GPU Nuclear

AUDIT REPORT

Audit No. O-COM-90-13 Audit Dates June 28-29, 1990

Program/Activity Elsohly Laboratories, Inc. (ELI), Oxford, MS

PURPOSE:

Conduct an audit/investigation of Elsohly Laboratories, Inc., Oxford, MS to determine that appropriate controls have been established and implemented to provide satisfactory urine blind samples to support the GPUN Fitness-For-Duty program. The audit team will attempt to determine if blind samples from ELI are the source of false readings reported by biomedical laboratories.

ATTENDEES:

Name	Title	Representing
J. C. Cox (2)	Lab Technician	ELI
M. P. Craven (1,2,3)	Auditor	SCS
R. W. Ebert (1,2,3)	Technical Specialist	GPUNC
M. A. Elsohly (1,2,3)	President/Lab Director	ELI
B. H. Galloway (1,2,3)	Administrative Vice President	ELI
P. B. Magitz (1,2,3)	Audit Team Leader	GPUNC
C. Marti (2)	Lab Analyst	ELI
D. F. Stanford (2)	Assistant Director	ELI
V. L. Thompson (2)	Lab Technician	ELI

(1) - Attended Pre-Audit Conference (6/28/90)
(2) - Contacted During Audit (6/28-29/90)
(3) - Attended Post-Audit Conference (6/29/90)

SUMMATION:

Elsohly Laboratories, Inc. has established and effectively implemented a comprehensive program of procedures and controls to provide satisfactory urine blind samples and laboratory analysis. The program meets the letter and intent of FR-11970. It is implemented by a trained and motivated staff that is responsive to client needs. Based on data examined and processes observed, the audit team cannot attribute false readings reported by biomedical laboratories to blind samples supplied by ELI.

REFERENCE:

FR-11970, Mandatory Guidelines for Federal Workplace Drug Testing Programs

	Signature	Title	Date
Originator	P.B. Magitz	Audit Team Leader	7/18/90
Concurred By	Raymond S. Stanford	QA Audit Manager	7/20/90
Approved By	Raymond S. Stanford	Mgr., QA Prog. Dev. & Audit	7/20/90
Audit Package Complete	Philip B. Magitz	Audit Team Leader/Manager	7/20/90

N 5099 (02-88)

DETAILED DISCUSSION:

Certification:

The audit team examined certification documents to verify that Elsohly Laboratories, Incorporated (ELI) is appropriately certified to conduct laboratory analysis (and produce blind samples). Documents reviewed include a certificate from the College of American Pathologists (CAP) and a Clinical Laboratory License (No. 23-1025) issued on 7/1/89 by the Department of Health and Human Services for Toxicology and Urinalysis procedures. The audit team also examined NIDA letter dated 6/26/89 signed by Charles R. Schuster, Ph.D, Director, National Institute on Drug Abuse (NIDA) notifying Elsohly Laboratories of its meeting requirements. ELI is included under the current list of laboratories which meet minimum standards to engage in urine drug testing for federal agencies in Federal Register / Vol. 55, No. 46 / March 8, 1990. The audit team concluded that ELI is adequately certified.

Capability:

The audit team examined documents and equipment operating procedures to verify that ELI is capable of testing for at least the following five classes of drugs:

1) Marijuana
2) Cocaine
3) Opiates
4) Amphetamines
5) Phencyclidine.

ELI utilizes Syva Emit Screening Equipment for preliminary screening of urine samples. THC is tested using the Abbott TDx System. The TDx generates a calibration printout for operator verification. The laboratory also uses the Hewlett Packard 5970B MSD with 5890 Gas Chromatograph and UNIX Chem Station. There are operating procedures for these items of equipment. The audit team concluded that procedures and equipment are sufficient to test for the listed classes of drugs.

Personnel:

The audit team examined resumes and training documents to verify that ELI personnel meet the requirements of paragraph 2.3, FR-11970.

The position described as "Day-to-Day Management" is filled by M. A. Elsohly, Ph.D. He is responsible for assuring that adequate trained personnel and equipment are available, assuring that the laboratory has an up to date procedures manual, maintaining the laboratory's QA Program and taking remedial actions necessary to maintain satisfactory performance. Dr. Elsohly has a Ph.D in Pharmacy (1975) from the University of Pittsburgh. He has the necessary experience, training and certifications to meet the requirements.

