U. S. NUCLEAR REGULATORY COMMISSION
REGION I

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Licensee: Teledyne Isotopes, Inc.
50 Van Buren Avenue
Westwood, New Jersey 07675

Facility Name: Teledyne Westwood Laboratories

Inspection At: Westwood, New Jersey

Inspection Conducted: July 12-14, 1988

Inspectors: Laurence F. Friedman — 9/7/88
Laurence F. Friedman, Ph.D., C.H.P. — date
Senior Health Physicist

Theodore A. Rebelowski for ARK — 9/14/88
Aristidis G. Krasopoulos — date
Reactor Engineer

Theodore A. Rebelowski — 9/14/88
Theodore A. Rebelowski — date
Senior Reactor Engineer

Laurence F. Friedman — 9/16/88
Walter V. Thomas, Radiation Specialist — date

Joel D. Kinneman — 9-16-88
Shawn Googins, Health Physicist — date
U. S. Environmental Protection Agency, Region II

Approved by: Joel D. Kinneman — 9-16-88
John D. Kinneman, Chief — date
Nuclear Materials Safety Section B

Inspection Summary:

Special, Announced, Safety Inspection Conducted July 12-14, 1988 (Combined Inspection Report Nos. 030-05218/88-001, 030-05219/88-001, 030-08681/88-001, 030-14482/88-001, 040-08413/88-001, 070-00124/88-001

Areas Inspected: Special announced inspection by a team composed of NRC Region I and EPA Region II personnel to review conditions at the licensee's facility to determine whether there are potential safety hazards that, when combined with routine facility operations, could impact on public health and safety.

Results: No violations of NRC requirements were identified. Thirty-four recommendations to improve safety conditions at the facility were made based on observations during the inspection. The recommendations appear throughout the report, and are summarized in Section 9.

DETAILS

1. Persons Contacted

1.1 Teledyne Isotopes, Inc.

*Dr. Donald F. Schutz, President
*Eugene O'Brien, Vice-president, Administration and Finance
*Steven A. Black, Manager, Radiological Services, Radiation Safety Officer (RSO)
*Jeffrey Guenther, Alternate Radiation Safety Officer
Michael Vala, Health Physics Technician
Lewis Cassabona, Manager, Mass Spectrometry Services
Les Sine, Manager, Crystals
Barbara Campbell, Manager, Quality Assurance
Betty Demos, Personnel Director
Robert Pavese, Manager, Building Services
Hector Martos, Radwaste Supervisor
Andrew Carmichael, Laboratory Supervisor
James Buckley, Laboratory Supervisor
Linda Tyndall, Laboratory Supervisor
Mike Zyberg, Lessee of laboratory space (non Teledyne employee)

*Present at the entrance and/or exit interviews

1.2 State of New Jersey

John Feeney, Radiation Physicist
Bill Csaszar, Radiation Physicist

Personnel from the State of New Jersey conducted an independent inspection and will submit an independent report to the licensee.

2. Background

As a result of the accident involving the release of uranium hexafluoride from Kerr-McGee's Sequoyah Fuels facility in Gore, Oklahoma, on January 4, 1986, the NRC decided to conduct an operational safety review at selected major fuel cycle and materials facilities.

The operational safety review is designed to evaluate existing conditions at each facility and to determine whether there are potential safety hazards that, when combined with facility operations, could impact upon public health and safety. Further, the review will assist the NRC in determining if additional license conditions are needed to minimize such impact. During each review, the review team determines whether the licensee has systems and procedures in place to identify and correct in-plant industrial safety problems that could result in radiological safety consequences, and determines whether the licensee is adequately implementing existing procedures to prevent or mitigate such problems. The areas reviewed included personnel training, waste management, and facility operations, and encompassed procedure control, equip-

ment maintenance, non-radioactive chemical control, fire protection, and emergency planning. Upon completion of the review, based upon observations made during the review, recommendations were made to the licensee. Those observations and recommendations will also be considered by the NRC for the purpose of effecting program changes.

## 3. Organization and Scope of Operation

### 3.1 Physical Facility

Teledyne Westwood Laboratories is housed in three buildings. The main building is a 47,000 square foot ($ft^2$) wood-frame structure, with concrete fire walls which divide the building into six areas.

The crystal-growing operation is housed in a smaller building directly behind the main building, half of which is leased for the crystal operation. The other half of this building is not used by Teledyne. The building is of cinder block or concrete block construction.

The waste-compactor facility is housed in a warehouse which is a former garage one block from the main building. The building is of cinder block or concrete block construction.

Teledyne Westwood Laboratories is located in a small urban industrial area, but private residences are located a few blocks from the facility. The facility is located far enough from railroad tracks and highways to be relatively safe from the effects of transportation accidents.

### 3.2 Product Lines and Support Services

Teledyne Isotopes, Inc., Westwood Laboratories, is a wholly-owned subsidiary of Teledyne, Inc. The Westwood Laboratories ("licensee") is organized along product lines. An organizational chart with the names of responsible individuals, current as of December 21, 1987, is included as Attachment 1.

#### 3.2.1 Environmental Analysis

This department analyzes environmental samples in support of reactor environmental monitoring programs. This is the licensee's main activity. This department also analyzes samples from within reactors, including gas samples. Other activities are radon analysis and analysis of environmental TLD's.

