# A COMPREHENSIVE UXO CLEARANCE QUALITY ASSURANCE PLAN TRACADIE RANGE, NEW BRUNSWICK, CANADA

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## ABSTRACT

As part of the Infrastructure Reduction Program, the Canadian Department of National Defence (DND) recently closed the former Tracadie Range and transferred the 18,088 hectare property to the Province of New Brunswick. Associated with the property transfer, DND undertook an Unexploded Ordnance (UXO) Survey of the range in 1995 and 1996 and prepared a Clearance Plan to be undertaken over the years (1997-2001) to address the UXO forecast by the survey to be contained on the site. The actual degree of clearance to be completed on the Range will be sufficient to support the next land use as determined by the Province.

In May of 1997, DND retained Dillon ADI to act as the Clearance Inspection Team (CIT) for the duration of the five year Clearance Plan. The CIT concept was developed by DND to oversee contracted range clearance projects and is an integral part of a Comprehensive Quality Assurance Program for most range clearances in Canada and more specifically the Tracadie Range Clearance Project. The role of the CIT is to represent the DND Technical Authority on the site and to undertake quality assurance activities in relation to the UXO Clearance Contractor's duties. This process involves numerous activities such as location surveys, equipment calibration, quality assurance inspections, liaison and communications with the Clearance Contractor as well as development of a Communications Plan for the general public.

The presence of a CIT is essential in order to establish that "due diligence" is provided on the part of DND and ensures that future uses for the Tracadie Range property are made possible in cleared areas with minimal risk to the users.

**BACKGROUND**

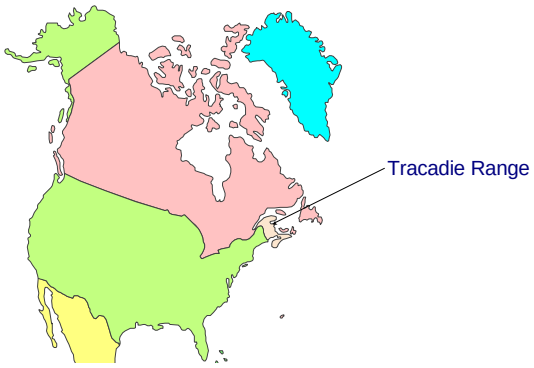
The clearance of ranges and training areas has been an ongoing part of the Canadian Military Engineers (CME) history since the introduction of dud producing explosive ammunition. However, it is only within the past 25 years that the requirement for conducting large scale clearances has become a principal task in the Canadian Forces.

Previous to 1970, range clearances were normally conducted in response to an incident or to fulfill a military requirement. There was not a great deal of specific environmental awareness or knowledge both in DND or the public at this time. These clearances usually involved field engineers and ammunition specialists supervising other military personnel conducting range clearance operations.

In the early 1970's the demand changed as DND started to become involved in the return of leased/expropriated land to the original owners or the public. This coupled with a rising public and DND awareness for environmental concerns raised both the profile and interest in range clearance methods and results. The year 1973 also saw the change from past reliance on solely military clearances to the current method of contracting. These new clearance operations resulted in a need for DND for more up to date direction in range clearance procedures resulting in the production of the first Range Clearance Handbook. Although the use of private contractors started in 1973, most of DND's clearance operations were still conducted by military personnel. From 1986 however, there was a major shift in favor of civilian contracted clearance projects due to the very high demand for military personnel and the effect it had on training and operations. The effect of a third party Contractor also had the positive effect of increased individual and public confidence that the clearance was not biased or unduly influenced by a government agency.

In keeping with its practice of awarding range clearance contracts to private Contractors, DND intended on carrying the same procedure for one of its major training areas that was declared surplus in 1994, the Tracadie Range located in north-eastern New Brunswick, Canada, as shown in Figure 1.