The position described as ""Day-to-Day Operations and Supervision of Analysis" is filled by D. F. Stanford, M.S. This individual is responsible for day-to-day operations and supervises analysis. Mr. Stanford has a Masters Degree in Biological Scier , University of Mississippi. He has the requisite training and experience to fill this position.

Test validation responsibilities are shared between Dr. Elsohly and Mr. Stanford, who review all pertinent data and quality control results in order to attest to the validity of laboratory results.

Training files for a sample of three laboratory technicians were examined. All were trained in the equipment and analysis functions that they are responsible for. In all instances training records were signed by Dr. Elsohly.

The audit team concluded that personnel qualifications and training exceed the requirements.

Quality Assurance/Quality Control:

The audit team examined documents and interviewed personnel to verify that ELI has a documented program that encompasses all aspects of the laboratory analytical process. Procedural coverage was found to cover:

a. Chain of Custody
b. Security
c. Reporting of Results
d. Validation of analytical processes.

The document generally describing the laboratory program is the "Standard Operating Procedure for Quality Control Samples/Drugs in Urine; Preparation, Handling and Shipping". The document covers the range of activities: reagents, urine, reference compounds, urine solutions, certification, computer records, filling orders, storage, blank preparation and certification, QC sample preparation and certification, certification of analysis, specimen control and chain of custody. Implementing procedures have been issued to describe the activities described in section 2.5, FR-11970: analytical runs, initial testing, confirmatory testing, linearity of results and prevention of carryover of contamination between specimens. ELI participates in testing surveys by which the laboratory's performance is compared with peers and reference laboratories, see discussion on "Standard Requirements", following.

The audit team examined in detail the methods used at ELI to prepare quality control samples. While some details of this process are proprietary, the following description summarizes the highlights. All reagents used in the process are ACS or purified grade. Demineralized water is used in the preparation of aqueous solutions. The primary source of blank urine is from individuals in Dr. Elsohly's immediate family; other sources are employees and their families. Prior to use the urine is filtered through a 0.2 micron filter, screened by immunoassay testing at ELI and a second NIDA approved laboratory to confirm the absence of drug metabolites, and verified to be negative for the presence of HIV virus. Drug metabolites are obtained from

commercial suppliers such as Radian Corp., Research Triangle Institute, and Altech Inc. along with certificates of analysis indicating the purity of the material. Based on the purity, a calculated weight of drug metabolite is dissolved in a suitable solvent and diluted to known volume to prepare a stable stock solution with a specified metabolite concentration. A calculated volume of the stock solution is then spiked into blank urine with a graduated pipet to prepare a batch of positive quality control sample having a target concentration at least 150% of the metabolite cutoff level. Between 1 and 100 liters of quality control sample as prepared in each batch although 4 liter batches are most common. Each batch is identified by a unique number and prefix. The prefix indicates whether the batch is positive or negative and, if positive, which is checked to ensure it falls within the range expected for normal human urine.

Following the preparation just described, positive batches are analyzed by immunoassay and GC/MS analysis at ELI and at another NIDA certified laboratory. Negative batches are analyzed in a similar manner, however only immunoassay screening is performed. If analysis results from ELI and the second laboratory agree within +/- 20%, the batch is accepted and stored in a 1 gallon carboy in a refrigerator. To fill a client's order, sample is poured from the carboy into 2 oz plastic bottles. Each bottle is labeled with a fictitious, name and social security number, which is randomly generated by a computer. Samples are only poured from a single batch at any one time. An additional bottle is always filled and tested by immunoassay screening to confirm that the correct batch was used and that no degradation occurred in storage. The audit team perceives that this is an excellent practice. In addition, a portion of each batch is retained for at least thirty days to resolve any discrepancies that may arise when clients submit the blind samples to vendor laboratories for analysis.

Overall the audit team concludes that ELI has an effective, well documented program for preparation, handling, and distribution of quality control samples. The program has excellent controls to ensure samples shipped to clients are prepared correctly and contain certified concentrations of the appropriate drug metabolites.

