Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision
Crosman Corporation Site
Town of East Bloomfield, Ontario County
Site Number 8-35-012

March 1997

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* John P. Cahill, *Acting Commissioner*

TABLE OF CONTENTS

DECLARATION STATEMENT - RECORD OF DECISION

Crosman Corporation Inactive Hazardous Waste Site
Town of East Bloomfield, Ontario County, New York
Crosman Corporation Site #835012

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedial action for the Crosman Corporation inactive hazardous waste disposal site (Crosman site) which was chosen in accordance with the New York State Environmental Conservation Law (ECL). The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based upon the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Crosman site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A bibliography of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential threat to public health and the environment.

Description of Selected Remedy

Based upon the results of the Remedial Investigation/Feasibility Study (RI/FS) for the Crosman Site and the criteria identified for evaluation of alternatives the NYSDEC has selected Soil Vapor Extraction (SVE) and continued pump-and-treat of on-site groundwater. The components of the remedy are as follows:

- Aggressive operation of the SVE system to remove contaminants from soils for a period not to exceed two years;
- Continued operation of the IRM groundwater pump-and-treat system;
- Continued operation of the on-site production well;
- Long-term groundwater monitoring;
- Evaluation of the IRM system after completion of SVE; and
- Annual evaluation of the long-term monitoring program and remedy effectiveness.

The cleanup goal for groundwater is the standard of 5.0 ppb. It is anticipated the SVE system will operate for a period of six months to one year. The SVE system would be shut down if acceptable asymptotic removal rates are achieved and significant amounts of TCE are no longer being removed. Long-term groundwater monitoring and operation of the production well would continue operation as long as groundwater standards are exceeded.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

Michael J. O'Toole, Jr., Director
Division of Environmental Remediation

3/26/97
Date

RECORD OF DECISION
CROSMAN CORPORATION SITE
Town of East Bloomfield, Ontario County, New York
Site No. 8-35-012
March 1997

SECTION 1: SITE LOCATION AND DESCRIPTION

The Crosman site is located in a rural area in the Town of East Bloomfield near the western edge of the Village of Bloomfield in Ontario County. The facility is located on a 50-acre parcel and contains a manufacturing building, office facilities, a wastewater treatment plant, and a lined cooling water retention pond. Please refer to Figures 1 & 2 for the site location and plant layout, respectively. The facility manufactures air guns, lead pellets, BBs, carbon-dioxide (CO_2) gas cartridges (powerlets®), and rangefinders. The facility manufactures over one million air guns, 18 million powerlets® , 600 million lead pellets, and 5.5 billion BBs per year. The company employs approximately 350 permanent employees and up to 120 temporary employees during peak production periods.

SECTION 2: SITE HISTORY

2.1: Operational/Disposal History

In October 1990, Crosman Corporation sampled a groundwater production well located on the Crosman Corporation property near New York State Route 5 and U.S. Highway Route 20 (Rts. 5&20) and detected TCE contamination. The production well is used primarily for non-contact cooling water in the facility, and the water is subsequently discharged to a lined cooling pond in the central portion of the Crosman property (please refer to Figure 2). After further investigation, Crosman notified the NYSDEC of the results in December 1990, and Crosman, with the assistance of the Village of Bloomfield, sampled nearby private homeowner wells. These results did not detect any site-related contamination in the private wells.

2.2: Remedial History

In May 1991, Crosman Corporation initiated a preliminary site investigation to determine the source of contamination. The results of the investigation indicated the presence of TCE in the groundwater and soil on-site, and it indicated a potential source of contamination near a former aboveground TCE storage tank located on the eastern side of the manufacturing building (please refer to Figure 2). During this investigation, three private wells were sampled by Crosman. Sample results indicated a trace amount of TCE in one well. This well was subsequently resampled by the NYSDOH and the results did not detect any site-related contaminants. Based upon the preliminary site investigation, the Crosman site was listed in the New York State Registry of Inactive Hazardous Waste Sites as a class 2 in June 1992. A class 2 means the site poses a significant threat to public health or the environment and action is required.

SECTION 3: CURRENT STATUS

In response to a determination that the presence of hazardous waste at the Crosman site presents a significant threat to human health and/or the environment, Crosman and New Coleman Holdings, Inc. (the former site owner) recently completed an interim remedial measure (IRM) and a remedial investigation/feasibility study (RI/FS).

3.1 Interim Remedial Measure

IRMs are conducted at sites when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

Crosman Corporation initiated an IRM in October 1995. The purpose of the IRM was to take immediate action to control the spread of trichloroethylene (TCE) contamination in the groundwater. The IRM consists of a groundwater recovery well and an air stripper. Continued operation of the on-site production well is also part of the IRM system. Treated groundwater and non-contact cooling water from the production well is being discharged into an on-site pond. The discharge from the pond is regulated by a NYSDEC State Pollution Discharge Elimination System (SPDES) permit, and it eventually flows into Fish Creek (Please refer to Figure 1). Under the permit, Crosman Corporation is required to sample the pond discharge on a monthly basis for TCE, temperature, pH, and flow. The TCE discharge limit is 10 parts per billion (ppb).

The IRM system began operation in October 1995; it has provided hydraulic control of groundwater within the source area. To date, the IRM system has removed approximately 12 pounds of TCE from the groundwater. Please refer to Figure 3 for the location of the recovery well (IRM-1). Originally the vapor stream from the air stripper was treated with activated carbon; however, after several months of operation, in December 1996, Crosman Corporation demonstrated to NYSDEC that air control equipment was not required. Without control equipment, air discharges from the treatment system comply with New York State Ambient Guideline Concentrations (AGCs).

3.2: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of contamination resulting from previous activities at the site.

The RI was conducted in two phases. The first phase was conducted between October 1993 and July 1994 the second phase between October 1994 and March 1996. A report entitled Remedial Investigation, October 1996, has been prepared describing the field activities and findings of the RI in detail.

