TECHNIKON, LLC

Quality Manual Draft

Technikon # 1409-620

WBS # 6.2.0

31 July 2003

Casting Emission Reduction Program

Prepared by:

TECHNIKON LLC

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US Army Contract DAAE30-02-C-1095

FY 2002 Tasks

Quality Manual *Draft*

Technikon # 1409-620

31 July 2003

EPA United States Environmental Protection Agency

CISA

AFS AMERICAN FOUNDRY SOCIETY, INC.

UNITED STATES COUNCIL FOR AUTOMOTIVE RESEARCH

USCAR

DAIMLERCHRYSLER Ford Motor Company General Motors

TECHNIKON
ENVIRONMENTAL DEVELOPMENT CENTER™

Memorandum

Measurement Technologies

August 1, 2003

To: File

cc:

From: C. R. Glowacki

Subject: Technikon ISO Draft Quality Manual

The following draft quality manual was developed as part of the work products associated with Subtask 6.2. It defines Technikon's quality management policies. This is considered to be the systems Tier 1 document. This document cannot be finalized until the Second Tier manual of Critical Procedures has been drafted and a Gap Analysis completed. The Critical Procedures manual is a work product in Subtask 6.2 of the FY-2003 tasks.

A. TITLE PAGE

TECHNIKON, LLC

Quality Manual *Draft*

Copy No. 1

B. TABLE OF CONTENTS

C. MANUAL CONTROL

THIS IS A CONTROLLED DOCUMENT

C.1. Distribution

Master Copy	No. 1	TECHNIKON, LLC	ISO Library
	No. 2	George Crandell	Vice-President - Operations
	No. 3	Jodie Crandell	Senior Project Manager
	No. 4	Clifford Glowacki	Vice-President – Measurement Technologies / ISO Coordinator
	No. 5	Julie Glowacki	Associate ISO Coordinator
	No. 6	Pam Richmond	Controller
	N0. 7	Dennis Schuetzle	Vice President – Technology and Business Development
	No. 7	William Walden	President

These above mentioned personnel comprise the ISO Implementation Committee.

This manual outlines TECHNIKON, LLC's quality policies. It is based on the ISO-9001, 2000 quality standard and is intended to guide TECHNIKON, LLC's continuous improvement process.

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Clifford R. Glowacki
ISO-9001 Coordinator

First Published June 25, 2003

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C.2. Manual Review and Revision

The ISO Coordinator or Associate has the authority to issue and approve revisions of this manual. The manual will be reviewed at least annually in a manner selected by the ISO Coordinator. The requirements outlined in Section @@ govern the format and change/modification procedure for this manual.

Changes made to individual pages do not require reissue of the entire section. Each page will note the latest revision date. Changes will be identified by an (*) in the left hand margin. Hand written changes or updates are not permitted except in emergencies and only with the authorization of the ISO Coordinator. Dates and initials are required adjacent to those changes. Any suggestions for changes or modifications should be sent to the ISO Coordinator.

The ISO Coordinator sends out proposed changes for review to the ISO Implementation Committee and they will assess the effect, if any, these changes may have on their quality systems. Any change to this manual that affects the Quality System will be communicated back to the ISO Coordinator for resolution.

Identification of controlled and uncontrolled/obsolete documents may be found in @@@@ Section @@

C.3. Revision and review history

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See Critical Procedures Document @@@@@

D. TECHNIKON, LLC HISTORY

TECHNIKON, LLC was formed in 2000 to continue the research programs of two Cooperative Research and Development Agreements (CRADAs): the Casting Emission Reduction Program (CERP), and the American Industry/Government Emissions Research program (AIGER)

The Casting Emission Reduction Program was established to evaluate ways to reduce air emissions from foundry processes so the American metal casting industry can continue to deliver quality products while meeting clean air standards. The concept for CERP originated in 1994 as a collaborative effort between the private sector and the federal government. Parties to this agreement include U.S. automakers under the auspices of the U.S. Council for Automotive Research (USCAR) and the Department of Defense. Other CRADA partners directly supporting the project include: The American Foundry Society (AFS), the Casting Industry Suppliers Association (CISA), the US Environmental Protection Agency (USEPA), and the California Air Resources Board (CARB). CERP has developed or improved foundry processes and materials that allow the United States casting industry to remain competitive while working to achieve a near zero effect on the environment.

The AIGER program was started in 1992. The purpose of AIGER is to identify, encourage, evaluate, and develop the instrumentation and techniques needed to meet the requirements of the Federal Clean Air Act and California Health and Safety Code. Members of the AIGER consortium include the U.S. Environmental Protection Agency (U.S. EPA), the California Air Resources Board (CARB), and USCAR's Environmental Research Council (ERC). The mission of the AIGER program is to standardize mobile emissions measurement equipment, diagnostics, and procedures.

The CERP and AIGER CRADAs were combined under a single program manager in 1994. This consolidated management continued until July 2000 when the CRADA was transferred to the Army at the National Defense Center for Environmental Excellence (NDCEE) as part of the McClellan Air Force Base closure. Since then the CERP and AIGER CRADAs have been combined and CERP program management transferred to the Army's Industrial Ecology Center. Technikon continues to operate the CERP as well as conduct contract research and testing on a commercial basis..

