcript should just be ignored as not having happened.

**Transcription of Interview Number: 10-C26 (B)**

**C.R. Nixon**

**Interviewed 16 March 2010**

**By Gordon Smith**

**INTERVIEWER:** This is a CANDIB oral history project interview with C.R. (Buzz) Nixon. This interview is recorded on March 16th 2010. Buzz Nixon was interviewed by Gordon Smith and helped by Tony Thatcher as the recorder. Both the interviewer and the interviewee have signed the copyright release form. This interview relates to the DDH 280 destroyer program between 1963 and 1975. It reflects the particular experience of the interviewee with respect to this program. Buzz, now I would like you to outline your naval career to start this interview.

**NIXON:** My naval career started at Royal Roads in 1944, graduating in '46 when I formally joined the RCN as Midshipman (L). There were five of us who were sent to university. I was not accepted by the University of Manitoba because I hadn't taken surveying. However, I was accepted into second year at the University of Toronto on the basis that my experience in spherical trigonometry and spherical navigation sufficed for surveying experience. The next year, as my mother had moved into Winnipeg, I changed to U of M, which accepted my marks from U of T, for third year, leading to graduation in 1949. I then spent the year of 49-50 at the Electrical School in *STADACONA* where we Acting Sub Lieutenants (L) studied the application of our university education to the naval applications of electricity and electronics.

I was appointed to the Dockyard in Esquimalt for a year prior to being appointed as electrical officer in *HMCS CAYUGA* in 1951. After one year in *CAYUGA* on its second trip to Korea, I spent four years in Naval Headquarters designing, approving designs, checking and testing electrical power equipment for the AMC minesweepers and the first part of the DE program. The equipment included the circuit breakers, motors, generators, transformers and control gear that comprised the electrical power installation of those ships as well as the control gear for electrical-mechanical systems like auxiliary boilers, air-conditioning, winches et.

I spent 56 to 58 at MIT where I was primarily concerned with energy conversion. That is, I was trying to find a better way to drive things like turning torpedo tubes or gun mountings without having to resort to a huge motor-generator (Ward-Leonard) system to drive and control these types of mountings. I did come up with a design (there is a patent for it) of a static system using power rectifiers, actually power transistors, but my invention was overtaken by the introduction of silicon controlled rectifiers. I had room in my program at MIT so I managed to include some study of nuclear physics, introductory nuclear reactor design and nuclear reactor control systems.

On leaving MIT I had been appointed electrical officer of an east coast DE, but because of the nuclear experience that I had acquired at MIT, I was diverted to the Nuclear Submarine Survey Team at Naval Headquarters. The NSST examined the technical and personnel as well as the industrial implications of having nuclear submarines and of having them built in Canada. After the Team had submitted its report I spent a year with AECL at Chalk River to gain experience in the operating and control of nuclear reactors. To my surprise I found that the discipline of engine room watch keeping that I had experienced in the navy was superior to that which I encountered with the research nuclear reactors at Chalk River, although I recognized that commercially operated high pressure steam generator plants, whether coal or nuclear fueled might be a different situation.

On returning from Chalk River I completed a study concerned with whether the then three sonar system installation of the DEs could be reduced to two without reducing the effectiveness of the total installation. On completion of that study I was appointed Assistant Electrical-Engineer-in-Chief (Research and Development) where I became responsible for the completion of the contract for the installation of the "Models Control Trainer" in the navigation school at *STADACONA*. I also dealt with the continuing deliberations (following the successful DATAR pilot project on Lake Ontario in the early 50s) on the use of digital information in the conduct of tactical real time operation of combat vessels with respect to the acquisition of the data from various sensors, the processing and display of that data and in transmission of such data both within and between units.

Shortly after being promoted Commander, I became the Director of Systems Engineering under the Director General of Fighting Equipment in the new naval technical organization. The foremost naval equipment program at that time was the General Purpose Frigate design wherein I was responsible for consolidating the total effect of the Fighting Equipment with respect to personnel, cost, the requirement for power, space and weight, handbooks, training equipment, spare parts, as well as any premium for Canadian content and federal sales tax. When a similar approach to consolidating the requirements in DG Ships was introduced, the result was a doubling of the estimates leading to the cancellation of the program by the Minister of National Defence.