This department also conducts analyses of nuclear fuel for quality assurance and material accounting purposes.

Another function of this department is the TeleTrace program which involves field-flooding to assist in secondary recovery from oil wells.

The Environmental Analysis Department also does radiocarbon, potassium-argon, and rubidium-strontium dating of biological materials and minerals.

3.2.2 Mass Spectrometry Services

This department provides mass spectrometry services to other departments. One of its functions is to determine the enrichment of nuclear fuel by analyzing for uranium-235.

The Precious Metals Recovery Area is included in this department. This area receives laboratory ware made of precious metals, usually platinum, from customers who have used it to process radioactive material, usually transuranics. The precious metal is refined and purified of the contaminants, and returned to the customer.

3.2.3 Radiological Services

The licensee is a radioactive waste broker. Radioactive waste materials are collected from waste-generating institutions, and are shipped to disposal sites. Some waste is compacted and repackaged at the licensee's facility. This operation is conducted in a separate building within a block of the licensee's main facility.

This department also decommissions radiologically contaminated facilities under contract, and provides other health physics services to customers. These include calibration of radiation detection instruments and x-ray equipment, leak testing of sealed sources, and bio-assays.

The Radiological Services Department also furnishes health physics support for TeleTrace (see above) at remote sites.

In addition, this department also is responsible for the radiation safety, industrial safety, fire safety, and emergency planning at the facility, as discussed below.

3.2.4 TLD/Nuclear Instruments

The licensee manufactures and distributes thermoluminescence dosimetry systems, including the manufacture of instruments and some of the phosphors. In addition to selling readout systems, badges, and phosphors, the licensee operates a TLD badge service.

3.2.5 Crystals

The licensee grows thallium-activated sodium iodide [NaI(Tl)] crystals for use as radiation detection scintillators. This operation is housed in leased space in a building located directly behind the main building.

3.2.6 Administration and Finance

This department comprises Personnel, Purchasing, Accounting/Payroll, Building Services, and Computer Services. The Personnel Department maintains accident reports as one of its duties. Building Services is responsible for making any building modifications requested by the Safety Committee or Radiation Safety Committee.

3.3 Safety Operations

According to licensee documents incorporated in the NRC license, the licensee's radiation safety program is overseen by the Radiation Safety Committee. Donald F. Schutz, the facility President, is Chairman of the Committee. The Committee reviews applications for and approves uses of radioactive materials under the licensee's six NRC licenses. Steven A. Black, Manager, Radiological Services, is Radiation Safety Officer.

In June 1988, the licensee issued a Safety Manual covering all aspects of non-radiological safety. It is eight pages in length, and includes the facility evacuation plan. Mr. Black was responsible for drafting this document.

Licensee representatives stated that, approximately two years ago, the licensee established a Safety Committee to oversee nonradiological aspects of safety at the facility. Mr. Black was made chairman of this committee.

According to a resume he supplied, Mr. Black has the following responsibilities:

- Operational control of the Health Physics and Radioactive Waste product lines
- Determining prices, preparing bids, designing brochures
- Maintaining the chemical inventory
- Proper hazardous waste disposal
- Radioactive and hazardous materials shipping compliance
- Compliance with NJDEP Divisions of Air and Water Quality regulations
- Compliance with and maintenance of six NRC licenses
- Compliance with and maintenance of Illinois and New Jersey licenses for use of radioactive material
- Implementing the Right-to-Know program for employees and emergency service personnel

Computerization of all facets of the business
Preparing and updating employee evacuation plans
Safety orientation training for all new employees
Leading the fire brigade and liaison with local fire department.

The inspector interviewed Mr. Black and determined that, while Mr. Black's knowledge of radiation safety is extensive, he has minimal formal training in industrial safety and fire protection. Further, it was apparent that Mr. Black was not familiar with available codes and guidance in these areas, and was not aware of what literature existed or where it could be obtained.

The inspector recommended that the licensee reassess the training and time needed to perform the duties of Industrial and Fire Safety Officer.

The inspector reviewed internal memoranda between Mr. Black and the Building Services Manager, and reviewed minutes of meetings of the Safety Committee. From these reviews, and interviews with licensee personnel, the inspector determined that safety related tasks had not been performed (e.g., identification of electric switches and receptacles with circuit breakers), or had been delayed (e.g., inspection of safety showers), due to division of responsibility between Radiological Services and the Building Services Department, undermanning of the Building Services Department, and assignment of other priorities by management.

The inspector recommended that licensee management assure by exercising its supervisory function and by clearly articulating its commitment to safety that all safety-related work is performed in a timely manner. This includes assuring that adequate manpower is available

4. Fire Protection

4.1 Crystal Building and Warehouse

This phase of the inspection focused on identifying possible fire hazards, a review of established fire prevention measures, and the methods of fire detection and fire suppression used.

As indicated in 3.1 above, the licensee's facility is composed of three buildings. The main building, which is approximately 47,000 $ft^2$, and two smaller buildings, the crystal-growing building and the warehouse that houses the waste-compactor facility. The inspector observed that the two smaller buildings did not represent a fire protection concern because they are constructed of concrete block and they contain minimal amounts of combustibles. Any combustible material in the warehouse was contained in 55-gallon metal drums and was protected by an automatic carbon dioxide ($CO_2$) fire suppression system. The combustibles in the crystal

building were limited to small amounts of cable and wire insulation contained in or associated with the electronic controls of the crystal-growing furnaces.