The RI included the following activities:

- *Installation of soil borings and monitoring wells for analyses of soils and groundwater as well as physical properties of soil and hydrogeologic conditions;*

Figure 1
Crosman Corporation Site Location

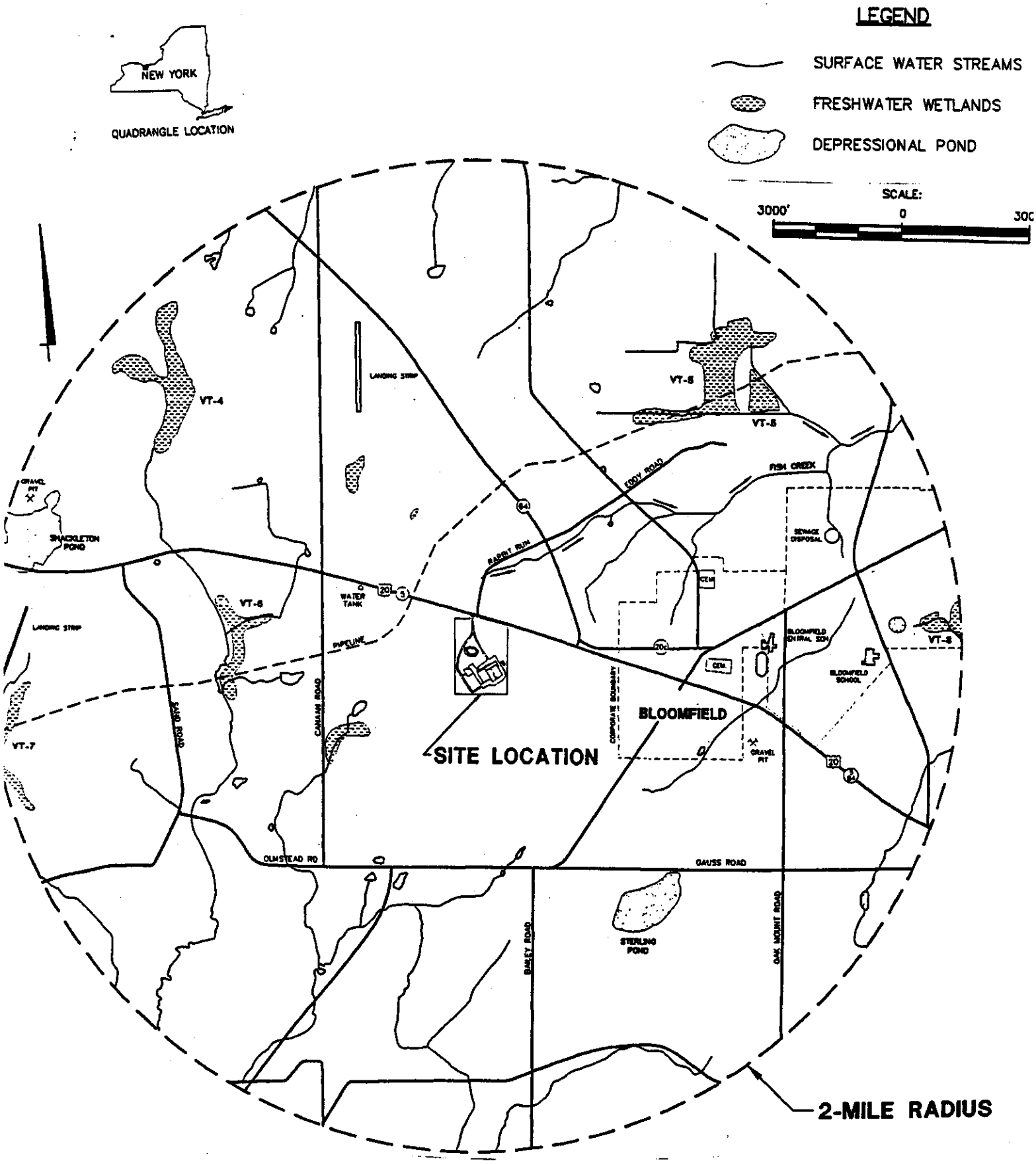
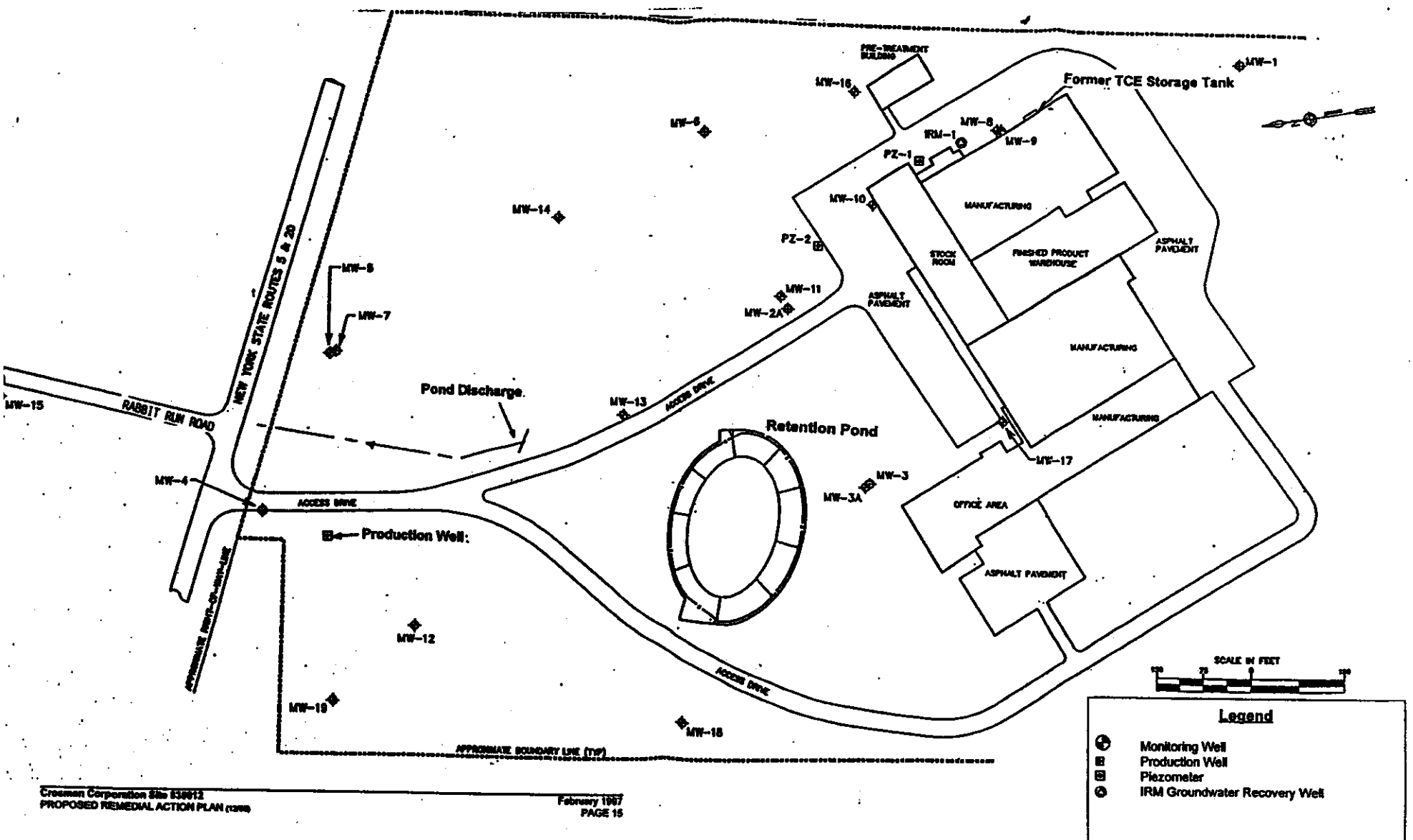