**Figure 1. Location of Tracadie Range**




As part of its Defence Establishment Reduction Program of 1994 (DER '94), DND closed the former Tracadie Range and transferred the 18,088 hectare property to the Province of New Brunswick. Associated with the property transfer, DND undertook an Unexploded Ordnance (UXO) Survey of the range in 1995 and 1996 and prepared a Clearance Plan to be undertaken over the years (1997-2001) to address the UXO forecast by the survey to be contained on the site. The actual degree of clearance to be completed on the range had to be sufficient to support the next land use as determined by the new owner, the Province of New Brunswick, and ensure that all future uses identified for the property could be carried out in a safe manner.

## THE CIT CONCEPT

Most clearance projects undertaken by private Contractors since 1986 have been overseen by military personnel available on an as required basis. This approach has proven adequate since most range clearance contracts awarded to private Contractors have been small in scope and did not require a permanent DND presence at the site. With the advent of the Tracadie Range Clearance Project however, there was a requirement to implement a Comprehensive UXO Clearance Quality Assurance Plan (QA Plan) in order to ensure that "due diligence" was provided by DND in meeting the requirements of the UXO Clearance Plan for the range.

The development of the QA Plan has the following objectives:

- Ensure that the work carried out by the Clearance Contractor is performed according to DND and Provincial guidelines while meeting the UXO clean-up objectives of the UXO Clearance Plan
- Ensure that problems in the field are identified quickly and proper rectification carried out in a timely manner
- Ensure that the general public is well aware of the on-going clean-up process and its repercussions on the future uses of the property
- Provide DND with the proper level of confidence that the future uses identified for each ammunition-related area (ARA) within the range can be carried out in a safe manner once these areas have been cleaned-up
- Ensure that important resources (ie environmental or archaeological) are maintained in their natural condition and not damaged by the clearance process
- Ensure that proper "due diligence" is provided on the part of DND
- Ensure that DND gets value-for-money approach from the Clearance Contractor

In order for these objectives to be met, it was important that DND benefit from a continuous presence at the site to oversee the Contractor's work. Thus the Clearance Inspection Team (CIT) concept was created. The CIT was to act as the DND Technical Authority's representative in all manners of UXO Range Clearance at Tracadie while keeping in mind the main objectives of the QA Plan.

In May of 1997, DND retained Dillon ADI to act as the CIT for the duration of the five year Clearance Plan. As the DND's representative on the range, the CIT was to carry out two main tasks: 1) Quality Assurance plan which includes location surveys, equipment calibration, quality assurance inspections, liaison and communications with the Clearance Contractor; and 2) The development of a Communications Plan for the various project stakeholders, including the general public. The CIT Organization Chart is shown in Figure 2.