In the waste compactor building the inspector noted that there were unsealed penetrations in the walls, the overhead garage door was broken in several places, and the garage door had no gasket on the bottom. These gaps could reduce the effectiveness of the $CO_2$ fire suppression system.

The inspector recommended that the licensee repair the gaps in the walls and garage door, and install a gasket on the bottom of the door.

4.2 Main Building

4.2.1 Housekeeping Conditions

Every laboratory visited in the main building contained supplies of cardboard boxes which, according to licensee personnel, represented more than a year's supply. In several areas these boxes and other combustibles were piled high on racks creating not only a fire hazard but also a personal safety hazard. In the loft above the Precious Metals Recovery Area, loose combustibles in the form of cardboard boxes, pump and fan oil, and hanging plastic sheets were observed. Flammable solvents were stored under tables in laboratories in the five-gallon drums in which they were delivered. Empty drums, which formerly contained volatile organics, and which can be more dangerous than full drums, were found in many laboratories.

The inspector recommended that the storage of combustibles in the facility be limited as much as possible, and housekeeping be improved generally. Flammable liquids should be stored in laboratories in safety cans with flame arrestors. Bulk storage of flammables should be in remote and fireproof areas. The inspector recommended that only enough combustibles for current needs be stored in laboratories.

The welding area in the machine shop, currently not in use, is not sufficiently enclosed to prevent sparks or hot particles from reaching combustibles in the surrounding area during welding operations.

The inspector recommended that fire protection in this area be improved before the welding area is put back in operation.

In the Precious Metals Recovery Area, the inspector found the following situation that could present a fire hazard.

A glove-box train composed of five compartments is located in this area. In the middle compartment is an induction furnace where the metals are fused and separated. This compartment is separated from the adjoining compartments by sliding fire doors. These fire doors, which are operated pneumatically, are opened or closed by the action of a lever. If this lever were accidentally actuated when the metals were being heated, and the doors opened, the heat from the furnace could ignite the plastic or rubber in the adjacent glove box, causing a breach of the radiological contamination barrier. There is no provision for suppressing a fire in the glove boxes.

The inspector also observed that some of the gloves on the glove boxes were pulled out of the boxes and tied when not in use but that others were not. It is the opinion of the inspector that allowing gloves to be pulled into the glove boxes presents a hazard in that gloves pulled into the box by reduced pressure may inadvertently strike objects in the box which may be upset, or may be hot enough to ignite the gloves.

The inspector recommended that the controls be modified on the glove box fire doors to prevent accidental opening during furnace operation. Interlocks should be provided that will assure that water is flowing in the box jacket during furnace operation. Procedures should be instituted to assure that gloves are not pulled into boxes when not in use. The licensee should consider methods of suppressing a fire in the glove box train.

The inspector observed that the duct leading from the furnace glove box passed close to the wood of the loft floor and was in contact with paper covering this floor. The duct also passed within a few inches of plastic sheet hung in the loft. If the duct became sufficiently hot during melting operations, it could set fire to any of these materials.

Licensee representatives agreed to correct these conditions before operations were resumed in the precious metals recovery area.

4.2.2 Fire Prevention Measures

Fire prevention measures usually include the conscious and systematic limiting and controlling of the amounts of combustibles present, controlling ignition sources, and the creation of awareness (through training) of fire hazards and the consequences of fires.

Limiting the amounts of combustibles was discussed above under "Housekeeping" and was identified as an area of weakness in the licensee's safety program. With regard to control of ignition sources, the inspector observed that most of the laboratory work taking place at the licensee's facility does not use hot processes, although some use of heat guns and soldering equipment was noted. The program would be improved by additional fire awareness training for all employees. Present training is infrequent and sporadic. The inspector noted that smoking is not permitted in the facility except for a few, limited areas.

Licensee representatives stated that the roof material, which was observed by the inspector, has a flash point of 500 degrees F.

The inspector recommended that the licensee review the impact of low-flash-point roofing material on the safety of the building in the event of a fire.

The inspector observed that two areas which contained gas water heaters had no method of monitoring for gas leakage or accumulation in the area surrounding the heater, and had other sources of ignition present. Other areas of the building contained gas piping and gas meters with no provision for detecting a leak, such as a device that would alarm on high gas flow. The inspector also observed that the ceiling was not protected where the chimneys from these heaters passed through.

The inspector recommended that the licensee install sleeves around chimneys from gas heaters where they penetrate the ceiling and install gas monitors in areas where gas water heaters and other gas-related equipment are installed. The inspector recommended that the licensee consider the installation of other gas leak detection equipment.

4.2.3 Fire Detection

A fire detection system has been installed in the majority of the laboratories and corridors using smoke and heat detectors, but some laboratory and office areas do not have detectors. Licensee personnel stated that there had been no rationale for the inclusion of some offices and corridors but not others in the fire-protection system. Licensee representatives also stated that the system was designed and installed by individuals who did not have special competence or training in fire protection. The system is tested annually by a contractor.