E. INTRODUCTION

This manual defines TECHNIKON, LLC's management policies with regard to the application of quality systems in all areas and activities having an influence on quality of services and customer satisfaction.

This manual is a reference document outlining the policies of TECHNIKON, LLC and references to TECHNIKON, LLC's controlled procedures that comply with the ISO 9001:2000 standard. The specific ISO-9001 components are referenced in the column directly to the right of the quality statements in this manual.

Individual procedure reference numbers are quoted within the body of the quality manual and references will be made to areas where the procedures or records are located. (Also, refer to the Index located in Appendix I of this manual). This permits the revision of procedures in various work groups of TECHNIKON, LLC independent of the Quality Manual.

The Quality Manual and procedures of various work groups may contain specific procedures and references that are proprietary and, therefore, considered **Confidential**. Access to these documents will be granted only when authorized by the TECHNIKON, LLC President, Vice President, or the ISO Coordinator.
The "Scope of Registration" encompasses provision of a service of environmental research and laboratory testing including contract design of processes for chemical related industries.

The functions of the Quality Manual are therefore to

- Define TECHNIKON, LLC's policies regarding quality in a form directly related to ISO-9001-2000 and equivalent standards.

- Identify and reference the procedures and records that affect quality. Refer to Index located in Appendix I for specific records by TECHNIKON, LLC group.

- Act as the reference document for purposes of audit, management review and external assessment of TECHNIKON, LLC's quality program.

F. DEFINITONS

AIGER	American Industry/Government Emissions Research
CERP	Casting Emission Reduction Program
CRADA	Cooperative Research and Development Agreement
ERP	Environmental Research Council (of USCAR)
NDCEE	National Defense Center for Environmental Excellence
USCAR	U.S. Council for Automotive Research
IEC	Industrial Ecology Center

G. THE QUALITY MANAGEMENT SYSTEM

G.1 General Requirements	**ISO-9001 REFERENCE**
TECHNIKON, LLC will establish, document, implement, maintain, and continually improve its quality management system in accordance with the requirements of ISO 9001:2000. In order to implement our quality management system, TECHNIKON, LLC will carry out the following: • Identify the necessary processes needed for the system • Determine the proper sequence and interaction of the processes • Determine what is needed to ensure effective operations and controls • Provide the proper and necessary support information • Monitor the processes and work to achieve continual improvement These processes shall be managed in accordance with the requirements of ISO 9001:2000. See Critical Procedures Manual, "Customer Interface", CPM XXX, for the path a work order (test request, method development request, validation request, etc.) follows from its arrival at TECHNIKON, LLC until the resulting report is communicated.	4.1
G.2 General Document Requirements	**ISO-9001 REFERENCE**
TECHNIKON, LLC has a documented Quality System that supports the TECHNIKON, LLC Quality process. The quality management system documentation shall include: • The documented procedures as required by ISO 9001:2000 • The documents required by TECHNIKON, LLC to ensure that operations are carried out effectively and that all processes are appropriately controlled The documentation within TECHNIKON, LLC to control the quality system is arranged in four levels.	4.2 4.2

• Tier I is the Quality Manual that describes the TECHNIKON, LLC Quality Policy, the manner in which the Quality System is controlled and monitored through related documentation, and the overall organization and responsibilities for Quality within TECHNIKON, LLC. • Tier II contains the Critical Procedures that are pertinent to all groups within TECHNIKON, LLC. The procedures and responsibilities are described in detail and are the interface between the TECHNIKON, LLC Quality Manual and the individual group operating procedures, SOP's, policies and work instructions. • Tier III consists of the individual group's operating procedures/policies, standard operating procedures, and work instructions. These define in detail how each group within TECHNIKON; LLC performs operations that affect product quality. • Tier IV consists of all supporting forms, records and documents used by TECHNIKON, LLC, which may include, but are not limited to: purchase orders, maintenance, operating procedures, work instructions, training records, calibration data and certification, Complaint/Request for Action forms showing corrective actions, and preventive action documentation.	
G.3 Management Commitment	**ISO-9001 REFERENCE**
Technikon, LLC's Total Quality Management is a long-term commitment aimed at completely satisfying our customer requirements through a process of continuous improvement. To ensure the achievement of this goal, Senior Management will: 2 Communicate to the organization the importance of meeting both customer and regulatory requirements, 3 Establish the quality policy and objectives, 4 Conduct management reviews on a regular basis, and 5 Provide the necessary resources	5.1

G.4 Customer Focus	**ISO-9001 REFERENCE**
At Technikon, our goal is to achieve total customer satisfaction through a thorough understanding of our customers' expectations and requirements.	5.2

G.5 Quality Policy	**ISO-9001 REFERENCE**
Technician's Quality Policy as stated by the Technikon President is: "It is the policy of Technikon, LLC to provide services that will meet and exceed our customer's requirements of quality and reliability. We pledge to accomplish our quality objectives through the implementation of a documented Quality System consistent with the requirements of ISO 9001:2000. We will review and renew our Quality Policy on a regular basis, and ensure that the policy is properly understood and implemented by our employees. We will strive to continuously improve our processes and systems, and we will ensure the proper training of our personnel so that they may better serve our customers." This Quality Policy is controlled (see G.9.5)	5.3