Security and Chain of Custody:

The audit team examined facilities, interviewed personnel and reviewed documents to verify that ELI meets the security and chain of custody requirements of Section 3.8, Subpart C, FR-11970. The current authorized access list to the laboratory area was signed by Dr. Elsohly 5/24/90 authorizing seven persons unescorted access to the laboratory area. The audit team noted that two new employees who have unescorted access to these areas were not on the authorization list. The authorization list was immediately corrected. An access log is maintained in a bound book with unnumbered pages has entries dated from 7/16/86 to the present. The book is maintained in the controlled area. Since 1/90 there have been 101 "visitor" entries. Of these,

two had no "time in" documented and three did not specify the purpose of the visit. The audit team considers that these are isolated occurrences, the indications were called to the attention of laboratory supervision and the Administrative Vice President. Chain of custody forms are used to maintain control and accountability of samples processed by the laboratory. The audit team did not identify any discrepancies regarding chain of custody. The audit team concluded that ELI meets the security and chain of custody requirements specified in Section 3.8, Subpart C, FR-11970.

Documentation:

The audit team examined documents and interviewed personnel to verify that ELI maintains and makes available for at least two years documentation in accordance with Section 2.4(m), FR-11970. Standard Operating Procedure, "Data Review and Reporting" adopted 4/22/88 with latest version dated 9/13/89 states on page 4, "Data Storage, ...Data will be stored for a minimum of two years." The audit team examined documentation of GPUN batch #02290A, shipped on 4/3/90 showing positive for cocaine at 1130 ng/ml. Lab Acc #AB373 recorded on the chain of custody form dated 2/22/90, which is the same day the substance was tested shows no deviation greater the 14 ng/ml. The sample was removed from temporary storage on 2/26/90 for GC/MS testing. The GC/MS data confirmed the analysis and was found under the correct batch number, 02290A/Acc #AB373. Other documentation examined includes personnel files, see "personnel", preceding, Procedures Manuals, see "QA/QC", preceding, test and performance data, see "Standard Requirements", following. The audit team found that documentation is complete and retrievable.

Standard Requirements:

The audit team examined documentation and interviewed personnel to verify that performance testing is part of the continuing assessment of ELI laboratory performance. Performance testing is conducted by the Research Triangle Institute (RTI) for NIDA. ELI also participates in a round robin evaluation program through CAP. ELI is properly participating in a program of continuing assessment of laboratory performance. Laboratory procedures for performance tests and routine tests are the same procedures. The assessment includes blind performance tests.

Performance Test Specimen Composition:

The audit team examined performance documentation to verify that performance test specimens contain those drugs and metabolites which the laboratories must be capable of assaying in concentration ranges that allow detection by commonly used techniques. Performance test specimens were found to be spiked with the following drug classes and their metabolites:

Marijuana
Cocaine
Opiates
Phencyclidine
Amphetamines.

All concentrations were set at least 20% above the cutoff limit. Blank samples contain less than 2 ng/ml of the target drugs.

Evaluation of Performance:

The audit team examined in detail NIDA test reports to verify that ELI maintains a satisfactory level of performance as defined in paragraph 3.19, FR-11970. The requirement is that a laboratory must maintain a grade of 90% on any required performance test; i.e., identify 90% of total drug challenges. Scores received by ELI during the last five cycles of performance testing are as follows:

10 Nov 89	100%
13 Dec 89	100%
12 Feb 90	100%
11 Apr 90	96.7%*
20 Jun 90	93.3%*

*NOTE: ELI management perceives that RTI is experiencing computer problems, and that these results are lower than actually realized efficiency. Based on the practices and data examined, the audit team is sympathetic to this perception.

Performance comparison conducted under the auspices of CAP indicate that ELI results are within one standard deviation of 182 laboratories.

The rule requires that laboratories quantitate 80% of total drug challenges within +/- 2 standard deviations of a calculated reference group; quantitate all challenges within 50% of the reference group mean; and that laboratories detect and quantitate 50% of the total drug challenges for any individual drug. ELI results are well within these performance indicators on every comparison.

Additional Requirements:

The audit team examined in detail four laboratory procedures to verify that they include the requirements specified in Section 2.4(n)(1), FR-11970. In all instances the procedures included:

+ principles of the test
+ preparation of reagents
+ standards and controls
+ Calibration procedures
+ derivation of results
+ linearity of methods
+ sensitivity of the method
+ cutoff values
+ reporting mechanisms
+ criteria for unacceptable results
+ remedial actions
+ reagents and expiration dates.