Licensee representatives stated that the system is monitored by the alarm company, which summons the local fire department when an alarm is received. An evacuation alarm is sounded in the building at the same time. Pull boxes throughout the building perform the same function.

In the machine shop the detector was not installed in accordance with NFPA Standard No. 72 in that the detector was mounted more than 12 inches from the ceiling.

The inspector recommended that the fire detection system be reviewed to assure that it complies with NFPA guidance, and that the system be modified if necessary.

4.2.4 Fire Suppression

The main building is constructed with concrete fire walls, dividing the building into six fire areas. The balance of the building is wood frame construction and the roof is not fire resistant. In order to perform their function of preventing the propagation of a fire from one fire area to the next, these fire walls must be provided with doors with at least a 1.5 hour fire rating which are maintained normally closed or close automatically. Fire doors were observed to be missing or to have been replaced with wooden doors. Licensee representatives were uncertain whether or not ductwork which penetrated the fire walls was equipped with fire dampers.

The inspector recommended that fire barriers be improved, particularly by the installation of fire doors, to assure that a fire, once started, is confined to one area. The inspector further recommended that ductwork penetrating fire walls be surveyed, and fire dampers installed where needed.

The licensee does not have an automatic fire suppression system in the main building. The suppression methods relied upon are portable extinguishers located throughout the facility (for use by plant personnel or the facility fire brigade to fight fires in the incipient stage) and the local fire department. There are no hose stations and no standpipe system. Licensee representatives stated that they hold training for the local volunteer fire company every three years and that the fire department response time is three to five minutes. The inspector noted that a fire hydrant was located just behind the building.

The inspector reviewed the March 1987 and March 1988 reports of annual safety surveys performed by the licensee's insurance carrier. In both reports the insurance company

recommended that the licensee install an automatic sprinkler system.

A local Halon suppression system installed in the loft above the precious metal recovery laboratory would, in the opinion of the inspector, be ineffective in suppressing a fire originating near the filter train equipment. The volume of Halon provided is insufficient for the size of the room and the fusible metal release on the Halon tanks probably would not trigger in time to be effective in extinguishing a fire.

It is the inspector's opinion that, in the absence of an automatic fire suppression system, with the amounts of combustibles present, unless the local fire department responds promptly, a fire that gets beyond the incipient stage would probably result in the loss of the entire building, and the spread of radioactive contamination. While the licensee has broad licenses authorizing curie quantities of byproduct material and tens of grams of Special Nuclear Material, the quantities of radioactive materials typically on hand at any time in the licensee's facility are less. The quantities are, however, sufficient to present a cleanup problem if dispersed.

## 5. Radiological Safety

### 5.1 Procedures

Procedures for all radiological operations and for radiation safety are contained in the Radiation Safety Code and Quality Control Manual (RSC/QCM). The RSC/QCM is incorporated by reference in the facility licenses, and includes procedures for drafting new procedures and amending existing ones. The procedures cover both operations and safety, and appear adequate.

### 5.2 Air Sampling

Licensee representatives stated that studies of air flow in exhaust ducts from radiological operations had been made, and that flow in air sampling probes had been made as nearly isokinetic as possible. Probes had been placed in areas of minimum turbulence, though it was not always possible to locate probes in areas of completely laminar flow. The inspector observed that, in several areas, the air-sampling collection filters were separated from the sampling probes in the ducts by long lengths of tube. The tube was frequently horizontal, or had many bends in it, which makes plating out of particulates in the line likely and would give the air-sampling results a low bias. Licensee representatives agreed to review the placement of collectors and probes.

5.3 Hoods

The inspector observed that, while flow in hoods appeared adequate and was measured by licensee personnel at six-month intervals, there was no indication at the hood of flow presence or failure. The inspector recommended that a flow indicator be installed on each hood.

5.4 Calibration Range

The inspector measured radiation levels outside the calibration range with an Eberline SPA-3 scintillation probe connected to an Eberline ESP-2, calibrated against cesium-137 to read in micro-Roentgen per hour (uR/hr), and an Eberline RO-4D ionization chamber. The maximum reading outside the building was 500 uR/hr with the source exposed. Inside the building, in the restricted area where the source controls are located, levels of 7 mR/hr were measured. Licensee representative stated that the source was sometimes left exposed overnight.

The inspector noted that, while the source-on indicator light next to the door to the calibration range was at eye level, and had the words "source on" on it, the red warning lights in the corridor leading to the calibration range and over the storage room door adjacent to the range were high up on the wall or over the door, and had no indication except the red bulb.

The inspector recommended that the licensee place the warning lights at the instrument calibration range at eye level, and provide a sign or other notice of the light's significance.

5.5 Transportation

The licensee's procedures for the packaging and transportation of radioactive material are contained in the section of the RSC/QCM pertaining to the waste disposal license. These procedures cover all phases of packaging and transportation, including training of drivers. While the licensee vehicle and drivers were not available during the inspection, other licensee personnel stated that all procedures in the manual were followed.