**Quality Assurance Plan.** This task includes such principal activities as:

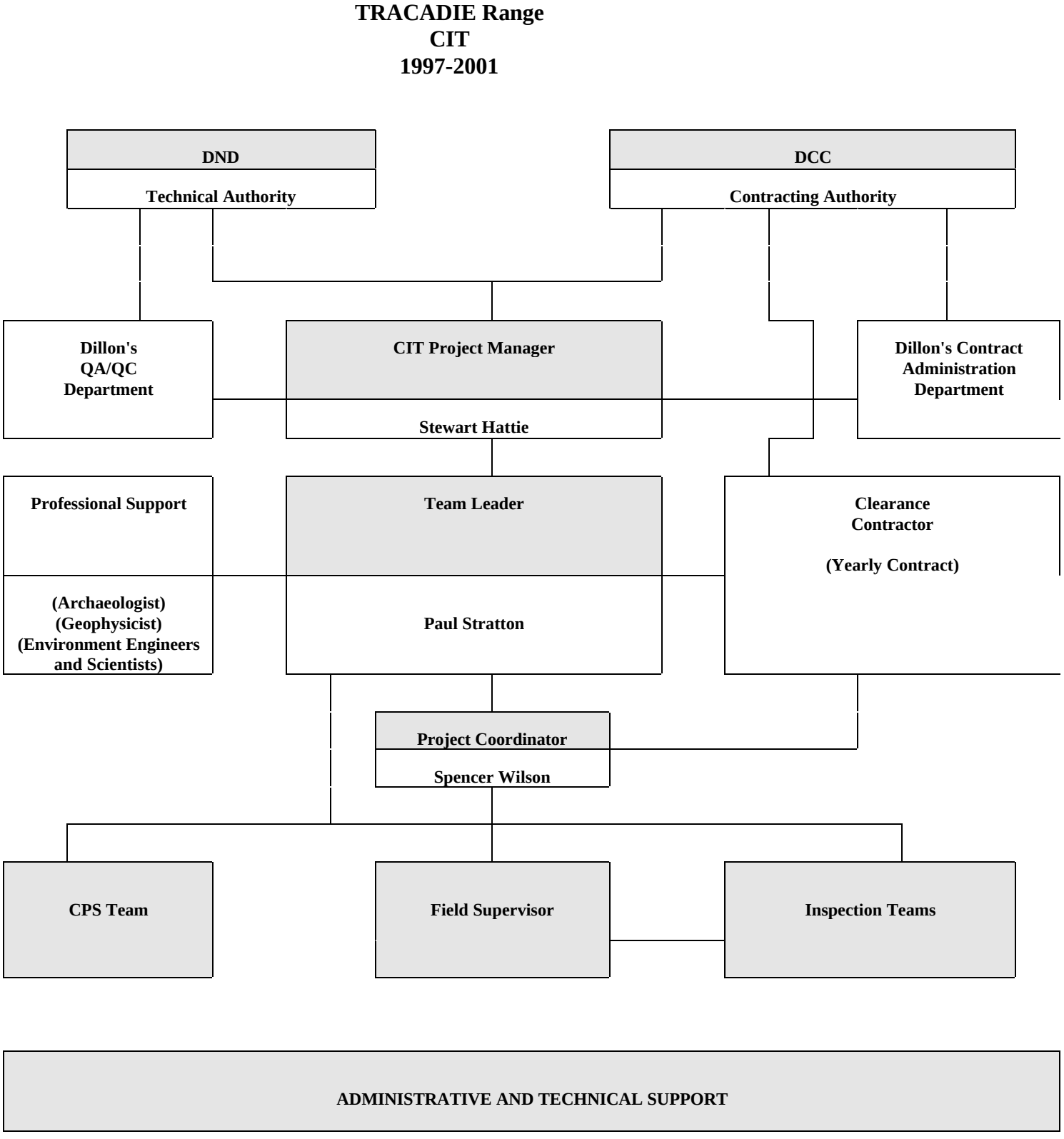
- On-Site Quality Management
- Level I Clearance (Surface only) Quality Assurance Inspections
- Level II Clearance (Down to 45 cm minimum) Quality Assurance Inspections
- Free From Explosive (FFE) Certifications
- Reporting

<u>On-Site Quality Management</u>. The On-Site Quality Management includes but may not be limited to:

- 15% quality assurance auditing for compliance with requirements

- random quality audits
- comparison of actual UXO finds with those projected from the UXO Survey