G.6 Planning	**ISO-9001 REFERENCE**
G.6.1 Quality Objectives Statement In order to meet the objectives as stated in the Quality Statement, Technikon, LLC will • Establish metrics for measuring and documenting response to client requests including project cycle times. • Monitor and document communications to ensure that clients are aware of any project delays, • Maintain training and skills matrices to provide guidance on training needs, • Establish procedures for verifying and demonstrating the accuracy and/or precision of analyses, and • Establish procedures for validation activities and the criteria for acceptability.	5.4.1
G.6.2 Quality Planning Management is committed to planning and ensuring the availability of resources necessary for the achievement of the quality objectives. Quality planning encompasses resources, processes and improvement, and is documented to maintain the integrity and control of the Quality Management System.	5.4.2
G.7 Administration	**ISO-9001 REFERENCE**
G.7.1 General Administration of the Quality Management System is described below.	5.5.1
G.7.2 Responsibility and Authority Responsibility for quality is incumbent upon all employees. All employees are expected to: • Be thoroughly familiar with the Quality process • Make recommendations for improvements • Take advantage of opportunities for further training	5.5.2

• Recommend action to terminate incorrect processes or data • Communicate to management problems or suggested improvements • Comply with policies, systems and procedures defined in TECHNIKON's quality manuals	
G.7.3 Management Representative The current ISO-9001 management representative is the ISO-9001 Coordinator, who oversees the implementation and maintenance of the quality system. The ISO-9001 Coordinator reports to the TECHNIKON, LLC. President. There is an Associate ISO-9001 Coordinator assigned to assist the ISO-9001 Coordinator. The Coordinator/Associate Coordinator will monitor the Quality System for performance and possible improvements needed, and will provide that information to Management and employees.	5.5.3
G.7.4 Internal Communication Effective communication is recognized as being of paramount importance to the functioning of any organization; therefore, TECHNIKON, LLC management is dedicated to ensuring the on going, organization-wide communication of all aspects of operation. Tools for communication can include: • team briefings and other meetings • notice/bulletin boards, memos • electronic media, audio-visual media • regular staff meetings	5.5.4
G.8 Planning	**ISO-9001 REFERENCE**
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Tools for communication can include:

- team briefings and other meetings
- notice/bulletin boards, memos
- electronic media, audio-visual media
- regular staff meetings

G.9.5 Control of Documents — 5.5.6

Procedures, manuals, records, and completed forms that are requirements of the ISO Standard or of TECHNIKON's Quality Management System are controlled.

The Quality Management System documents shall be controlled through a documented procedure, outlined as follows:

- Ensure that documents are accurate before dissemination. Controlled documents will be reviewed and approved by authorized personnel prior to issuance.
- Review and update as necessary. Handwritten changes are not allowed except in emergencies and with proper authorization by the ISO Coordinator. Dates and initials are required adjacent to changes.
- Identify the current revision status.
- Ensure availability and legibility of current documents. The most recent version of appropriate documents will be available at work locations.
- Identify and control documents of external origin. Uncontrolled documents shall not be used within the Quality System except for training, distribution to customers, and draft revisions.
- Prevent the use of obsolete documents through careful

identification. All obsolete documents will be promptly removed.

The Document Control System is described in the Critical Procedures Manual, "Document Control", Document No. CPMXXX

Documents may be in either paper or electronic form.
Procedures are available for controlling revisions. (See Critical Procedure CPM,@@ Document Control). All revisions must also be approved by the ISO Coordinator or Associate.
The document itself must indicate its issue date as well as the date of the previous issue.

Additional information can be found in the Critical Procedures Manual, "Document Control", Document No. @@@@ and in each TECHNIKON Department's Procedures Manual.

G.9.6 Control of Quality Records 5.5.7

It is TECHNIKON's policy to establish and maintain procedures for the identification, collection, filing, storage, maintenance, and distribution of quality records. Quality records are used to document the effective operation of the quality management system and to provide for identification and tracking of events and materials leading to the quality of the finished product.

The Quality Management System records shall be controlled, and maintained to prove conformance. The identification, protection, storage, retrieval, retention time and disposal of such records will be controlled through a documented procedure.

Records are readily accessible and are stored either as hard copies or on electronic media.