5.6 TeleTrace

The TeleTrace program involves field flooding [a procedure involving the injection of a radionuclide (typically tritium or a radioactive noble gas) into a well and then sampling adjacent wells for the radionuclide to determine the direction and rate of flow of the underground fluid] at remote sites, usually at oil well heads. Licensee personnel stated that a health physicist from the Westwood facility was present at all job sites and was responsible for radiation safety. Industrial safety at the job site is the responsibility of the customer, and licensee personnel

stated that the customers are very careful about safety at the job sites.

6. Industrial Safety

6.1 Electrical Safety

The inspector observed that the various branch distribution boxes throughout the facility have many unmarked, unidentified circuits. Many boxes do not have an index of all circuits. Some boxes have two indices that contradict each other. This makes it impossible to determine which circuit breaker to throw in the event of an emergency.

The inspectors reviewed a memorandum from Mr. Black to the Building Services Manager, requesting a progress report on the identification of each light switch and receptacle in the building with its associated circuit breaker. The original request was submitted November 24, 1987. Licensee representatives stated, and the inspector observed, that no progress had been made on this item as of July 14, 1988.

The inspector recommended that the licensee index all branch distribution boxes so that all circuit breakers are identified and mark each light switch and receptacle so that it is identified with its associated circuit breaker.

Electrical cables have been run through the loft area with no system and no protection for the cable. This makes it difficult or impossible to identify any given cable. The cables are exposed to rodent and other damage. (No evidence of rodent intrusion was actually observed in the loft area.)

The inspector recommended that the licensee arrange electrical cable in the loft in trays or conduit, or some other arrangement that will protect cable from damage, and mark cables for identification. The inspector further recommended that the licensee assure that all electrical installations comply with latest applicable codes.

The inspector observed that, in a number of laboratories, particularly in the Radiocarbon and Tritium Laboratory, ungrounded electrical equipment was in use. The equipment did not appear to be double-insulated.

The inspector recommended that the licensee review all electrical equipment in use in the facility to assure that it is grounded and meets applicable codes.

The inspector noted that the incoming electrical power lines passed through the branches of a tree. In addition, vegetation

was growing in the power transformer enclosure area behind the building.

The inspector recommended that the licensee request that the electric utility trim the branches of the tree touching the incoming power lines and remove vegetation from the transformer area.

6.2 Storage of Materials

Throughout the building, the inspectors observed shelves up to the ceiling on which were stored folded boxes, electric motors (Room 402), light cases and light frames (Room 404), partially filled, two-gallon liquid sample containers (corridor outside gas analysis laboratory), and chemicals. The storage of heavy items on shelves above shoulder height and in places inconvenient to reach is an apparent violation of 29 CFR 1910.176, which requires that materials be stored in a way that will not create a hazard.

The inspector recommended that the licensee perform a comprehensive review of the storage of materials throughout the building. Arrangement of storage must be such that manipulating the materials will not create a hazard for workers.

In the compressed gas cylinder storage area in the corridor at the west end of the building, oxidizing and reducing gases were stored side-by-side. (29 CFR 1910.252(a)(2)(iv)(c) requires a distance of at least 20 feet between oxygen cylinders and combustible gases or materials.) In addition, cylinders of compressed flammable gases in Rooms 401, 201, and 204 are not properly secured upright. (29 CFR 1910.101(b) requires that the in-plant handling, storage, and utilization of all compressed gases in cylinders be in accordance with Compressed Gas Association (CGA) Pamphlet P-1. Paragraph 3.5.8 of CGA P-1 requires that all compressed gas containers in service or in storage be stored standing upright where they are not likely to be knocked over, or the containers be secured.)

The inspector recommended that the licensee correct the storage arrangements for compressed gas cylinders.

Many of the shelves in the building used to store chemicals are made of wood. Most of the wood is unfinished. Unfinished wood shelves pose a cleaning and contamination problem and fire hazard if contacted with acid or other hazardous materials.

The inspector recommended that the licensee reevaluate the material from which storage shelves are constructed.

The inspector observed a gap between the chemical storage closet in the HP lab and the adjacent hood, through which air was being drawn. This defeats the purpose of the closet design in which the hood provides ventilation of the closet.

The inspector recommended that the licensee correct the ventilation system for the chemical storage closet in the HP lab.

6.3 Non-ionizing radiation

Licensee personnel stated that no surveys had been performed to measure the radio-frequency fields around the induction furnace and associated equipment in the precious metals refining area to assure that the radiation is within New Jersey State Standards.

Licensee personnel also stated that no surveys of this type had been done in the Mass Spectrometry Area.

The inspector recommended that the licensee perform surveys of the radio-frequency radiation fields in the precious metals refining and mass spectrometry areas to assure that they are within applicable limits.

6.4 Ladder Safety

During an inspection of the roof of the main building, the inspector observed that the ladder leading to the roof started an estimated 10 feet from the ground and extended an estimated eight feet to the edge of the roof. The ladder was not equipped with a cage.

The inspector recommended that the licensee install a cage on the ladder leading to the roof.

6.5 Materials Handling Safety

The inspector observed that licensee procedures required the use of safety glasses while filling liquid nitrogen containers. The inspector suggests that face shields instead of glasses be considered for liquid nitrogen filling.

The inspectors observed two floor drains under safety showers which licensee representatives stated were rarely used. The inspectors noted that, under these circumstances, the water normally in the traps in the drain evaporates. This defeats the purpose of the trap, which is to prevent sewer gases from backing up into the facility.