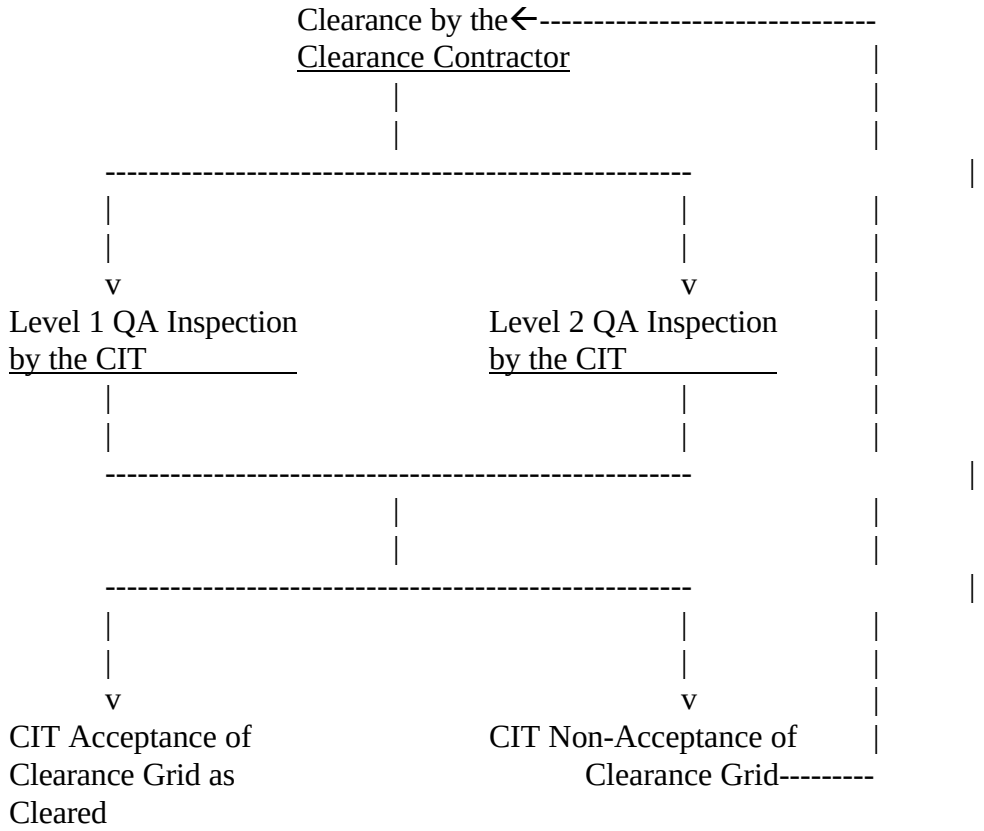
**Figure 2. Project Organization Chart**



___ Lines of Reporting
..... Lines of Communication

Levels I and II Clearance Quality Assurance Inspections. The DND CIT is to conduct independent QA checks on the different Levels of clearance. QA checks are conducted on a minimum of 15% of the Contractor's work in each of the ARAs and take the form of a digital electronic inspection. To facilitate the QA inspection work by the CIT, each ARA is subdivided into one hectare clearance grids (CGs) which constitute the basic QA inspection elements. The outputs from the digital survey are, after processing and interpretation, compared to the Contractor's data records for each CG and any unexplained anomalies identified and notified to the Clearance contractor for further investigation. In addition to the digital electronic inspections, over-the-shoulder checks and other spot checks are carried out. The Clearance and Quality Assurance Process is illustrated at Figure 3.

**Figure 3. Clearance and Quality Assurance Processes**




The following defect criteria have also been developed as part of the QA Plan. These were established solely based on past experience and have no proven scientific value. However, while the development of a scientifically based set of criteria is being

