REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

NO: NR-224-D-101-E DATE: AUG 1 5 1983

DEVICE TYPE: Gas-Aerosol Detector

MODEL: Chevron Leak Detector Kit, Model 10

MANUFACTURER/DISTRIBUTOR: Chevron Research Company
576 Stand Avenue
Richmond, CA 94802

MANUFACTURER/DISTRIBUTOR:

SEALED SOURCE MODEL DESIGNATION: Detector cells sources manufactured by Ion Track Instruments or Chevron Research Company

ISOTOPE: Nickel-63 MAXIMUM ACTIVITY: 10 millicuries

LEAK TEST FREQUENCY: Not Required

PRINCIPAL USE: (N) Ion Generators, Chromatography

CUSTOM DEVICE: _____ YES X NO

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DEVICE TYPE: Gas Aerosol Detector

DESCRIPTION:

"Chevron Leak Detector Kit, Model 10" is the name of the entire set of equipment contained in three suitcases as shown in Figure 1. Suitcase B contains a gas-liquid separator (for those systems involving mixed flows) through which a sample stream is first depressured, cooled, and freed of liquids before passing to the detector. This case also contains two small gas cylinders, which after charging with SF_6 gas are used to inject this tracer into the system under study. Suitcase C contains a supply of SF_6 (liquid) in a pressure cylinder and equipment used to charge the gas cylinders from Suitcase B. Suitcase A contains a strip chart recorder, a pressure cylinder of argon, and the detector module to which the final gas sample is brought for analysis.

The entire assembly is manufactured of high quality components and is packaged in high quality suitcases.

The detector module, which contains ^{63}Ni in the electron capture cell, is mounted (and is not removed during use) within Suitcase A, which is lockable, aluminum carrying case (Zero, Model 106X). The module itself is a rectangular box (9 in. x 9 in. x 5.5 in. high) of which the sides and bottoms are 1/4-in., and the top is 1/8-in. aluminum plate all bolted together. The top plate carries all the detector controls and prominently displays the label indicating the presence of radioactive material in the detector cell with the caution not to dismantle the cell. See Figure 2 for labels.

To open the module, eight 1/2-in. long 6-32 machine screws must be removed from the top plate. Except for a battery and its charger mounted to the base plate, all the rest of the contents are mounted on the tope plate, as shown inverted in Figure 3., prominently visible in the center is the detector cell. One inch behind the cell is the printed circuit board holding all the electronic components.

The detector cell (ca. 3/4 in. diameter x 1-3/4 in. long) is held in place by two straps that are each riveted to the cell support. These rivets must be drilled out to effect the removal of the cell. We believe that this, plus the written instructions, discourages any attempt at dismantling.

LABELING:

The cell is engraved with Ni-63, 10 mCi, and a serial number and has a label mounted close to it stating the company identification. The labeling information as specified in Section 32.29, 10 CFR Part 32, as well as a self-adhesive label with the radiation symbol, "Caution-Radioactive Material," 10 mCi ^{63}Ni, the date, and instruction to "return the module in this suitcase to Chevron Research Company for repairs involving the detector or for disposal."

DEVICE TYPE: Gas Aerosol Detector

DIAGRAM:

See attachment.

CONDITIONS OF NORMAL USE:

The device is used for air sampling to detect leakage from lines, vessels, etc. In use only gaseous materials pass through the detector cell. These include hydrogen and various hydrocarbons and occasionally some H_2S, all at ambient temperatures 50-80°F) and pressure plus the internal argon flow. The detector cell is not heated as for other electron-capture detector systems. The flow rate through the detector cell is low, about 10 ml/sec.

PROTOTYPE TESTING:

The device has been approved by the NRC for licensing purposes since September 29, 1977.

EXTERNAL RADIATION LEVELS:

The manufacturer reported contact radiation levels to be less than or equal to 0.01 mr/hr

QUALITY ASSURANCE AND CONTROL:

The manufacturer quality assurance and control program maintains records in serial number, source number, source swipe test results, external radiation detector swipe test results, calibration, purchaser, and date of transfer for each source and detector.

The program can be broken down into the following four basic points: (1) determine the extent of plating by radioassay, (2) determine integrity of containment, following cleanup of the cell after plating, by counting solvent washes, (3) determine removable contamination from the entire cell surface by tissue wipes, and (4) determine the presence of any detectable radiation from Ni-63. Furthermore, the program was deemed acceptable by the NRC in 1977.

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- This device is acceptable for licensing for distribution to persons who are exempt from the requirements for a license pursuant to Section 30.20, 10 CFR Part 30.
- The devices shall be manufactured, labeled, and initially transferred in accordance with the requirements of Section 32.26, 10 CFR Part 32 or equivalent requirements of an Agreement State.