The inspector recommended that the licensee either assure that the traps always remain full of water, or that the drains be capped.

6.6 Respirator Safety

In the warehouse area where the radioactive waste compactor is located, the licensee uses supplied air respirators. NUREG-0041 specifies and 29 CFR 1910.134(d)(1) requires that breathing air for supplied air respirators be of Compressed Gas Association Grade D or better. Licensee representatives stated that they were

unaware of this requirement, and had never tested the quality of the breathing air supplied to these respirators.

The inspector recommended that the licensee assure that breathing air used in respirators meets the requirements for Grade D or better, and that the quality of the breathing air is tested periodically.

6.7 Machine Safety

A radial arm saw located in the carpentry shop was not equipped with a hood or guard that meets the requirements of 29 CFR 1910.213(g)(1), which requires a hood which will, among other requirements, automatically cover the lower portion of the blade and remain in contact with the work being cut during use.

The inspector recommended that the licensee install a hood on the radial arm saw in the carpentry shop that complies with OSHA requirements.

6.8 Accident Reports

The inspector reviewed accident reports for the past two years. The documentation appeared complete, and showed that each accident had been investigated. The accidents were either of a minor nature (e.g., cut finger) or occurred at a remote site (e.g., slipping on ice in a hotel parking lot). There was no apparent pattern to the accidents, and none pointed up deficiencies in safety at the facility.

7. Operational Safety

7.1 Procedure Control

The inspector reviewed operating procedures for non-radiological areas. The inspector observed that each of the product lines had its own procedures. The inspector determined by review of representative procedures in each area that the procedures were adequate, and addressed safety issues where applicable. The procedures appeared to follow a uniform format.

Licensee personnel stated that there was no facility-wide requirement for written operating procedures, that procedures for each product area were the responsibility of the manager of that area, and that procedures for writing new procedures and amending existing procedures were determined by each product area. Thus, the existence of operating procedures in each area appears to be the result of individual initiative, and not of company policy.

The inspector recommended that the licensee establish a facility-wide policy for control and implementation of operating procedures.

Licensee representatives stated that there were no procedures covering operations in the maintenance area or machine shop.

The inspector recommended that the licensee establish operating and safety procedures for the maintenance area and machine shop.

7.2 Waste Compactor Facility

This facility is located in a former garage which now serves as a warehouse. The compactor is a hydraulically actuated ram that is automatically guided into a barrel that contains packages of low-level radioactive waste. A volume reduction of approximately 25% to 35% is achieved.

The inspector requested that the action of the microswitch on the protective enclosure doors be demonstrated. The unit was started and, upon opening the enclosure door, the unit tripped off and ram movement stopped. No deficiencies were identified in the operation of the compactor.

Operating personnel for the compactor were interviewed and were found to be well trained.

7.3 Precious Metals Recovery Area

The glove box surrounding the induction furnace is cooled by water. Licensee representatives stated that, while the cooling water through the RF coil of the furnace is monitored by a sensor which cuts off power to the furnace if the flow fails, the cooling water to the glove box jacket is not so monitored. The inlet and outlet to this jacket are controlled by manually-operated valves. It is the inspector's opinion that failure of this flow during furnace operation or operation with closed valves could cause overheating of the glove box, and a possible steam explosion inside the liner, leading to a release of radioactive material.

The inspector recommended that the licensee provide interlocks that will assure that water is flowing in the box jacket during furnace operation.

The inspector observed that tanks of water and hold-up liquid waste tanks are located in this area. These tanks are above floor level, and a leak in or rupture of a tank could release a large quantity of contaminated water onto the floor of the facility. The joints between the floor and walls are open, and there is a gap under the door. The inspector recommended that the licensee evaluate the consequences of a large spill in this area and the possibility that it may cause contamination under and outside the building.

The inspector observed that a large tank in this area containing scrubber water was supported by a wood shelf. The inspector rec-

ommended that the licensee reassess the adequacy of this shelf to support the weight of the tank and contents.

7.4 Roof

The inspector observed that, in two cases, the wood supports for gas piping to the air conditioning heaters had deteriorated.

The inspector recommended that the licensee replace the wood supports for gas piping on the roof with new wood supports, or, preferably, manufactured hangers of the auto-jack type.

7.5 Water Service

Licensee representatives stated that there were no check valves installed at the point where the city water supply enters the licensee's facility. This would permit back flow of water from the facility into the municipal system in the event of over pressure in the facility, or loss of pressure in the municipal system.

The inspector recommended that the licensee install check valves in the water pipes where the municipal water system enters the facility.

7.6 Liquid Nitrogen

The pressure gauge on the liquid nitrogen storage tank behind the facility appears to be faulty. Rust was observed on the inside of the gauge face cover.

The inspector recommended that the licensee inspect the gauge and repair or replace it as necessary.

The piping nipple on the loading nozzle on the tank appears deformed. A bolt which secures the filling assembly to the tank is missing.

The inspector recommended that the licensee inspect all piping and other equipment associated with the liquid nitrogen system and repair or replace any damaged parts.

The filling hose inside the building was lying on the floor, uncapped. This could allow dirt to enter the line.