Figure 2
Crosman Corporation Site Layout



- *Residential well sampling and analyses to determine if any drinking water supplies have been contaminated; and*

- *Surface water and sediment sampling and analyses to assess the potential for off-site migration of site contaminants.*

To determine which media (soil, groundwater, etc.) contain contamination at levels of concern, the RI analytical data were compared to environmental Standards, Criteria, and Guidance values (SCGs). Groundwater, drinking water and surface water SCGs identified for the Crosman site were based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of NYS Sanitary Code. NYSDEC Technical Administrative Guidance Memorandum (TAGM) 4046 contains soil cleanup guidelines for the protection of groundwater, background conditions, and risk-based remediation criteria were used to guide the development of SCGs for soil and the Division of Fish and Wildlife Technical Guidance for Screening Contaminated Sediments was used for developing data to evaluate sediments.

Based upon the results of the remedial investigation in comparison to SCGs and potential public health and environmental exposure routes, certain areas and media of the site require remediation. These are summarized below. More complete information can be found in the RI Report.

3.2.1 Nature of Contamination

As described in the RI Report, many soil, groundwater, surface water and sediment samples were collected at the Crosman site to characterize the nature and extent of contamination. TCE was used historically by Crosman Corporation until August 1995. TCE is a volatile organic compound (VOC) which was used to clean metal parts. A small release of TCE into the sub-surface can contaminate large quantities of groundwater above the drinking water standard of 5 ppb. Because of its limited solubility in water and moderate toxicity to microorganisms, TCE contamination is persistent in the subsurface environment. The TCE in contaminated soils can be a source for years by slowly dissolving into the groundwater. Currently, Crosman Corporation uses aqueous-based cleaners to degrease metal parts.

3.2.2 Extent of Contamination

The results of the RI indicated TCE contamination in on-site groundwater and soil, and identified the probable source of contamination in the area of the former TCE aboveground storage tank. Table 1 summarizes the extent of contamination for the contaminants of concern in soil and groundwater and compares the data with the proposed remedial action levels for the Crosman site. The following are the media which were investigated and a summary of the findings of the investigation.

3.2.2.1 Groundwater

During the RI, sixteen additional wells and piezometer were installed to determine groundwater flow patterns and chemistry and site geology.

The depth to bedrock is 156 feet below ground surface (bgs). Generally, bedrock is overlain by 60 to 120 feet of glacial till overlain by 30 to 90 feet of interbedded sand, gravel, silt, and clay. An exception to the general stratigraphy is the presence of a very dense sand and gravel zone approximately 15 to 30 feet bgs in the vicinity of the source area. The till is very dense and of low permeability. General permeabilities of the interbedded unit range between 10^{-5} and 10^{-3} cm/s. The majority of the monitoring wells were installed in the upper interbedded unit. One well was installed to the top of bedrock in the glacial till unit.

Groundwater is approximately 50 feet bgs in the vicinity of the building and about 20 feet bgs near the production well. Groundwater flows in a northerly direction and a groundwater contour map is presented in Figure 3. A well defined TCE plume has been identified by on-site groundwater wells in the interbedded unit. Site-related contaminants were not detected in the top-of-rock well. The plume originates from the former TCE storage tank area, and appears to be captured by the on-site production well near the northern property line. Groundwater was sampled for VOCs and metals. To date, groundwater sample results have not detected any TCE breakdown products nor have metals been a concern. Please refer to Figure 4 for a detailed site map with well locations and TCE concentrations. To date, there have been no indications of off-site migration of TCE contamination. Residents on Rts. 5&20 are supplied by public water. Nearby private homeowner wells on Rabbit Run Road were sampled for the presence of site-related contamination in August 1992, November 1992, April 1993, July 1993, and July 1994. These results did not detect site-related contamination. One of nine samples from well MW-15 had a detection of TCE below the groundwater standard of 5 ppb. Please refer to Figure 4.