During my experience with both the NSST and the GPF program I found that some of my views on naval matters were out of step with what I perceived to be that of the then naval leadership. I therefore decided that I should leave the RCN and take my government provided training to where it might be better used in the national interest. I resigned and moved to the nascent Department of Industry where I became involved with assisting in the further development of the Canadian electrical and electronic industry for the next three years. I was then seconded to the Privy Council Office where I started as a secretary to various Cabinet committees, then as the leader of a policy analyst team, then as a coordinator of two secretariats, and finally as Deputy Secretary Plans to the Cabinet before being appointed Deputy Minister of National Defence where I was immediately involved with finalizing the Aurora maritime patrol aircraft program as well as the initial steps in the Canadian Patrol Frigate program.

**INTERVIEWER:** Is that the DDH 280?

**NIXON:** NO.

**INTERVIEWER:** That's the CPF program.

**NIXON:** Yes, it was the CPF program. I had nothing to do with the DDH program as I had left the Navy in 1963 before the DDH program started and didn't return to DND until 1975 after the DDH program had been completed.

**INTERVIEWER:** Buzz, you said that you were not involved with the DDH 280 program but you must have had some interests in what was happening.

**NIXON:** Well yes. There are two particular points that I believe should be included in any history of the DDH program. The first one pertains to the admirable and courageous stand that Admiral Jock Allan (Captain at the time) took when he was appointed Project Manager and had to pick up the mess that apparently existed with respect to unrelenting changes in the design of the ships with the related increases in the estimated cost of the program, with each increase in cost

requiring a resubmission to the Treasury Board. My understanding is that on completing his thorough and rigorous review of the program, Allan had frozen the design and had prepared the resulting TB submission. The initial response of the Ministers was along the lines of: "Sorry Captain Allan but you can't have that much money." As the story goes, Allan's response was: "Well Ministers, if that's all that you can provide you are going to have to find someone else to manage the program because I can't complete it within the funds you have suggested." With that type of bold response I understand that the Ministers agreed to provide that funds that Allan had asked for and that the program was completed within those funds.

I mention this incident of Allan with the DDH program to illustrate the type of Project Manager required in order that major equipment programs are completed on time and within initially allocated funds. If you are going to run projects successfully, you've got to have Project Managers who have done their homework and also have the courage to freeze the design and be forceful as to what's required to finish the program. There's no room for "namby-bambies" or being "wishy-washy" about the design or specification if an equipment project is to be successfully managed.

My other point also concerns the type of project management that had been instituted in DND resulting from the bad experience of the DDH program. When I became Deputy Minister in 1975 there was one program, the maritime patrol aircraft (Aurora) in contract negotiation and several other major programs in the preparatory stage, such as the replacement for the fighter aircraft, the tanks, the heavy trucks and the AVGP (armoured vehicle general purpose). All of these programs were organized on a Total Project Management basis. This means essentially a "turn-key" operation where you incorporate everything required for the program into a **single contract with one supplier** for the **delivery of the specified number and capabilities of the operational units** (ships, aircraft, or vehicles) along with the **associated unique tools, test equipment, simulators, handbooks, initial outfit of spare parts, special training of initial operational personnel, etc.**, such that when the contract is completed the equipment can be put into operation and be fully supported by trained users and maintainers, with all of the unique spare parts, dedicated repair facilities and training equipment; the whole shamozz so there is **no ancillary and subsequent requirement or further costs**. In other words, there is **only one Treasury Board submission** and **only one contract with one supplier**.

This reminds me of an incident about 1954 when the Navy contracted for a PBX telephone exchange for the Halifax naval establishments. When the equipment was delivered it was found that there was no space for it. Thus, a further TB submission was required to cover a building to house the equipment. The reply from the Board to the Naval Secretary was something like you'd expect from Admiralty: "My Lords view with growing disdain the repeated submission for further funds to complete projects which should have been full described to start with. My Lords hope that this will not happen again."

Well that's enough about Project Management. But I thought that any history of the DDH program should include the effect that program has had on the management of all subsequent equipment programs at least while I was Deputy Minister. I assure you that you'd never have had the CP Frigate program of twelve ships, starting with six without suffering repeated changes in design and related cost increases the likes of which had plagued many previous DND equipment purchases if the CPF program hadn't been run on a Total Project Management basis as it was when I left in '82 when the contract was in the final stage of negotiation which lead to the first commissioning in '90 or '91.