Quality records are maintained for specified periods in order to permit retrieval, which could provide input for identifying trends and corrective action. Specific details for records, are listed in the Critical Procedures Manual,

"Document Control", Document No. CPM-@@
"Personnel Training", Document No. CPM-@@

"Corrective Action and Preventive Action, Document No. CPM-@@ "Internal Auditing", Document No. CPM-@@ "Customer Interface", Document No. CPM-@@ "Reports", Document No. CPM-@@ "Purchasing", Document No. CPM-@@ TECHNIKON, LLC will maintain records dealing with measuring and test status. See each group's policy and procedure manual for additional group record keeping.	
G.10 Management Review	**ISO-9001 REFERENCE**
G.10.1 Review Frequency The quality system defined in this manual will be reviewed at least annually by the TECHNIKON, LLC Management. Records of such reviews will be maintained. Reviews may include, but are not limited to, results of audits, corrective action plans, review of Complaint/Request for Action forms, preventive action items, and improvements needed to the Quality System and measurement indices. Quality Plans and the TECHNIKON, LLC quality policy as stated in 2.3 are reviewed for relevancy, suitability, and effectiveness. The results of Management Reviews will be recorded (per 5.5.7).	5.6 5.6.1 5.6.2
G.10.2 Review Responsibility Review Responsibility lies with the ISO Implementation Committee.	5.6.2
G.10.3 Input to Management Responsibility • Internal Audit Results - Audit Team Leader or ISO-9001 Coordinator • Customer Feedback & Corrective Action - ISO-9001 Coordinator • Process performance and report conformance – ISO-9001 Coordinator • Corrective and preventive actions status – ISO-9001 Coordinator • Status of previously instituted follow-up actions – ISO-9001	5.6.3

Coordinator
- Quality Manual, including any changes - ISO-9001 Coordinator
- Group Manuals, including any changes - Group Coordinators
- Quality Plans - ISO-9001 Coordinator and TECHNIKON, LLC President

G.10.4 Outputs from Management Review

- Improvements to be made to the Quality System and the related processes
- Improvements to be made relative to meeting customer requirements

H. RESOURCE MANAGENENT

H.1 Provision of Resources	**ISO-9001 REFERENCE**
TECHNIKON will provide in a timely manner the resources needed to continually implement and improve the Quality Management System processes and to ensure complete customer satisfaction. Each department within TECHNIKON shall set up its requirements for verification of their servicing process, and the adequate training needed to perform those services.	6.1
H.2 Human Resources	6.2
H.2.1 Assignment of Personnel Personnel performing assigned tasks shall be qualified on the basis of appropriate and applicable education, training, and/or experience. **H.2.2 Training, Awareness, and Competency** TECHNIKON will identify competency needs for all personnel. Each department within TECHNIKON has a documented system to identify training needs; appropriate records are maintained. All employees are expected to attend training sessions to foster continuous job performance improvement. Each department manager is responsible for the administration of the training program for that department. The effectiveness of the training provided will be evaluated and it will be ensured that all personnel are motivated to work toward the achievement of the quality objectives. Records of education, training, and qualifications for employment will be maintained.	6.2.1 6.2.2

H.3 Facilities	6.3
TECHNIKON will provide and maintain its facilities, including workspaces, equipment, and support services in the manner necessary to assure the conformity of our product.	
H.4 Work Environment	6.4
TECHNIKON will assure that the physical work environment and quality of personnel are conducive to the achievement of our quality goals.	

I. PRODUCT REALIZATION

I.1 Product Definition

The "product" supplied by TECHNIKON, LLC is defined as a report communicating test data and/or interpretive results. — 7.1

I.2 Planning of the Realization Process

Product realization is that sequence of processes and sub-processes required to achieve the product. In planning the processes for realization of product, TECHNIKON LLC shall determine the following as appropriate: — 7.1.1

- determine the quality objectives for the product, project, or contract
- establish processes and documentation
- provide resources and facilities specific to the product
- verify and validate activities and the criteria for acceptability
- determine the records necessary to provide confidence of conformity

I.3 Customer Related Processes

7.2

Identification of customer requirements

- determine requirements specified by the customer including availability, delivery, and support
- determine product requirements not specified by the customer but necessary for intended or specified use
- determine obligations related to the product, including regulatory and legal requirements

7.2.1

TECHNIKON, LLC has established and maintains documented procedures for contract review.

7.2.2

It is TECHNIKON's policy that contracts shall be reviewed both internally and with the contracting party as appropriate before implementation to ensure that the requirements are clear and fully documented and that resources for the testing/inspection are adequate. Any differences in contract interpretation are resolved before contracts are finalized.

If any contract needs to be amended after it has been finalized, the appropriate person responsible for performing the work will be notified, and the contract will be amended to include the changes. The changes can become part of the original contract, or a new contract may be written.	
Contracts within TECHNIKON, LLC fall into four classes: • Contracts with government entities • Contracts with private sector clients • Contracts with suppliers/vendors of materials • Contracts with suppliers/vendors of suppliers	7.2.2
See Critical Procedures Manual "Purchase Requisitions" Document No. CPM-@@@ for the processes used for Purchase Requisitions and "Customer Interface", Document no. CPM-@@ for the processes used for all other types of contracts.	
Customer Communication: TECHNIKON will identify and implement necessary arrangements for communication with customers relating to product information, inquiries, all aspects of contracts, order handling, and customer feedback. All such communication will be documented.	7.2.2
I.4 Design and/or Development	
Procedures will be described within TECHNIKON's documents to plan and control design and/or development of the product.	7.3

Design/Development Planning
• determine stages of design/development processes
• determine review, verification and validation activities appropriate to each stage
• determine responsibilities and authorities
  o The design process will be initiated by a department in TECHNIKON.
  o The department will identify the person(s) having the responsibility for implementation.
  o The person(s) initiating the design process will have the responsibility of maintaining the necessary documentation of the process.
	7.3.1