3.2.2.2 Soils

During the RI, several soil borings were advanced throughout the known and suspected source areas. Only one of forty-eight (48) soil samples exceeded SCGs for soil. This sample was located near the source area. A 3-day pilot study using soil vapor extraction (SVE) was conducted in the area of the former TCE storage tank. The results of the study indicated a moderate amount of TCE contamination in unsaturated soils. The results of the study are presented in the appendix of the Feasibility Study report. During the 3-day study, approximately 14 pounds of TCE were removed from soil in the source area.

Due to the nature of dense-phase solvents, it is difficult to detect small residual sources of TCE by direct measurements. The results of the pilot study imply there is a moderate source of TCE in soils based upon the amount of TCE recovered.

3.2.2.3 Surface Water and Sediment

Surface water and sediment samples were taken during the RI and did not reveal the presence of site-related compounds leaving the site. The SPDES permit outfall from the man-made retention pond is monitored monthly for TCE. To date, there have been no reported exceedances of the 10 ppb limit for TCE in the retention pond discharge.

Table 1
Nature and Extent of Contamination

Media	Class	Contaminant of Concern	Concentration Range (ppb)	Frequency or samples exceeding SCGs	SCG (ppb)
Groundwater	Volatile Organic Compounds (VOCs)	Trichloroethylene	ND (1) to 10,000	11 of 22 well locations	5
Soil	Volatile Organic Compounds (VOCs)	Trichloroethylene	ND to 1,200	1 of 48 samples	550

Figure 3
Crosman Corporation Site
Groundwater Elevations (December 28, 1995)

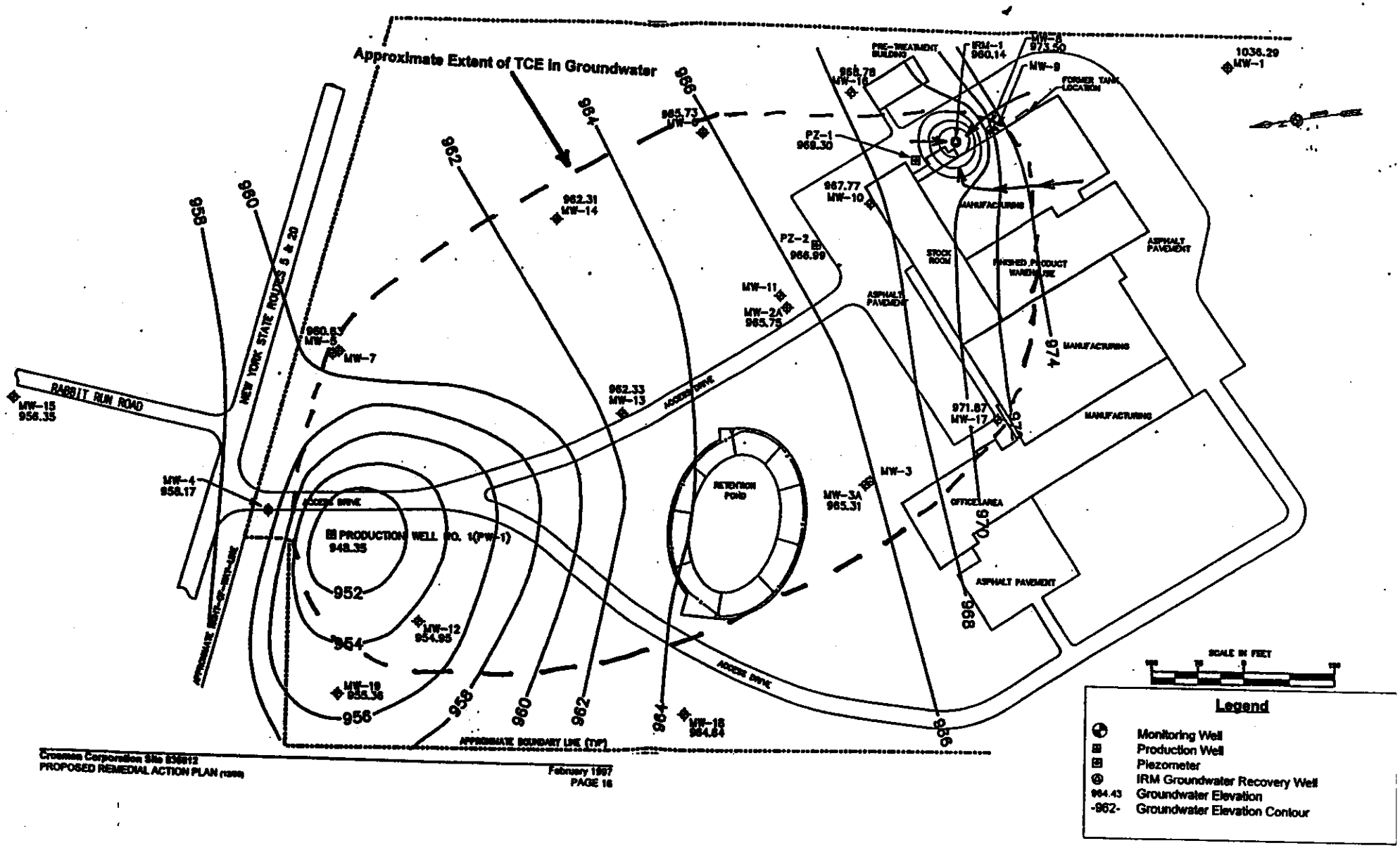
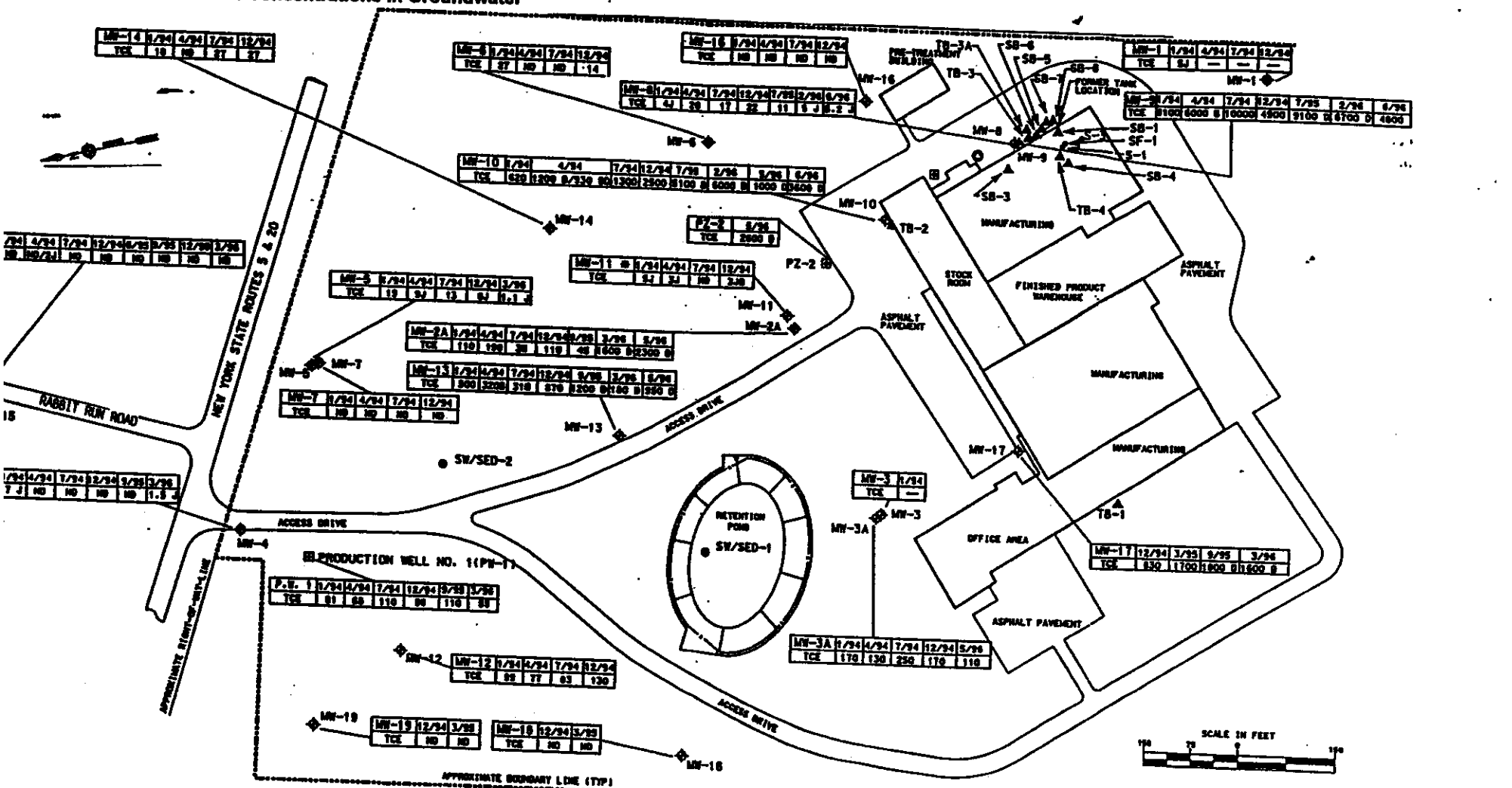