I'd like to illustrate just how importance of the concept of Total Project Management was to me as Deputy Minister. Project Managers reported to an interdepartmental Senior Review Committee at the ADM level. But I also ensured that Project Managers were well aware that I would be holding them responsible for the successful completion of their program unless they had reported to me directly should difficulties be encountered by the PM whether from within DND or in other departments that may be involved with the program. All the links in the chain of command were aware of this proviso that I had laid on a PM. I only had a couple of instances when a PM came to me and said something like: "I'm running into a particular problem. I may be able to resolve it but anything you can do to push it along from your side would be appreciated." Whether or not this approach had any effect, all the related major equipment programs required only **one Treasury Board submission**, only **one contract** with **one supplier** and were **completed on time** and **within originally approved funding**.

*For the CANDIB oral history project, the interview should have stopped at this point (at the end of the second last paragraph on page three of the rough transcript) which has covered the points that I had wanted to make about my reactions to the DDH program. From there on I believe the transcript of the interview only adds confusion to any history of the DDH program or its comparison with the CPF program. If it seems desirable to try to carry out a comparison of the two programs then the two programs must be put on a common basis which I will attempt to do in what I **SHOULD** have said following the Interviewers comments and query at the bottom of page three of the transcript as copied below.*

**INTERVIEWER:** Buzz you were saying that the CPF program I go back now to the DDH 280 that the Naval Board put out the requirement to the preliminary design section of DG Ships for the design of four ships. The GP Frigates had been cancelled so it was to be a repeat *NIPIGON* and we were to design this destroyer to replace the failed GPF program. We designed the DDH 280 "in house". The propulsion system was all gas turbine, which was a first in the navies of the world and we put them to sea, four of them, the *IROQUOIS*, the *HURON*, *ATHABASCAN*, and the *ALGONQUIN*. The cost of these ships was roughly 256 million dollars. The next program was the Canadian Patrol Frigate program and I understand that each ship was roughly just less than a billion dollars. Could you explain to me how project management can change from one program to another and spend so much money?

**NIXON:** Well Gord when we spoke on the phone prior to the interview I voiced my skepticism on your figures for the DDH 280s. If the 256 million figure that you have mentioned was maintained right from the starting estimate until the final payment, then why did Capt. Allan have to go back to the Treasury Board for more money, and just how many increases were there in the amount approved by the Treasury Board? Furthermore, at what point and how was the final cost of the Government Furnished Equipment (GFE) and the ancillaries thereto determined? Trying to compare these two programs is a bit like trying to compare apples and oranges. I believe that it is essential to carefully examine how each of these two programs were developed and then were managed in order to appreciate their profound differences which make it extremely difficult to gain a valid basis for cost comparison.

**[The following comments are part of the Interviewee's re-write of the initial transcript]**

Before commenting on the program differences, I wish to note that in almost the same time frame of the CPF the USN had a comparable building program at Pascagoula. Anecdotal

information is that USN officers who had seen the CPFs couldn't believe that Canada was getting such outstanding capabilities of the CPFs for the price that we were paying.

The development work leading to the CPF program culminated with a mission statement for a vessel to replace the aging DEs outlining the desired combat capabilities, proposed limitations on the vessel characteristics and the allowable cost that the program could have within the overall defence multi-year capital budget. The program was then designated for Total Project Management which required the Program Manager (PM), within the defined constraints to produce a clear thorough total statement of requirement (SOR) of what the selected contractor would be expected to provide at the to be negotiated contract price. The PM then solicited detailed proposals from industry as to how each and every aspect of the SOR would be satisfied complete with cost and delivery schedule for the program. The PM then thoroughly reviewed the industrial responses and negotiated requisite changes in the proposals (and attendant changes in proposed cost) so as to ensure that the SOR would be satisfied. At that point Cabinet approval was sought to proceed with further detailed negotiations with the contractor whose proposal had been recommended on the basis of the most satisfactory response to the combination of the SOR, including industrial benefits, and proposed program cost and delivery. The final step before contract approval was the negotiation of the "Target-Ceiling-Incentive" contract price which was based, not on the SOR, but on the final negotiated proposal of the supplier.