The audit team verified that drug standards are properly labeled as to content and concentration; and that labels are marked with the following information:

+ when received
+ when prepared
+ when placed in service
+ expiration date.

Volumetric pipettes and measuring devices were found to be certified for accuracy, traceable to the National Institute of Science and Technology (NIST) through supplier certifications. ELI is in the process of securing an independent service for calibration of their analytical balances. Non of the observed instruments had exceeded the calibration interval requirements.

Packing, Shipping and Storage:

The audit team reviewed documents, witnessed operations and interviewed personnel to verify that ELI procedural requirements are implemented for packaging, shipping and storage. The ELI Packaging and Shipping Checklist dated 4/3/90 indicates 12 areas requiring signature by the individual preparing the sample for shipment and the reviewer. The audit team examined Federal .. Express shipping receipt No. 2695279403, dated 4/3/90. The aliquot verification form dated 4/3/90 for batch #022090A showed that it was tested immediately prior to shipment.

The audit team observed the lab technician completing a shipping form for a shipment to BG&E. The order consisted of 80 negative samples and 20 positive, fortified samples. The packaging checklist was being properly completed to document each sequential step completed. Names with social security numbers were affixed to each container with a label attaching from the cap to the container. The audit team observed the entire process from preparation of the aliquot to packaging for shipment. An aliquot from this batch will be tested to confirm drug concentration prior to actual shipmentof the blind samples.

Both frozen and refrigerated samples are kept in unlocked freezers or refrigerators in the QC Lab. The QC Lab is not alarmed and access is possible through two windows from the outside as well as from the interior hall. Prior to completion of the audit, ELI issued Purchase Order #026990 to J&H Locksmiths to extend the alarm system to the QC Lab.

Packaging/shipping constraints observed include the requirement that only one batch of one client's order is processed at a time. Aliquots prepared during packaging are assayed by immunoassay to insure correct labelling. Results are reviewed by a certifying agent. If shipment is not made on the same day that samples are prepared they are refrigerated. Packages conform to federal regulations for shipment of urine samples. Each container is packed with absorbent material. Photocopies of signed certificate of analysis/specimen control log/chain of custody are maintained for traceability.

Internal guidance states that positive batches may be stored at 2° C to 8° C for three months or at -10° C to -20° C for one year. This is consistent with stability studies.

Fictitious names and social security numbers are derived from three data bases:

1. first names
2. last names
3. social security numbers.

Fictitious combinations are derived via a random generator using these data bases. The audit team believes that the possibility of duplicating an actual combination of first name, last name and social security which could cause confusion between an actual specimen and a blind sample is highly remote.

Stability Study:

ELI has conducted stability studies for quality control samples containing metabolites of marijuana, cocaine, opiates, amphetamines, and phencyclidine. The results of these studies show that quality control samples are stable for at least one month. A procedure, "Blind Quality Control Specimens - Stability Study" prescribes the process. Controls exercised include container preparation and labelling, batch control and identification, Stability control testing and sequencing, Chain of custody and records requirements. The audit team examined in detail data from batch #122589A, THC metabolite/urine. data indicates that the metabolite is:

+ stable at room temperature for one month
+ stable when refrigerated for at least three months
+ stable when frozen for more than four months*

*NOTE: Stability study of the frozen batch is continuing.

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AUDIT NOTIFICATION

Date: June 8, 1990
6161-90-0112

To: Elsohly Laboratories, Incorporated
1215-1/2 Jackson Avenue
Oxford, MS 38655
Attn: Ms. Bettye Galloway
Vice President

Subject: Notification of GPUNC-QA Audit O-COM-90-13

Project: Oyster Creek/TMI

Contract No: TP085999

Dear Ms. Galloway:

The following information pertains to the audit we plan to conduct on June 28-29, 1990.

Audit Team Leader: P. B. Magitz (201) 316-7101

Audit Team Members: M. P. Craven (SCS)
R. W. Ebert (TS)

Date of Pre-Audit Conference: June 28, 1990

Location of Pre-Audit Conference: Elsohlay Laboratories

Scope of Audit: Verify that appropriate controls have been established and implemented to provide urine blind performance samples.

Anticipated Completion Date: June 29, 1990

Any questions concerning this audit shall be transmitted to the Audit Team Leader.

Very truly yours,

D. L. Herfel
Director, Materials Management

DLH/PBM/dcr

cc: Attached

N65073 (11-86)