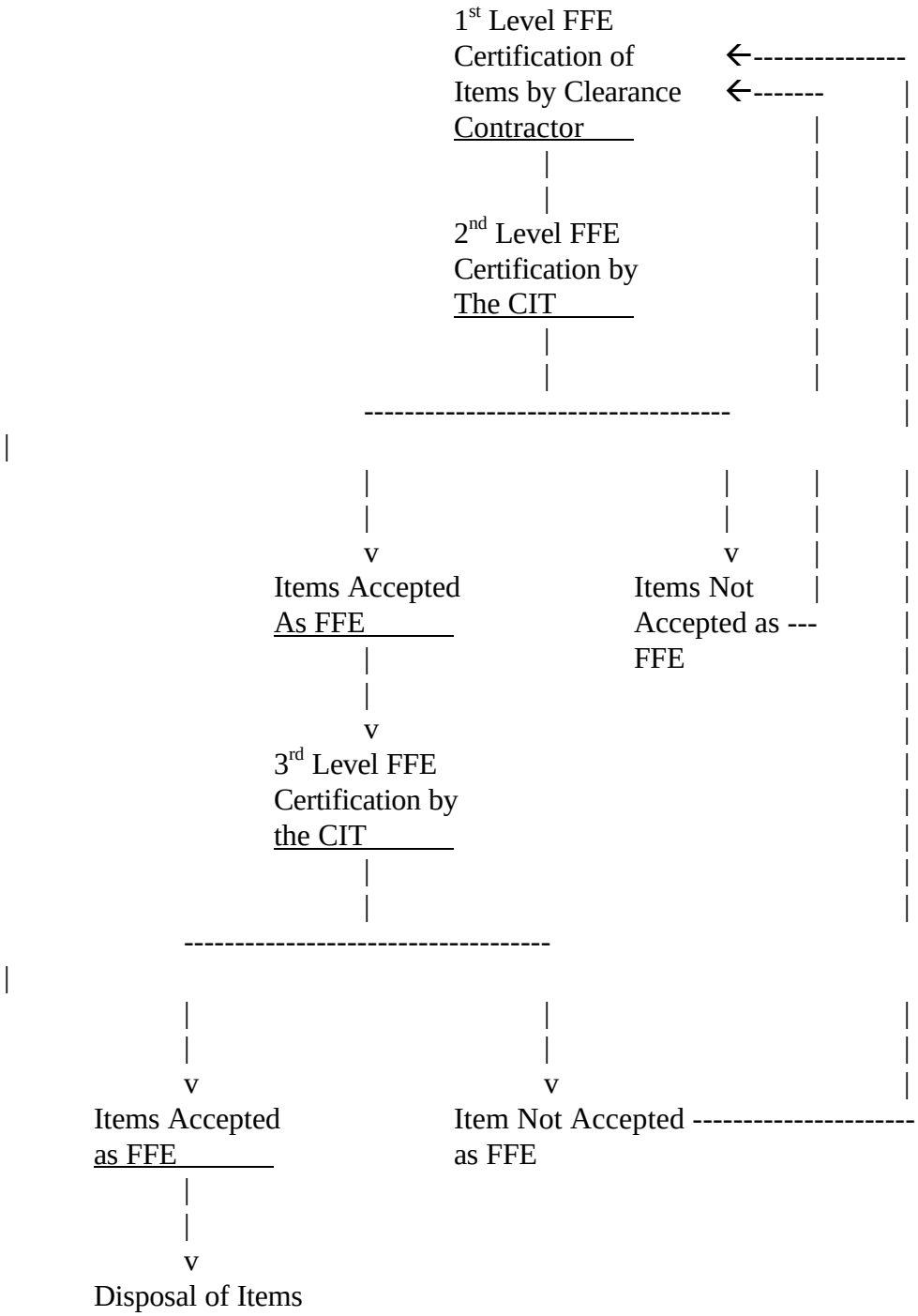
considered, these constitute a “comfortable” approach to providing QA Inspection guidelines:

- Critical Defect. The identification as the result of QA inspection of a UXO or an item containing an active constituent, for example WP encrusted fragment or partially functioned item containing HE. The identification of a critical defect will result in the non-acceptance of the CG which will have to undergo a further 100% clearance. The identification of three (3) critical defects under each clearance contract will cause the DND Project Manager to re-examine the contract and could form the basis for a recommendation to the Contracting Authority that the contract be terminated.
- Major Defect. The identification as the result of QA inspection of a significant ammunition related item, for example an expended carrier projectile, solid shot or large ammunition related fragment. By way of a guide, the fragment is a metallic item of equivalent or larger in volume than 5 cm x 5 cm x 5 cm. The identification of one (1) major defect will result in the non-acceptance of the CG which will have to undergo a further 100% clearance. The establishment of a minimal volume is a site-specific criteria and based on past uses of the ammunition related area by the military.
- Minor Defect. The identification as the result of a QA inspection of a metallic item other than critical and major of equivalent or larger in volume than 5 cm x 5 cm x 5 cm. The identification of fifteen (15) minor defects will result in the non-acceptance of the CG which will have to undergo a further 100% inspection.