Figure 4
Crosman Corporation Site
TCE Concentrations in Groundwater



Key to TCE Concentrations
All concentrations are in ppb

ND	Not Detected
J	Estimated Value
B	Compound Detected in Laboratory Blank
D	Laboratory Dilution

Legend

- Monitoring Well
- Production Well
- Piezometer
- IRM Groundwater Recovery Well
- Surface Water/Sediment Sampling Location
- Soil Boring Location
- Sub-Floor Soil Boring Location

3.3 Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 6.0 of the RI Report.

An exposure pathway is how an individual may come into contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the impacted population. These elements of an exposure pathway may be based on past, present, or future events.

Currently, there are no completed exposure pathways associated with site-related contaminants. However, if the site were left unremediated, *the following potential* ***future*** *exposure pathways associated with the use of groundwater from private residential wells may exist:*

- Ingestion of contaminants from drinking water;
- Dermal contact with contaminants while bathing/showering; and
- Inhalation of contaminants while bathing/showering, cooking, and irrigating lawn/garden.

If the Crosman site is left unremediated there is a potential for future health risks.

3.4 Summary of Environmental Exposure Pathways:

This section summarizes the types of environmental exposures which may be presented by the site. The fish and wildlife impact assessment included in section 5.0 of the RI presents a more detailed discussion of the potential impacts from the site to fish and wildlife resources. A tributary to Fish Creek is the nearest surface water body. The effluent from Crosman's SPDES permit flows into this water body (please refer to Figure 1). Samples downstream from the SPDES outfall did not indicate that site-related contaminants were leaving the site.

SECTION 4: ENFORCEMENT STATUS

Potentially responsible parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

In 1990, Crosman Corporation purchased the air gun division of New Coleman Holdings, Inc. (formerly The Coleman Company). In September 1993, the NYSDEC, Crosman Corporation and New Coleman Holding, Inc. entered into a Consent Order. The Order obligates the PRPs to implement an IRM and an RI/FS. Upon issuance of the Record of Decision (ROD) the NYSDEC will approach the PRPs to implement the selected remedy under another Order on Consent. The NYSDEC is currently negotiating this Order with the PRPs.