Design/Development Input: • determine functional and performance requirements • determine applicable regulatory and legal requirements • determine applicable information derived from previous similar design • any other requirements essential for design/development • review these inputs for adequacy; resolve incomplete, ambiguous, or conflicting requirements.	7.3.2
Design/Development Outputs (must be verifiable against the inputs) • must meet the design/development input requirements • must provide appropriate information for production/service • must contain or reference product acceptance criteria • must define the characteristics essential to safe and proper use • output documents shall be approved prior to release	7.3.3
Design/Development Review • evaluate the ability to fulfill requirements • identify problems and propose follow-up actions • review participants shall include representatives of functions concerned with design/development • review results shall be recorded	7.3.4
Design/Development Verification: Perform verification to ensure the output meets the design/development stage under review. Results of reviews and follow-up action shall be recorded.	7.3.5
Design/Development Validation: Validation shall be performed to confirm the capability of resulting product for intended use. Validation shall be completed prior to implementation or delivery of product; if full validation not possible, partial is to be done. Results of validation and follow-up action shall be recorded.	7.3.6
Control of Design/Development Changes Design/development changes are to be identified, documented and controlled, including evaluation of the effect of the changes on product. Changes to be verified, validated, and approved before implementation.	7.3.7

Results of review and follow-up actions shall be documented. Additional activities and criteria for design process can be found in the Critical Procedures Manual, “Design Control”, Document No. CPM@@	

J. MEASUREMENT, ANALYSIS, AND IMPROVEMENT,

J.1 Purchasing	**ISO-9001 REFERENCE**
J.1.1 Purchasing Control • Purchasing shall be controlled to ensure conformity to requirements. The type and extent of control depends upon the effect on subsequent realization processes and their output. • TECHNIKON shall evaluate and select suppliers based on their ability to supply products that meet our requirements. • Criteria for selection and periodic evaluation are to be defined, and results of evaluations and follow-up are to be recorded. • TECHNIKON supplies are purchased through the purchase requisition system . The initiator of the purchase is responsible for verification of proper receipt and evaluation of goods. See Critical Procedures Manual, "Purchasing", Document No. CPM@@	7.4.1
J.1.2 Purchasing Information Purchasing documents shall describe the product to be purchased and: • requirements for approval of product, procedures, processes, equipment, and personnel • quality management system requirements. • The adequacy of specifications in the purchasing documents must be ensured. • Records of initiated orders, purchased items and receipts are maintained in the management area, or electronically.	7.4.2
J.1.3 Verification of Purchased Product • TECHNIKON will identify and implement the activities necessary for verification of purchased product. • Verification at the supplier's premises is to be specified as to method and specifications in the purchasing information.	7.4.3

J.2 Production and Service	**ISO-9001 REFERENCE**
J.2.1 Operations Control Production and Service operations shall be controlled through: • availability of information specifying characteristics of product • availability of work instructions • use and maintenance of suitable equipment • use of measuring and monitoring devices • implementation of monitoring activities • use of defined processes for release, delivery, and post-delivery activities	7.5.1
J.2.2 Identification and Traceability • Identify the product (report) by suitable means throughout process operations • Identify status of the report respective to measurement/monitoring requirements • Control and record the ID of the report for tracing purposes	7.5.2 7.5.3
J.2.3 Customer Property • Customer owned property will be uniquely identified • The condition of customer property will be verified upon receipt • Customer property will be maintained in at least as received condition while in TECHNIKON's possession.	7.5.4 7.5.5
J.2.3 Preservation of Product • Conformity of product to customer requirements to be preserved including identification, handling, etc.	
J.2.4 Validation of Processes TECHNIKON shall validate processes where resulting output cannot be verified by measurement or monitoring, including processes where deficiencies show up after delivery of product. Validation will include: • qualification of processes • qualification of equipment and personnel • use of defined procedures/methodologies • requirements for records • re-validation	

J.3 Control Of Measuring/Monitoring Devices	**ISO-9001 REFERENCE**
J.3.1..Device Identification and Calibration/Verification Technikon shall perform necessary identification of test measuring/monitoring devices required to assure conformity to specified requirements. Measuring/monitoring devices shall be used and controlled to ensure consistent measurement capability per the measurement requirements. Where applicable, such devices shall: • be calibrated against internationally or nationally standardized devices, or lacking standards, the basis for calibration is to be recorded. • be protected from unofficial adjustments to invalidate the calibration • be protected from damage and deterioration during use or storage • be on record/documented as to calibration results • have validity of previous results reassessed if devices are out of calibration, and corrective action taken and recorded • Software used for monitoring/measuring of specified requirements is to be validated prior to use.	7.6

J.4 Planning	**ISO-9001 REFERENCE**
TECHNIKON will define, plan and carry out measurement/monitoring activities needed for conformity and continuous improvement. The activities shall consist of applicable methodologies, including the determination of the need for and use of statistical techniques.	8.1