As I have noted earlier, the PM regularly reported to a Senior Review Committee (SRC). The SRC was the first tier of program management oversight. It ensured that the PM did have a schema for looking ahead as well as keeping track of progress on the program. The PM therefore had to report to the SRC on instances or trends where the program appeared to be lagging and on perceptions as to where issues may be foreseen. The PM also had to report on measures that were being taken on current problems and on assistance that may be required to obviate foreseen possible problems. This procedure was intended to "nip-in-the-bud" possible problems before they became nasty surprises.

To produce the total SOR every federal government authority having an interest in the program was required to provide the PM with a detailed description of its requirement in operational performance terms. In addition to the requirement for the ship, the SOR included the equipment manuals, initial spare parts, unique tools, test, simulator and training equipment, and initial training for both operations and maintenance. The PM then had to compile those individual requirements into a total SOR. In so doing the PM couldn't just add up all of the requirements but had to achieve reconciliation between conflicts when one requirement initially was in conflict with another requirement. One example of this was with respect to the suggestion by the PM to have only one anchor installation so as to save weight, space and cost. The PM probably had to negotiate several other instances where a requirement had been stated that, on thorough reconsideration, was more of a "wouldn't it be nice if" item than a requirement vital to the program being deemed as fully successful.

The "Target-Ceiling-Incentive" contract provided for a "Target" as well as the "Ceiling" price which were negotiated on the basis of the amount of material, equipment, services and the man-hours required to bring it all together, an allowable G&A and profit for the contractor. The "Incentive" provided for a share of the eventual costs between the "Target" and the "Limit", (example, 30% by contractor and 70% by DND) as well as for savings below the "Target" (example,

70% for the contractor and 30% by DND). Costs above the “Ceiling” were to be borne by the contractor. Provision also was made for late delivery penalties.

In response to Cabinet concern provision was made to provide for some of the construction of at least one hull to be carried out at other than the yard of the contractor, Saint John Shipbuilding. I do not know whether that had an effect on the cost of the program to DND. Also, in response to Cabinet concern about spreading DND shipbuilding to other yards, DND undertook to hasten the program for the updating of the DDH 280s.

Once the CPF contract was signed, to my knowledge, there were no program design changes introduced by the PM. I believe that there may have been changes desired by the contractor from the contract proposal which, as noted previously, was the governing document). One example might have been the contractor’s desired to change the mode of construction from the traditional in-the- dock to a modular shop-built manner with the modules being rotated and/or inverted to simplify construction and then being carried by a huge crane to the dry dock where they were joined together. That change in the mode of construction may have involved some deviation from the proposal. If such desired changes by the contractor did not create a shortcoming with respect to the SOR, they would probably have been acceptable to the PM.

As you noted, the DDH 280 program initially was to be a repeat *NIPIGON*. Worth pursuing is whether there had been any sort of initial definitive documentation which provided direction and constraints on the preliminary design and development of the DDH 280 program. Judging on the difficulties that were encountered with the DDH 280 program it would seem that the initial PM did not have or was not able to exercise restraint on the succession of changes that occurred both at the design as well as during the construction phase of the program. Similarly that doesn’t appear to have been any senior review authority (such as the SRC for the CPF) to monitor and keep tabs on just how well the DDH 280 program was being managed. It would seem that after starting with the concept of a repeat of the *NIPIGON* the DDH 280 went through a sequence of major changes such as, a larger hull to accommodate capabilities not in the *NIPIGON*, requiring a more powerful propulsion package than the Y100, capable of having two helicopters, and embarking on a naval first installation of gas turbine power plant with reversible screws, just to mention those items of which I am aware. Were the estimated cost of the DDH 280 program regularly adjusted with Treasury Board approval for these and perhaps other significant changes?

I imagine that in the DDH 280 program there probably was a contract for each shipyard or each ship to **cover the construction of the hull and structure** of the ships to the design provided by DG Ships and for the **installation of all of the Government Furnished Equipment (GFE)**. It seems that the DDH 280 program the Program Manager initially was only responsible for the work of the contracting shipbuilders, that is, for the construction of the hull and the installation of the provided GFE. Thus, when Allan (and perhaps before him) had to seek more Treasury Board funding for the program it probably was for the contracts with the shipyards.