SECTION 5: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all Standards, Criteria, and Guidance values (SCGs) and be protective of human health and the environment.

At a minimum, the remedy selected should eliminate or mitigate all significant threats to the public health and to the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- *Mitigate the threat to surface waters by regulating TCE discharges from the lined cooling pond through the existing SPDES permit;*
- *Eliminate the potential for direct human ingestion of contaminated groundwater;*
- *Mitigate the impacts of contaminated groundwater to the environment; and*
- *Provide for attainment of SCGs for groundwater quality at the limits of the area of concern (AOC) to the extent practicable.*

SECTION 6: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy should be protective of human health and the environment, be cost-effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Crosman site were identified, screened and evaluated in a Feasibility Study. This evaluation is presented in the report entitled Feasibility Study, January 1997.

A summary of the detailed analysis follows. As used in the following text, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with PRPs for implementation of the remedy.

6.1: Description of Alternatives

The potential remedies are intended to address the contaminated soils and groundwater at the site.

Alternative #1
No Further Action

This alternative recognizes remediation of the site conducted under current IRM. The IRM consists of a groundwater pump-and-treat system with continued operation of the on-site production well. Continued monitoring is necessary to evaluate the effectiveness of the remediation by the operating IRM system. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Present Worth:	$ 320,382
Capital Cost:	$ 0
Annual O&M:	$ 37,952

Alternative #2
Connection to public water supply

This alternative would involve connection of downgradient residents to the existing water main. The IRM system would be shutdown and the production would used only as need. A long-term groundwater monitoring plan would be implemented.

Present Worth:	$ 167,771
Capital Cost:	$ 80,098
Annual O&M:	$ 13,226
Time to Implement:	6 months - 1 year

Alternative #3
Continued groundwater pump-and-treat with soil vapor extraction

This alternative would involve operation of the soil vapor extraction system (SVE) used during the 3-day pilot study to reduce the concentration of TCE in the source area. The IRM system and the production well would continue to operate and a long-term groundwater monitoring plan would be implemented. It is estimated the SVE system would need to operate for a period of 6 months to 1 year. The SVE system would be evaluated for effectiveness on a periodic basis as specified in the design. The SVE system would operate for a maximum of two years. After shutdown of the SVE system, the continued operation of the IRM recovery well and production well would be evaluated.

Present Worth:	$ 418,783
Capital Cost:	$ 29,205
Annual O&M:	$ 77,882
Time to Implement:	3 months

Alternative #4
Enhanced groundwater pump-and-treat with soil vapor extraction

This alternative would be the same as Alternative #3 and it would involve enhancements to the existing IRM system by adding additional recovery wells. A long-term groundwater monitoring plan would be implemented.

Present Worth:	$ 541,047
Capital Cost:	$ 65,516
Annual O&M:	$ 86,939
Time to Implement:	6 months - 1 year

Alternative #5
Groundwater pump-and-treat with air sparging

This alternative would involve the use of air sparging and SVE to reduce TCE concentrations in the source area. The IRM system and production well would continue to operate and a long-term groundwater monitoring plan would be implemented. It is estimated the air-sparging/SVE system would operate for 5 years. An evaluation for continued operation of the IRM system would occur if the air sparging and SVE system is shutdown.

Present Worth:	$ 863,739
Capital Cost:	$ 198,643
Annual O&M:	$ 128,886
Time to Implement:	6 months - 1 year

6.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6NYCRR Part 375). For each criterion, a brief description is provided followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is contained in the Feasibility Study.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. *Compliance with New York State Standards, Criteria, and Guidance (SCGs).* Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

The most significant SCGs for the Crosman site are:

- *TAGM 4046 - Soil Cleanup Objectives and Cleanup Levels (1/94)*
- *TOGS 1.1.1 - Ambient Water Quality Standards and Guidance Values (10/93)*
- *6NYCRR Part 703 - Groundwater quality regulations*
- *6NYCRR Parts 370-374 Hazardous waste regulations*
- *6NYCRR Parts 750-757 - SPDES Permit*
- *6 NYCRR Parts 200, 201, 211,212, & 257 Air regulations*
- *Part 5 Drinking Water Standards*

Alternative #2 would not meet the water quality regulations. Drinking water regulations would be met because residents would be supplied with public water. All other alternatives would provide containment of TCE and mitigate off-site migration. The existing IRM system complies with all

appropriate regulations and any added technologies in alternatives #3, #4, and #5 would be designed to meet these requirements.

2. *Protection of Human Health and the Environment.* This criterion is an overall evaluation of the health and environmental impacts to assess whether each alternative is protective.

Alternative #2 would eliminate the potential future drinking water exposure route for TCE by supplying public water. The remaining remedial alternatives would provide for containment of TCE on-site. Exposure to public health would be eliminated by containment on-site and reduction of contaminant mass.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. *Short-term Effectiveness.* The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Each of the remedial alternatives would require less than one year to implement and would have little short-term impacts. The air emission impacts from alternative #1 have been demonstrated to be minimal and meet the SCGs. Alternative #2 would have no air emissions because the IRM system would be shutdown. Alternatives #3, #4, and #5 would involve short-term air emissions. Potential emissions would be evaluated during the design phase to determine the need for control equipment for these alternatives.

4. *Long-term Effectiveness and Permanence.* This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Alternative #2 would not be considered a permanent remedy. TCE contamination would be left to migrate off-site and the extent of contamination would increase. Alternative #1 would provide long-term effectiveness because TCE would be contained on-site and some TCE would be removed. Alternatives #3, #4, & #5 would provide long-term effectiveness and would provide some additional permanence by removal of more TCE from the subsurface.

5. *Reduction of Toxicity, Mobility or Volume.* Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternative #2 would not provide any reductions of TCE in the environment and would not meet this criterion. The remaining alternatives provide for reduction in mobility. Alternatives #3, #4, & #5 would provide for greater reduction in toxicity and volume than alternative #1 because these alternatives more aggressively remediate the source area.