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SAFETY ANALYSIS SUMMARY:

The NRC deemed this device to be acceptable for licensing purposes in September 1977. Chevron Research Company buys the Ion Track Instrument, Inc. SF_6 detector/chromatography, that has been approved for licensing, and modifies it to make their Model 10 leak test kit. Previously, the devices were sold only to subsidiaries of the Standard Oil Company. The manufacturer will now sell the devices outside of this restricted market. They anticipated a sale of three units per year. The manufacturer reported that 11 devices have been sold since 1977. This shows the device to be of interest only to a specific populous. The cost of a single unit further limits the distribution of the device. Chevron plans to electroplate the Nickel-63 onto the detector cell walls. This will further limit the possibility of removable contamination and additionally, the electroplated source demonstrated the ability to show less removable contamination then the present foil insert used. This process will also use a lower activity to about 7 millicuries of Nickel-63. The use of this process improves the safety of the device by further limiting the radiation exposure to the user. Based on a review of this information and test data, we continue to conclude that the detector kit is acceptable for licensing purposes.

REFERENCES:

The following supporting documents for the Model 10 leak detector kit are hereby incorporated by reference and are made a part of this registry document:

- o Chevron Research Company License No. 04-720-7E
- o Chevron Research Company letters dated September 28, 1982 and June 29, 1983 with enclosures thereto.

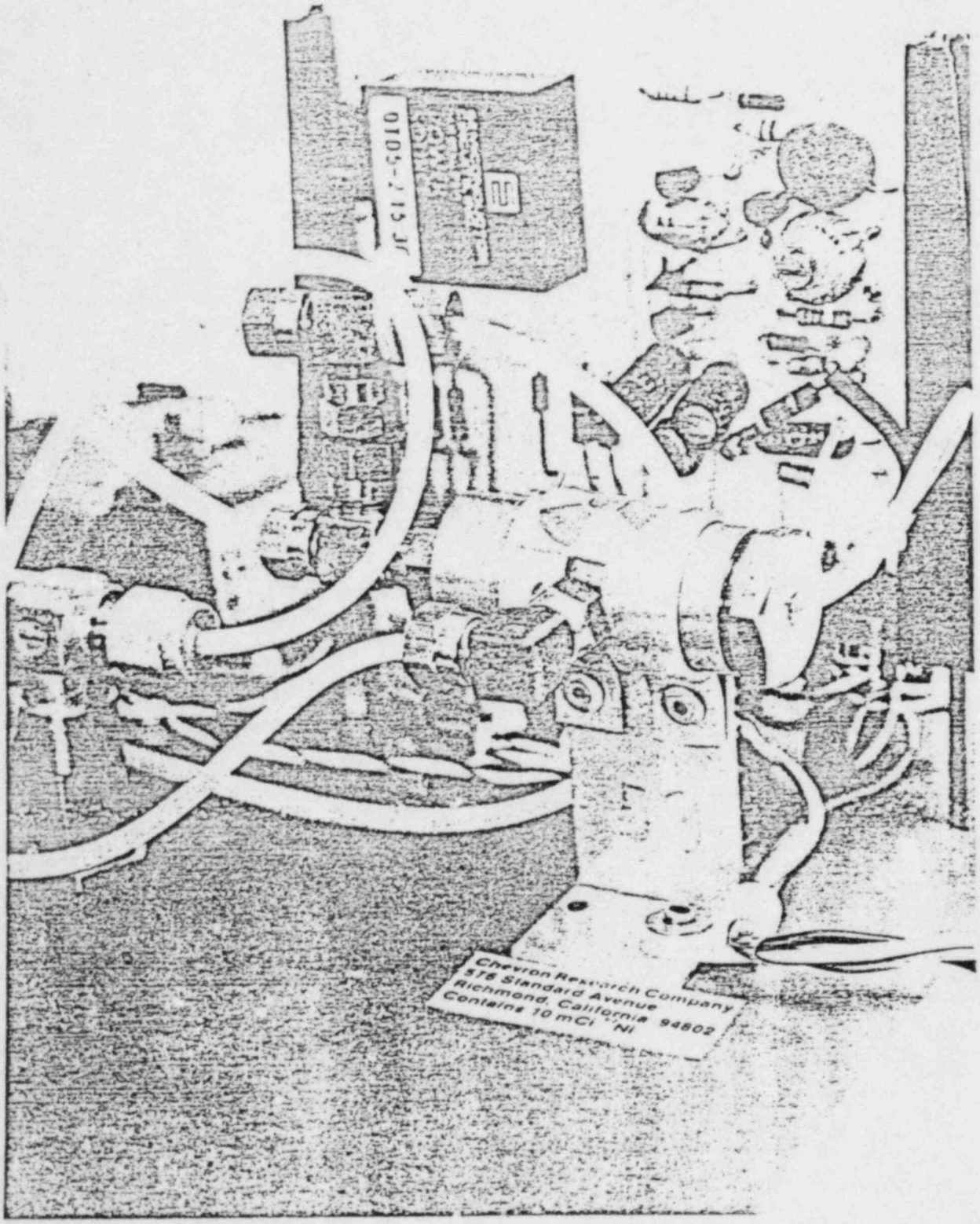
ISSUING AGENCY:

U.S. Nuclear Regulatory Commission

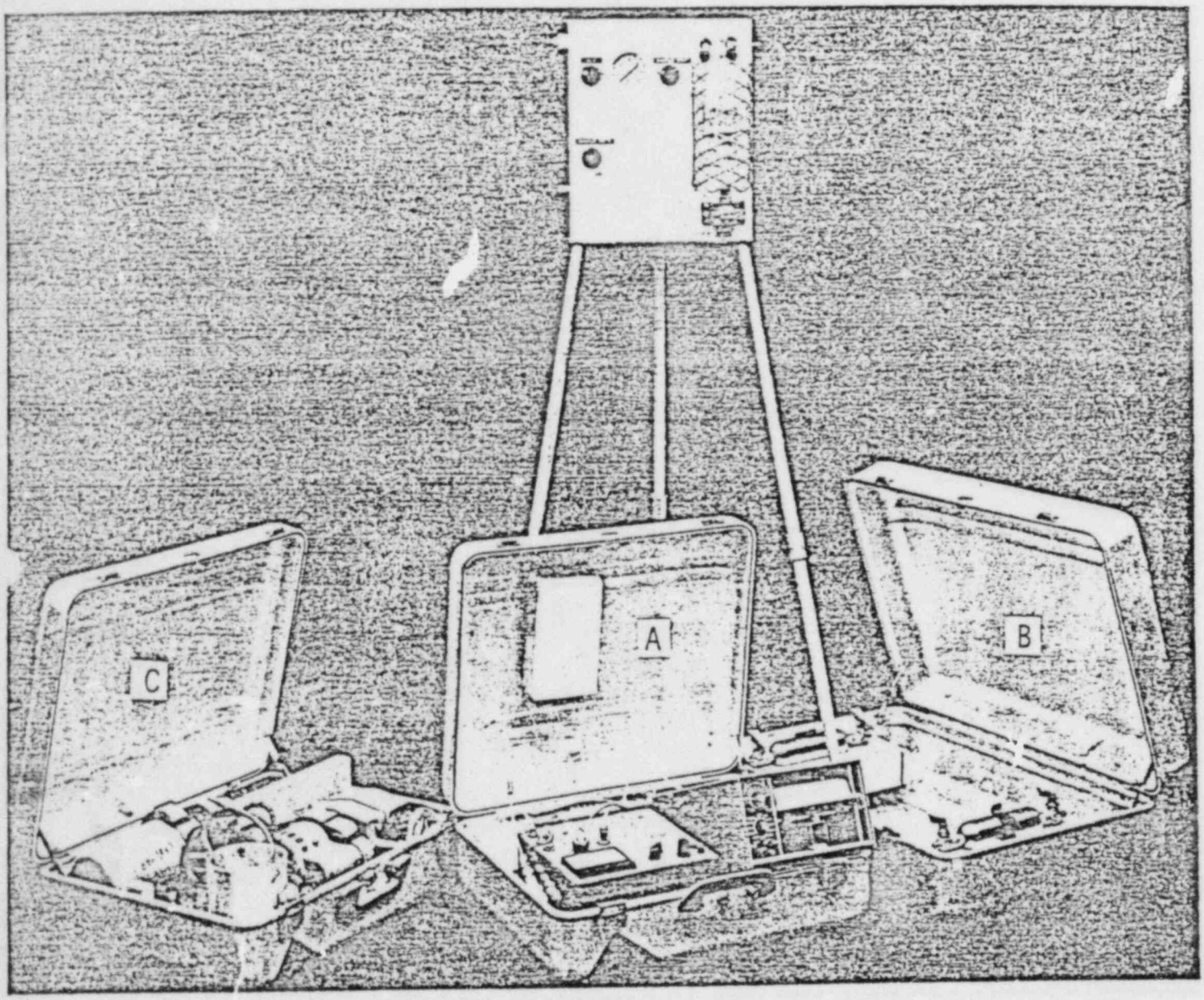
Date: AUG 1 5 1983 Reviewer: [signature]

Date: AUG 1 5 1983 Concurrence: [signature]

INTERIOR VIEW OF DETECTOR MODULE



CHEVRON LEAK DETECTOR KIT EQUIPMENT



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PROCESS ENGINEERING DEPARTMENT
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