The GFE probably would have been purchased by sections within Naval Technical Services through separate contracts with the supplier for each equipment such as for the Main Gas Turbines, the Main Gearing, the reversible screws, all of the individual pieces of Fighting Equipment (weapons with ancillaries, computers, display, communication and navigation equipment), winches, sea boats, life-saving provisions, helicopter handling, and possibly some of the equipment for auxiliary systems such as refrigeration, air conditioning, ventilation, fire main, fresh water and sewage. These separate equipment contracts might, to a greater or lesser extent,

have provided for the equipment unique items such as special spares, test, maintenance and training equipment as noted for the CPF program. However, the responsibility for the GFE contracts and what was provided by those contracts probably did not rest with the PM of the DDH 280, but with particular technical section which had prepared the equipment specification. Thus any shortage or inadequacy with manuals or handbooks for the GFE (as apparently happened with respect to the gas turbine installation) probably would not have been the responsibility of the PM but of the technical section that had contracted for the equipment.

When it comes to trying to compare the costs of the DDH 280 and the CPF programs it is easy to establish the final cost of the CPF program. Just go to the one contract for the first six units which fully met the original SOR, were on time, at lower than the "Target" with the government paying less than had been anticipated and the contractor gaining more profit than had been expected. Add to that the contract for the second six where the "Target-Ceiling-Incentive" probably was for a lesser amount than for the first six, thereby producing the total cost for the 12 CPFs.

As for the DDH 280 program, it would seem like a tremendous sleuthing task to ascertain what was paid for the myriad of contracts for the GFE as well as for subsequent contracts to cover aspects that had been neglected in original contract such as unique spare parts, handbooks, tools and test equipment as well as for the Canadian production premium for the manufacture of some of the GFE in Canada whereas the original estimates had been based on unit costs to the USN. Moreover, it would be helpful to ascertain just at what stage of the DDH 280 program and how the figure of 256 million appeared. Was it at the "repeat" *NIPIGON* stage, or at some other point as the program grew, or at the point where contracts were signed with the shipbuilders? Also, what was the amount of the last Treasury Board approval that Capt. Allan obtained which I imagine had nothing to do with the GFE, but only pertained to the contracts with the shipbuilders? Comparing the size and the capability of the DDHs to that of the *NIPIGON* certainly raises the question as to how much more the DDH costed than was paid for the *NIPIGON*. That is, for reasons I have discussed, if it were possible to ascertain what were the full cost of each.

When thinking about the merit or otherwise of Total Project Management I suggest that what happened with the large equipment programs for the Canadian Forces during the late '70s early '80s is highly relevant. The programs for the maritime patrol aircraft, the CPF, the CF18 new fighter aircraft, the APC armored vehicle, the heavy truck, and I believe the ADACS anti-aircraft missile program all came in on time, on cost, and without being the subject of constant media and political criticism. I believe that none of those programs could have been so successful and free of program performance criticism without the Total Project Management or similar process. To support this perception, just cast your memory back to many previous major Canadian military equipment programs which exceeded budgets, were late on delivery and were lacking in initially desired performance.

## ABBREVIATIONS AND ACRONYMS

ADACS	Air Defence Artillery Control System
ADM	Assistant Deputy Minister
AMC	NATO designation for a Coastal Minesweeper
APC	Armoured Personnel Carrier
AVGP	Armoured vehicle general purpose
CANDIB	subcommittee of Canadian Naval Technical History Association
Cdr	Commander
CPF	Canadian Patrol Frigate (Halifax Class)
DATAR	Digital Automated Tracking and Resolving
DDH	Helicopter Destroyer (NATO Designator)
DDP	Department of Defence Production
DE	Destroyer Escort [Saint Laurent Class] (NATO Designator)
DG Ships	Director General Ships
DND	Department of National Defence
DSS	Department of Supply and Services
GFE	Government Furnished Equipment
GPF	General Purpose Frigate
GST	Goods and Services Tax
L	Electrical
MIL	Marine Industries Limited (Sorel, QC)
MIT	Massachusetts Institute of Technology
PBX	Private Branch Exchange (phone system)
PM	Project Manager
RCN	Royal Canadian Navy
SCRs	Silicone Control Rectifiers
SOR	Statement of Requirement
SRC	Senior Review Committee
TB	Treasury Board
USN	United States Navy
Y100	Steam propulsion system of the DEs