6. *Implementability*. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc..

Alternative #1 is already in place; therefore, is the easiest to implement. Alternative #3 would be easily implemented because the wells and equipment from the 3-day pilot study would be used. Alternative #5 would be the most difficult to implement due to the depth to groundwater. The remaining alternatives are readily implemented in less than one year.

7. *Cost*.Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is focused upon after public comments on the PRAP have been received.

8. **Community Acceptance** - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan have been evaluated. The "Responsiveness Summary" included as Appendix A presents the public comments received and the Department's response to the concerns raised.

In general the public comments received were supportive of the selected remedy. Several comments were received, however, pertaining to long-term monitoring and the effectiveness of the selected remedy.

SECTION 7: SUMMARY OF THE SELECTED REMEDY

Based upon the results of the RI/FS, and the evaluation presented in Section 6, the NYSDEC is selecting **Alternative 3**, *soil vapor extraction and continued operation of the IRM* as the remedy for this site. This selection is based upon the following narrative.

Alternative #2 will not be a permanent remedy; it will not meet SCGs; and it will not reduce the toxicity, mobility, or volume of TCE. *Alternative #1* meets the seven screening criteria; however, it is a less permanent remedy than the remaining alternatives. The SVE pilot study demonstrated to be more effective than the pump-and-treat technology; therefore, *Alternative #1* will not provide as much reduction to toxicity, mobility or volume of TCE. Alternatives *#3, #4, and #5* meet all the screening criteria and they will be more permanent remedies because of additional source remediation. *Alternative # 5* may be difficult to implement due to the depth of the water table, and is the most expensive to implement. *Alternative #4* will not provide much additional environmental benefit over Alternative #3. Comparison of SVE and pump-and-treat technologies at the Crosman site demonstrated that additional pump-and-treat wells provide little enhancement to contaminant recovery.

Table 2
Remedial Alternative Costs
Crosman Corporation Site

Remedial Alternative	Description	Capital Cost	Annual O&M	Total Present Worth
1	*No Further Action.* Continued operation of existing groundwater pump-and-treat system (IRM) and production well operation with long-term groundwater monitoring	$0	$37,952	$320,382
2	Connection to Public Water Supply and long-term groundwater monitoring. IRM is shutdown.	$80,098	$13,226	$167,771
3	Groundwater pump-and-treat with soil vapor extraction in the source area with long-term groundwater monitoring	$29,205	$77,882	$418,783
4	Enhanced groundwater pump-and-treat with soil vapor extraction in the source area with long-term groundwater monitoring	$65,516	$86,939	$541,047
5	Groundwater pump-and-treat with air sparging and soil vapor extraction in the source area with long-term groundwater monitoring	$198,643	$128,886	$863,739

The estimated present worth cost to implement the remedy is *$ 418,783.* The cost to construct the remedy is estimated to be *$29,205* and the estimated average annual operation and maintenance cost for 2 years of SVE and operation and 30 years of the IRM system (source area groundwater extraction and treatment) is *$389,578.*

The elements of the selected remedy are as follows:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the RI/FS will be resolved;

2. Installation and operation of soil vapor extraction system (SVE). The system will be operated until acceptable identification of asymptotic removal rates, and until evaluation that significant amounts of TCE are no longer being removed. Operation of the SVE system will not exceed two years;

3. Continued operation of the IRM system;

4. Continued operation of the on-site production well; and

5. Since the remedy results in untreated hazardous waste remaining at the site, a long-term monitoring program will be instituted. This program will allow the effectiveness of the selected remedy to be monitored and will be a component of the operation and maintenance for the site. Upon completion of this remedial action, the site will be reclassified to a class 4.

SECTION 8: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the remedial investigation process, a number of Citizen Participation (CP) activities were undertaken in an effort to inform and educate the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for the site:

- A repository for documents pertaining to the site was established and updated.

- A site mailing list was established which included nearby property owners, local political officials, local media and other interested parties.

- Fact sheets were distributed in October 1993, May 1995, and February 1997.

- Details of the PRAP were presented at a public meeting on March 4, 1997.

- In March 1997, a Responsiveness Summary was prepared and made available to the public, to address comments received during the public comment period for the PRAP.

Appendix A
Responsiveness Summary

This document summarizes the comments and questions received by the NYSDEC regarding the proposed remedial action plan (PRAP) for the Crosman site. A public comment period opened on February 21, 1997 and closed on March 22, 1997 to receive comments on the PRAP. A public meeting was held on March 4, 1997 to present results of the investigations performed at the site and to describe the PRAP. The public meeting received minor media coverage, and it was attended only by the Supervisor for the Town of East Bloomfield. The information below summarizes the comments and questions received by NYSDEC at the public meeting and provides a response. No additional comments were received during the public comment period.

1. There is concern that the TCE contamination could migrate off-site and not be captured by the on-site production well. Is there going to be additional groundwater monitoring wells installed on the northwest corner of the property? Also, well MW-19 hasn't been sampled since March 1995; will it be sampled in the near future?

Response:

The groundwater monitoring data gathered to date indicate the production well is capturing the contaminant plume of trichloroethylene on-site. The groundwater flow patterns do not indicate that contaminants would migrate off-site to the northwest. Based upon the existing data, the NYSDEC does not deem it necessary to install additional wells off the northwest corner of the site at this time. To insure the effectiveness of the continued operation of the production well, MW-19 will be added to the long-term monitoring network of wells. If contamination is detected in well MW-19, installation of additional wells will be evaluated.

2. I am concerned about the rising concentrations of TCE in MW-2A, MW-13, and MW-10. Is this trend going to continue? Will there be a problem with off-site migration if this trend continues to the production well?