The inspector recommended that the licensee equip the liquid nitrogen filling hose inside the building with a plug to be inserted when the hose is not in use, and provide support for the hose so that it does not rest on the floor.

8. Emergency Preparedness

The licensee has prepared and implemented emergency procedures for the Westwood facility. These procedures are set forth in the Safety Program manual dated June 1988 and were reviewed by the inspector. The procedures cover chemical spills, contamination of personnel, evacuation of the facility, reporting of fires, storage of hazardous materials, housekeeping, and safety reviews. The quantities of radionuclides authorized by the six NRC licenses are below those for which the submission of a Radiological Contingency Plan would be required (cf. NUREG-0767).

From a review of the licensee's emergency planning activities the inspector concluded that the licensee's emergency preparedness is complete and adequate for the magnitude of the hazard presented by the operations conducted and the types and quantities of materials used. However, NUREG-0762 recommends that arrangements be made for medical services for injured individuals who are contaminated with radioactive materials. While the licensee has conducted informal discussions with a local hospital, the licensee presently does not have a letter of agreement stating that the hospital is prepared for, and will provide, medical services for such individuals.

The inspector recommended that the licensee negotiate a letter of agreement with a local hospital for the provision of medical care for injured, contaminated employees.

9. Recommendations

9.1 General

9.1.1 It appears that the responsibilities for fire protection and industrial safety have been assigned without sufficient consideration for the training needed to perform these tasks competently or to the time required to perform these tasks properly, particularly if the majority of the knowledge of the appointee is expected to come from self study. It is recommended that additional manpower and expertise be devoted to this function.

9.1.2 Management must assure by exercising its supervisory function and by clearly articulating its commitment to safety that all safety-related work is performed in a timely manner. This includes assuring that adequate manpower is available.

9.2 Fire Protection

9.2.1 Limit the storage of combustibles in the facility as much as possible, and improve housekeeping generally. Store flammable liquids in laboratories in safety cans with flame arrestors. Bulk storage of flammables should be in

remote and fireproof areas. Store only enough combustibles for current needs in laboratories.

9.2.2 In the precious metals recovery area, modify the controls on the glove box fire doors to prevent accidental opening during furnace operation. Provide interlocks that will assure that water is flowing in the box jacket during furnace operation. Assure that gloves are not pulled into boxes when not in use. Consider methods of suppressing a fire in the glove box train.

9.2.3 Improve fire barriers, particularly by the installation of fire doors, to assure that a fire, once started, is confined to one area. Install fire dampers in ductwork where needed.

9.2.4 Assure that the fire detection system complies with NFPA guidance.

9.2.5 Improve general employee training in fire prevention.

9.2.6 Make expertise in fire safety available to Fire Safety Officer.

9.2.7 Review the impact of low-flash-point roofing material on the safety of the building in the event of a fire.

9.2.8 Install sleeves around chimneys from gas heaters where they penetrate the ceiling. Install gas monitors in areas where gas water heaters and other gas-related equipment are installed. Consider the installation of other gas leak detection equipment.

9.2.9 In the waste compactor building, repair the gaps in the walls and garage door, and install a gasket on the bottom of the door.

9.3 Procedure Control

9.3.1 Establish a facility-wide policy for operating procedures.

9.3.2 Establish operating and safety procedures for the maintenance area and machine shop.

9.4 Electrical Safety

9.4.1 Index all branch distribution boxes so that all circuit breakers are identified.

9.4.2 Mark each light switch and receptacle so that it is identified with its associated circuit breaker.

9.4.3 Arrange electrical cable in loft in trays or conduit, or some other arrangement that will protect cable from damage. Mark cables for identification. Assure that all installations comply with latest applicable codes.

9.4.4 Review all electrical equipment in use in the facility to assure that it is grounded and meets applicable codes.

9.4.5 Request that the electric utility trim the branches of the tree touching the incoming power lines and remove vegetation from the transformer area.

9.5 Storage of Material

9.5.1 Review the storage of material throughout the facility. Combustible solids (e.g., paper goods) and liquids should be stored in a fireproof location, with only supplies necessary for current use stored in work areas. Arrangement of storage must be such that manipulating the materials will not create a hazard for workers. Flammable liquids stored in laboratories must be in approved safety containers.

9.5.2 Cylinders of compressed oxidizing and reducing gases must be stored apart. All compressed-gas cylinders must be supported in a way that will prevent their being tipped over.

9.5.3 Correct the ventilation system for the chemical storage closet in the HP lab.

9.6 Non-Ionizing Radiation

9.6.1 Perform surveys of the radio-frequency radiation fields in the precious metals refining and mass spectrometry areas to assure that they are within applicable limits.

9.7 Water Supply

9.7.1 Install check valves in the water pipes where the municipal water system enters the facility.

9.7.2 Assure that traps in floor drains are always filled with water, or cap drains.

9.8 Liquid Nitrogen

9.8.1 Inspect all piping and other equipment associated with the liquid nitrogen system. Repair or replace any damaged parts.

9.8.2 Equip the liquid nitrogen filling hose inside the building with a plug when not in use, and support it so that it does not rest on the floor.

9.9 Roof

9.9.1 Install a cage on the ladder leading to the roof.

9.9.2 Replace the wood supports for gas piping on the roof with new wood supports, or, preferably, manufactured hangers of the auto-jack type.