J.5 Measurement and Monitoring	**ISO-9001 REFERENCE**
J.5.1 Customer Satisfaction TECHNIKON will monitor, according to predetermined methodologies, information on customer satisfaction/dissatisfaction as a means to measure the performance of the Quality Management System.	8.2.1
J.5.2 Internal Audits It is the responsibility of the ISO Coordinator to ensure that internal audits are scheduled, carried out, and documented, and that any necessary corrective action is successfully completed. Audits will be scheduled to access all of the TECHNIKON operations at least annually to determine whether quality activities comply with the quality plan. Employees trained to perform internal auditing, and not having direct responsibility in the areas being audited carry out the quality audits. The results of all audits are documented and brought to the attention of the TECHNIKON President and ISO Implementation Committee (see Section C.1) Any necessary corrective actions are reviewed, in a timely fashion, with the personnel having responsibility in the audited area. Follow-up action, including re-audit of deficient areas, will be taken where indicated. Corrective and follow-up actions will be appropriately verified and documented. Refer to Critical Procedures Manual, "Internal Auditing", Document No. CPM@@@ for the procedure for internal quality audits.	8.2.2
J.5.3 Measurement and Monitoring of Processes Each department within TECHNIKON shall identify and plan the servicing processes that directly affect quality. These processes will be found in individual department policies and procedures manuals and are to cover such items as (but not limited to) equipment maintenance, personnel training, work instructions, standard methods and calibration procedures. Realization processes necessary to meet customer requirements will be carefully monitored to ensure and confirm that each process is	8.2.3

performing satisfactorily. **J.5.4 Measurement and Monitoring of Product (Reports)** TECHNIKON shall monitor, at appropriate stages, the characteristics of our reports to ensure that all requirements are met. Evidence of conformity will be documented, and the series of signatures of approval for release of reports will be recorded. The release of reports is dependent upon the completion of the review signatures of approval, unless otherwise requested and approved by the customer.	8.2.4
J.6 Control of Nonconformity	**ISO-9001 REFERENCE**
TECHNIKON has established, documented and maintains procedures to identify any report not conforming to requirements, and to control such reports to prevent unintended use or delivery. This procedure is documented in the Critical Procedures Manual CPM@@@. Any report containing nonconforming information shall be corrected and re-verified to demonstrate conformity. Appropriate action will be initiated, as needed, regarding the consequences of the nonconformity.	

J.7 Analysis of Data	**ISO-9001 REFERENCE**
TECHNIKON shall provide for the collection and analysis of data to determine the effectiveness of the Quality Management System and to identify possible improvements. TECHNIKON recognizes that a variety of statistical techniques can be utilized for this purpose. Any necessary training in these tools and techniques will be provided as required. Also, each group within TECHNIKON has its own areas where statistical data are used to enhance testing quality. Data will be analyzed to determine: a) customer satisfaction/dissatisfaction b) conformance to customer requirements c) characteristics of processes and their trends d) suppliers Refer to group Tier III Manuals for further references to statistics and record keeping pertinent to statistics.	8.4

J.8 Improvement	**ISO-9001 REFERENCE**
J.8.1 Planning for Continual Improvement TECHNIKON shall manage and review the processes necessary for continual improvement of the Quality Management System. Continual improvement will be facilitated through use of: the quality policy, objectives, audit results, analysis of data, corrective/preventive action, and management review.	8.5.1
J.8.2 Corrective Action TECHNIKON has established procedures for identifying and eliminating the causes of non-conforming services, and evaluating the effectiveness of corrective action. Deficiencies in the Quality System are detected through audits and reviews, and are addressed by appropriate action plans, the results of which are tracked to completion and recorded. Periodic review by Management verifies the effectiveness of the corrective action plans, and ensures that nonconformities will not recur. Our goal is to initiate action that will avoid a recurrence, and to apply effective corrective action controls. All procedures impacted by the corrective action will be updated to reflect the changes, and will be reviewed for effectiveness.	8.5.2
J.8.3 Preventive Action In order to eliminate the causes and prevent the recurrence of nonconformities, TECHNIKON shall take corrective action appropriate to the impact of the problems encountered. The documented procedures shall include a) the identification of potential nonconformities and causes b) the determination of preventive action needed c) the documentation of the resulting action taken d) the review of the preventive action	8.5.3