Free From Explosives (FFE) Certification. FFE Certification is carried out at three different screening levels. The first level FFE screening is performed by the Clearance Contractor who is required to positively identify all items removed from CGs. Items determined by the contractor to contain hazardous constituents are to be disposed of by the Contractor. All items removed from the CGs are to be certified by the Clearance Contractor as FFE at a pre-established collection point.

At the collection point prior to loading, the CIT is to inspect recovered items to determine if they are FFE. This constitutes the second level FFE screening. Ammunition related and non-ammunition related scrap is then transported in separate vehicles to a holding area where the CIT performs the third level FFE screening prior to disposal of the scrap to a third party. The FFE Certification Process is illustrated at Figure 4.

**Figure 4. FFE Certification Process**



Reporting. The final part of the Quality Assurance Plan involves periodical reporting to the DND Project Manager. Through Monthly Progress Report, the CIT allows the DND Project Manager to keep abreast with the on-going clearance and inspection activities at the range. These address items such as:

- Contractor Progress
- CG Acceptance
- Contractor's Compliance
- Health and Safety Issues
- Forecast of CIT Activities
- Environmental and Archaeological Issues
- Expenditure
- FFE Certification
- Other Pertinent Comments

The Final Inspection Report is produced at the end of each clearance year as each clearance contract at Tracadie Range is awarded on a yearly basis. It provides a succinct summary of each year's clearance project and addresses the following points:

- Clearance Progress
- Clearance Contractor's Compliance with Plan
- Recommendations on Future Work
- Summary of UXO Items Identified
- Types and Quantity of Explosives Expended in Disposal Operations
- Summary of Third Level FFE Screening and Certification
- Environmental and Archaeological Issues
- Estimate of Amount of Scrap Removed From site and Estimate of Amount Left on Site
- Status of GIS File
- Recommendations for Improvement

**Communications Plan**

One of the objectives of the UXO Clearance Plan for Tracadie Range was the establishment of a public awareness program to inform the public through numerous information media on the hazards associated with use of the former range, on-going clean-up programs and measures to be followed in case of an encounter with UXO.

The nature of clearance operations presents potential disruptions to the public when travelling on the range for recreation or other purposes. For instance, during recovery and detonation of UXO, a safety template is imposed which could cause the closure of roads for a period of time. To ensure the public is advised of clearance activities on a yearly

basis, a Communications Plan needs to be developed. The objectives of the Communications Plan are to:

- Provide a very basic understanding of the range clearance process
- Update the public from time to time on the progress of the clearance project
- Advise the public of the need for caution in travelling on the former range
- Advise the public of the process of "sign postings" and areas "off-limits"
- Remind the public of specific dangers from past activities on the range and of those dangers associated with actual clearance activities
- Identify sources of additional information

The activities which are undertaken as part of the Communications plan on a yearly basis are:

- Posting of warning signage around ARAs of the range
- Signage at entrance gates alerting the public that clearance is underway
- Publication of newspaper notices alerting the public that clearance is underway
- Airing of radio notices alerting the public that clearance is underway
- Undertaking of an onsite media briefing with press kits
- Publication of bilingual (English and French) safety Bulletins and Yearly Clearance Bulletins. This material is distributed by the Province of New Brunswick and is also available at pick-up boxes at each main entrance gate

## CONCLUSION

The Department of National Defence instituted a formal Quality Assurance Program as an integral component of the Tracadie Range Clearance Project. In so doing, DND put in place a dedicated Clearance Inspection Team (CIT) whose role was to represent the Department on the project, to undertake the actual assurance program, to communicate the project to stakeholders and to ensure the concept of continual improvement was integrated into subsequent clearance contracts.

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