9.10 Respirators

9.10.1 Assure that breathing air used in respirators meets the requirements for CGA Grade D or better, and that the quality of the breathing air is tested periodically.

9.11 Radiation Safety

9.11.1 Relocate warning lights at instrument calibration range to eye level, and provide a sign or other notice of the light's significance.

9.12 Mechanical Safety

9.12.1 Install a hood on the radial arm saw in the carpentry shop that complies with OSHA requirements.

9.13 Emergency Planning

9.13.1 Negotiate a letter of agreement with a local hospital for the provision of medical care for injured, contaminated employees.

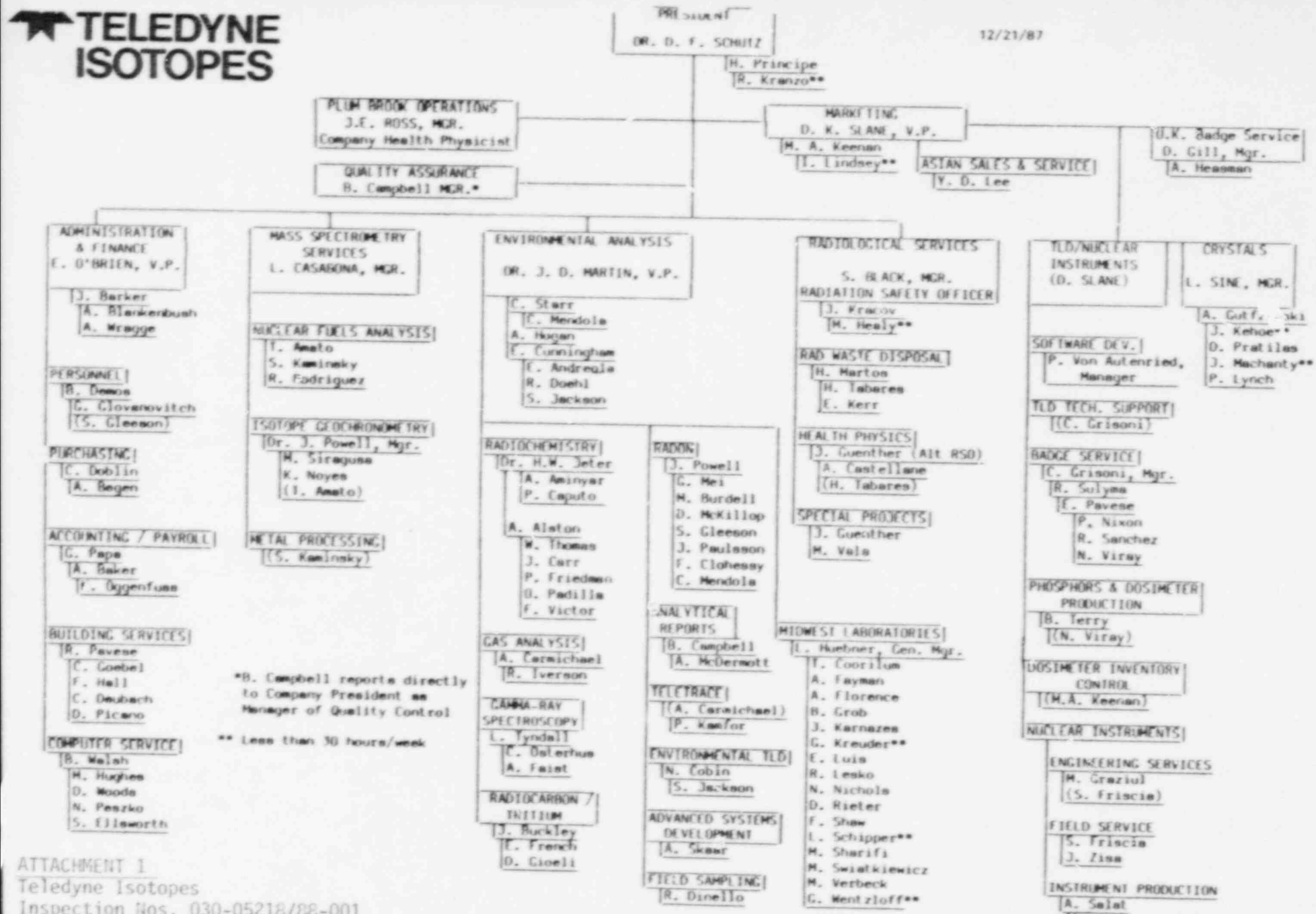
10. Exit Interview

The findings of the inspection were discussed with the individuals indicated in Section 1. Licensee representatives agreed to consider the inspectors recommendations for improving safety at the facility.

The licensee moved plastic away from exhaust pipe above the precious metals recovery furnace, and agreed to install sleeving by July 15, 1988. Licensee representatives stated that furnace operations in this area will be suspended until this action is taken.

# TELEDYNE ISOTOPES

12/21/87




*B. Campbell reports directly to Company President as Manager of Quality Control

** Less than 30 hours/week

ATTACHMENT 1
Teledyne Isotopes
Inspection Nos. 030-05218/88-001
030-05219/88-001
030-08681/88-001
030-14482/88-001
040-08413/88-001
070-00124/88-001