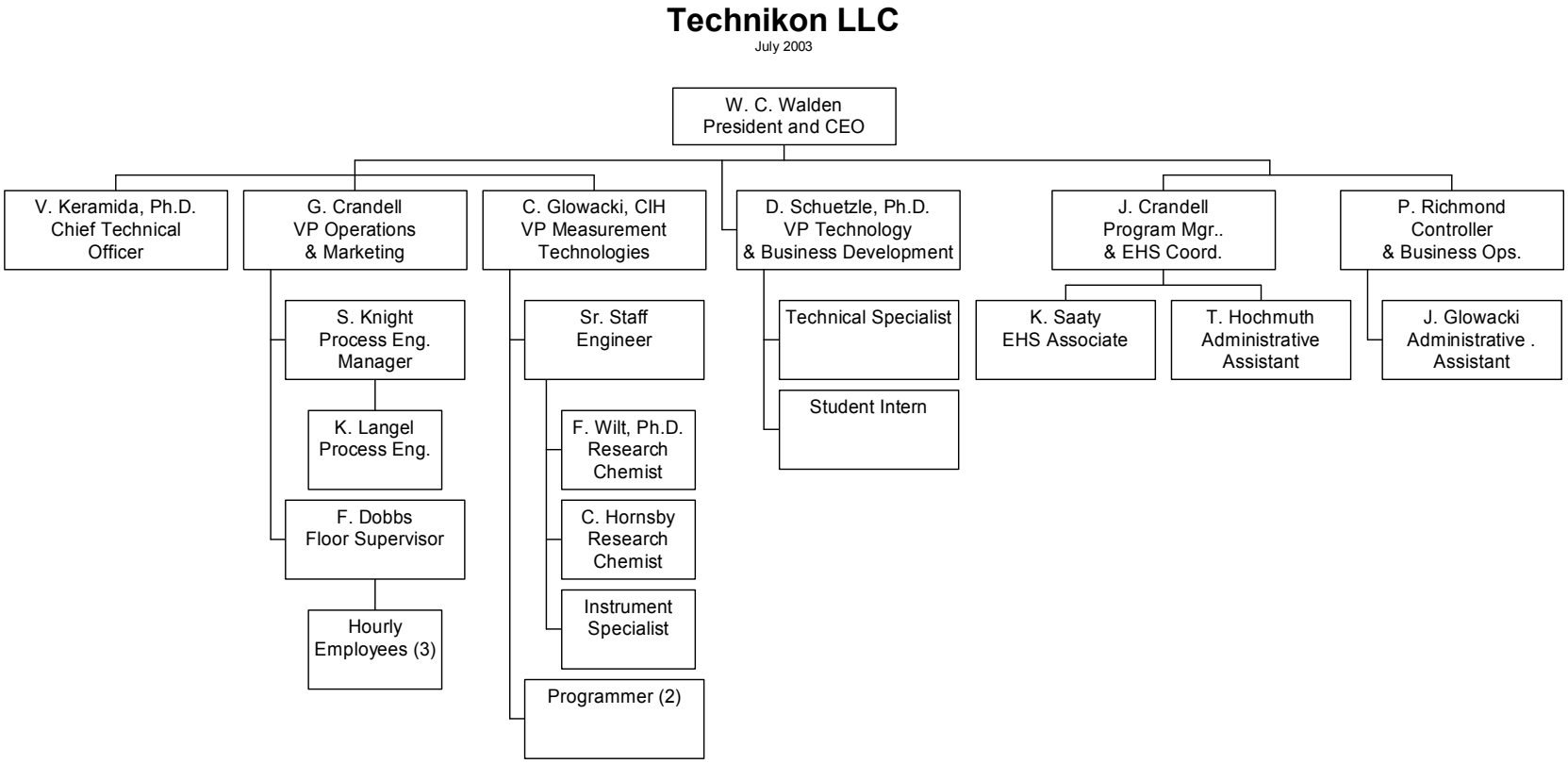
K. APPENDIX 1

- TECHNIKON, LLC ORGANIZATIONAL CHART
- INDEX OF DEPARTMENT MANUALS
- JOB DESCRIPTIONS WITHIN TECHNIKON, LLC

TECHNIKON, LLC

MANUAL TITLE			SECTION
QUALITY MANUAL			K
SECTION TITLE			ISSUE DATE
APPENDIX 1			8/1/03
APPROVED BY	PREPARED BY:	PAGE 34 OF 48	SUPERCEDES NEW

K.1. Technikon, LLC Organizational Chart



K.2. Index of Group Manuals

Group	**Document Numbers♦**	**Manual Location**
Critical Procedures Manual (CPM)	0001 - 999	See Master Distribution List in Master List Binder
TECHNIKON, LLC Forms Manual	See Table of Contents	See Master Distribution List in Master List Binder
Administration (AD)	1000 - 2999	See Master Distribution List in Master List Binder
Operations (OPS)	3000 - 5999	See Master Distribution List in Master List Binder
Measurement Technologies (MT)	6000 - 8999	See Master Distribution List in Master List Binder
Environmental Health and Safety (EHS)	9000 - 9999	See Master Distribution List in Master List Binder

Document numbers will be preceded by a Department or Descriptive letters, i.e.MT 7000 or CPM 0499

K.3. Job Descriptions

- **MANAGEMENT**

President, TECHNIKON LLC:

Has overall management responsibility for TECHNIKON LLC, encompassing all aspects of finance, projects, personnel, training, performance evaluation, planning, business and technology development, and strategic direction.

Reports to the TECHNIKON LLC Owner

Controller

The Administration Department reports directly to the Incumbent.

Reports to the President

Chief Technical Officer

Advised departments on technical issues.

Reports to the President

Vice President - Operations

The Operations Department reports directly to the Incumbent.

Reports to the President

Vice President - Measurement Technologies:

The Measurement Technologies Department reports directly to the Incumbent.

Reports to the President

Vice President – Technology and Business Development

The Technology and Business Development Department reports directly to the Incumbent.