Response:

The NYSDEC shares your concern about the rising concentrations in these wells. After implementation of the cleanup remedy, wells MW-13 and MW-10 will be closely monitored to insure the effectiveness of the remedy. Since MW-2A is directly between MW-13 and MW-10, it will not be necessary to closely monitor this well at this time. Based upon the existing groundwater flow data, there should not be a concern for off-site migration. These wells are directly along the flow path to the production well and contaminants in this flow path should be captured by the production well. If site-related contaminants were not captured by the production well, they would be detected in the monitoring wells downgradient of the production well prior to reaching any private wells. If contamination were migrating past the production well, appropriate remedial measures would be taken to prevent exposure to residents.

3. What plans do the New York State Department of Health have for sampling any residential wells in the near future?

Response:

The company will conduct long-term groundwater monitoring along the site boundary to help evaluate the effectiveness of the remedy. Although it is unlikely that contaminants in groundwater will migrate beyond the site monitoring system, the NYSDOH will periodically sample downgradient residential wells for the presence of site-related contaminants. The NYSDOH anticipates resampling nearby residential wells in 1997.

4. Were the monitoring wells installed at the proper locations and screened at the proper elevations?

Response:

During the remedial investigation (RI), groundwater monitoring wells were installed throughout the thickness of the upper water bearing zone. The upper water bearing zone (50-90 feet below ground surface) consists mainly of sand and gravel. These materials readily transmit groundwater and any contaminants in the groundwater. Below this upper zone, the soils consist of glacial till. Glacial till is a mix of different sized soil particles within a clay matrix. Typically, glacial tills do not transmit large amounts of water and act as a confining zone. During the RI, a monitoring well was installed below the glacial till into bedrock (about 200 feet below ground surface). Trichloroethylene was not detected above the groundwater standard in this well. To insure the effectiveness of the selected remedy, this well will be periodically monitored in the future. Based upon all of the data gathered to date, it is the opinion of NYSDEC that the monitoring well network adequately characterizes the extent and magnitude of groundwater contamination. The wells are properly located and screened at the proper elevations.

5. Please send out a notice when field work for the remediation starts and keep people informed periodically.

Response:

The NYSDEC will send out a fact sheet to the current mailing list of interested parties prior to startup of the site remediation. Additionally, the NYSDEC will send out fact sheets to the interested parties at project milestones.

Appendix B
Administrative Record

Citizen Participation, Consent Orders, and PRAP

Proposed Remedial Action Plan (PRAP), February 1997.

Site Information Sheet#2, May 1995.

Site Information Sheet, October 1993.

Order on Consent for RI/FS and IRM, Signed September 23, 1993.

Work Plans and Reports

Focused Feasibility Study, Blasland, Bouck, & Lee (BBL), February 1997.

Interim Remedial Measure System Performance Evaluation, BBL, January 1997.

Remedial Investigation, BBL, October 1996.

Work Plan Soil Vapor Extraction Pilot Study, Terra Vac, September 1996.

Groundwater Treatment System O&M Manual, CSK Technical, Inc., December 1995.

Groundwater Treatment System, CSK Technical, Inc. January 1995.

Interim Remedial Measures Work Plan, BBL, August 1994.

Remedial Investigation/Feasibility Study and Interim Remedial Measures Work Plan, Labella Associates, P.C., August 1993.

Citizen Participation Plan, Labella Associates, P.C., July 1993.

Preliminary Site Characterization Report, Labella Associates, P.C., July 1992.

Site Characterization Plan, Labella Associates, P.C., May 1991.

Correspondence

Letter to D. Stoltz (Crosman) and C. McDermott (New Coleman Holdings, Inc.) from T. Caffoe, P.E., (NYSDEC), RE: Feasibility Study approval, February 19, 1997.

Letter to D. Stoltz and C. McDermott from T. Caffoe, P.E.,RE: IRM Performance Evaluation Report approval, December 26, 1996.

Letter to M.J. Peachey, P.E. (NYSDEC), from William Popham (Blasland, Bouck, & Lee), RE: Soil Vapor Extraction Pilot Study, October 11, 1996.

Letter to D. Stoltz and C. McDermott from T. Caffoe, P.E., RE: SVE Work Plan, October 7, 1996.

Letter to D. Stoltz and C. McDermott from T. Caffoe, P.E., RE: Remedial Investigation Report Approval, September 20, 1996.

Letter to M.J. Peachey, P.E. from F. Kozak (Blasland, Bouck, & Lee), RE: RI Report Identification of Residential Well Locations, February 20, 1996.

Letter to M.J. Peachey, P.E. from F. Kozak, RE: Final Engineering Certification for IRM, January 31, 1996.

Letter to J. DeBrock (Crosman), from T. Caffoe, P.E., RE: IRM Design Approval, April 19, 1995.

Letter to J. DeBrock from T. Caffoe, P.E., RE: Approval of IRM Work Plan and Phase II RI work, September 7, 1994.

Letter to M.J. Peachey, P.E. from M. Weider (BBL) , RE: Proposed Phase II RI work, August, 22, 1994.

Letter to J. DeBrock from T. Caffoe, P.E., RE: Approval of IRM and Consent Order Modification, August 3, 1994.

Letter to M.J. Peachey, P.E. from M. Weider, RE: Modification of Consent Order and IRM, June 9, 1994.

Letter to J. DeBrock from T. Caffoe, RE: Approval of Modified Sampling Parameters for Second Round, April 29. 1994.

Letter to T. Caffoe, from M. Weider, RE: Request to Modify Sampling Parameters for Second Round, April 27, 1994.

Letter to T. Caffoe, from M. Weider, RE: Modification to RI/FS and IRM Work Plans, October 13, 1993.

Letter to J. DeBrock from T. Caffoe, RE: Approval of RI/FS and IRM Work Plan, August 2, 1993.

Letter to Crosman Corporation from R. Marino (NYSDEC), RE: Registry Listing Notification, June 15, 1992.