Reports to the President

Program Manager

Manages the program aspects of major contracts. Responsibilities include coordinating responses to "Requests for Proposals", development and maintenance of project management tools such as Gantt charts, delivery of work products, and preparation of other materials such as meeting agenda as required by client,

Reports to President

ISO-9001 Coordinator:

Oversees the implementation and maintenance of the quality system through, but not limited to, reviews, audits and corrective action initiatives. Has the authority to maintain, issue and revise the Quality Manual and Critical Procedures Manual to comply with TECHNIKON operations and the ISO-9001 Standards.

Reports to the President.

Associate ISO-9001 Coordinator:

Performs all the duties of the ISO-9001 Coordinator in the absence of or at the request of the ISO-9001 Coordinator or his/her manager.

Reports to the President

- **ADMINISTRATION DEPARTMENT**

Controller

Has overall responsibility for financial matters including all aspects of accounting, payroll, equipment financing, contract billing and financial reporting, cash management, budget compliance, banking relationships, financial projections, and federal and state agency returns. Also responsible for human resources activities.

Reports to the President

Administrative Assistant

Responsible for the day to day payroll, accounts payable, cash disbursements, and human resources activities. Performs other activities as assigned by the Controller.

Reports to the Controller

Reception/Report Assembly

Responsible for upkeep of company contact lists, typing and filing outgoing correspondence, assembly and final formatting of all deliverable reports, and archiving, printing, and posting the reports on the public or private web site. Other duties include organizing and maintaining media file, and other duties as assigned by the Program Manager

Reports to the Program Manager

- **OPERATIONS DEPARTMENT**

VP – Operations and Marketing

Has overall management responsibility for the Production Department. Plans, schedules, and coordinates all production and equipment maintanence activities. Works with VP – Measurement Technologies to plan, schedule, and coordinate emission testing activities.

Reports to the President

Process Engineering Manager

Develops and controls all production processes for foundry operations. Coordinates the development of test plans and documents process data for all emission testing.

Reports to the VP – Operations and Marketing

Floor Supervisor

Supervises hourly technicians in performance of tests and foundry operations.

Reports to the VP – Operations and Marketing

Process Engineer

Coordinates production processes during emission testing. Verifies process data recorded by hourly technicians and enters data into emission test process tables.

Reports to Process Engineering Manager

Hourly Employees

Operate and maintain foundry equipment used in production and in emission testing.

Reports to Floor Supervisor

- **MEASUREMENT TECHNOLOGIES DEPARTMENT**

VP – Measurement Technologies

Responsible for the management of the Measurement Technologies department including personnel, budget, and technical direction. Works with the VP – Operations to plan, schedule, and coordinate emission testing activities. Collaborates with other members of the management team to initiate, conduct and complete projects. Reviews and approves technical reports for dictribution.

Reports to President

Senior Staff Engineer

Responsible for the design and development of test plans and test equipment. Participates in the conduct of tests, reviews raw and reduced data, and validates final results. Performs other functions as assigned by the VP – Measurement Technologies

Reports to VP – Measurement Technologies

Research Chemist

Responsible for test and/or sampling plan development, collection of samples, validation of contract laboratory data, sample analysis and method development, as needed. Function as a member of the Measurement Technologies team.

Reports to VP – Measurement Technologies

Technician

Responsible for the collection of samples, validation of real time data, and the generation of charts and tables, as needed. Also responsible for the operation, maintanence, and repair of on line instrumentation. Function as a member of the Measurement Technologies team.

Reports to VP – Measurement Technologies

Instrument Specialist

Responsible for the design, installation, and operation of aa validation site for on line instrumentation. Function as a member of the Measurement Technologies team.

Reports to VP – Measurement Technologies

Programmer

Develop custom software applications as needed by Technikon. Maintain the current Technikon IT system, as needed.

Reports to VP – Measurement Technologies

- **TECHNOLOGY AND BUSINESS DEVELOPMENT**

VP – Technology and Business Development

Responsibile for the development and implementation of technology programs in the areas of renewable and clean energy resources and low-cost, continuous emissions monitoring systems. Establishment of collaborative business partnerships with other organizations in support of these and other emerging technologies. Long-term corporate plans are developed with the objective of promoting new business opportunities and future sources of revenue streams.

Reports to President

Technical Specialist

Responsible for energy, environmental and economic life-cycle studies for evaluation of emerging energy technologies and metal casting operations. Assists with the establishment of new business opportunities for Technikon.

Reports to VP – Technology and Business Development

Student Intern

Performs various tasks as directed by the VP – Technology and Business Development

- **Environmental Health and Safety (EHS)**

EHS Coordinator
Responsible for developing and implementing the comprehensive Environmental Health and Safety Program, designed to achieve and maintain compliance with all applicable federal, state and local environmental, health and safety regulations and policies, including chemical use and storage, employee exposures, waste and water disposal.

Reports to President

EHS Associate
Implements the comprehensive Environmental Health and Safety Program, designed to achieve and maintain compliance with all applicable federal, state and local environmental, health and safety regulations and policies, including chemical use and storage, employee exposures, waste and water disposal.

Reports to EHS Coordinator

L. ATTACHMENT 1

L.1. ISO 9001 Standard (2000)