REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

NO: NR-643-D-102-S DATE: NOV 4 1983

DEVICE TYPE: Consolidation Monitoring Device

MODEL: CMD-1

DISTRIBUTOR: U.S. Department of Transportation
Federal Highway Administration
6300 Georgetown Parkway
McLean, VA 22101

MANUFACTURER: Rexnord, Inc.
5103 W. Beloit Road
Milwaukee, WI 53214

SEALED SOURCE MODEL DESIGNATION: Gulf Nuclear, Inc. Model No. CSV

ISOTOPE: Cesium-137 MAXIMUM ACTIVITY: 500 millicuries

LEAK TEST FREQUENCY: 6 months

PRINCIPAL USE: (G) Portable Moisture Density Gauge

CUSTOM DEVICE: X YES ____ NO

CUSTOM USER: The device was custom-built for the Federal Highway Administration (FHA). The device is loaned to State highway agencies, universities, and other FHA offices for evaluation.

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DEVICE TYPE: Consolidation Monitoring Device

DESCRIPTION:

The CMD-1 is a prototype instrument designed for continuous density logging of a Fresh portland cement concrete. The device is constructed of steel and has no shutter mechanism. To be used, the source and source holder are installed into the device and a pad locked latch denies unauthorized access. The CMD is normally mounted on the back of a slip form paver.

The source/source holder remain in the device until the measuring job is complete or the user leaves the site. Once removed, the tungsten source/source holder is placed into a lockable storage and shipping container. In both laboratory and field trials, the primary exposure threat to the users will come during loading and unloading of the source assembly from the source shield and the source/sensor assembly.

LABELING:

The words "Caution-Radioactive Material," "Cs-137," and "500 mCi," and the magenta and yellow radiation symbol are engraved on the top surface of the source holder. Likewise, the device and storage shield has a permanent metallic label with the same words and symbol.

DIAGRAM:

See attachments 1, 2, and 3.

CONDITIONS OF NORMAL USE:

The CMD prototype will be used in laboratory and field tests to log the in-place density of portland cement concrete. The field tests will place the CMD in a generally harsh environment, highway construction sites; however, the device's specific location on the back of slipform pavers is relatively secure and accidents involving the device are unlikely. The device is expected to have a 3-5 year useful life.

PROTOTYPE TESTING:

The CMD-1 is a one-of-a-kind prototype; therefore, no testing was conducted. The source has been deemed acceptable for use in well-logging and gauging operations by the State of Texas. FHA reports there has not been any radiation safety problems, e.g., source disruption, significant personnel exposures, or equipment damage, during any of the development or field evaluation studies performed by the contractor.

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EXTERNAL RADIATION LEVELS:

See attachment 1, 2, and 3 for reported dose rates and locations.

QUALITY ASSURANCE AND CONTROL:

The CMD-1 is a one-of-a-kind prototype, so no quality assurance program has been established for production.

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- The device shall be distributed only to the specific licensee as referenced in this document (State highway agencies, universities, and FHA offices).
- The devices shall be leak tested at six month intervals using techniques capable of detecting 0.005 microcurie of removable contamination.
- Handling, storage, use, transfer, and disposal to be determined by the licensing authority.
- Review note: This device requires that the user remove the source holder from the gauge and place it into the storage shield. This action results in an unshielded radiation beam. Therefore, a person who performs this task should have personnel dosimetry and monitoring devices to ensure the source holder is in its proper position within the device and in storage shield. Additionally the applicant should have sufficient emergency procedures to handle the unlikely field accidents.
- This registration sheet and the information contained within the references shall not be changed or transferred without the written consent of the NRC.

SAFETY ANALYSIS SUMMARY:

Based on review of the information and test data cited below, that the device will be used by licensed and experienced gauge handlers, we conclude that the Model CMD-1 consolidation monitoring device is acceptable for licensing purposes.

Furthermore, we conclude that the device would be expected to maintain it's integrity for normal conditions of use and accidental conditions which might occur during uses specified in this certificate.

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REFERENCES:

The following supporting document for the CMD-1 consolidation monitoring device is hereby incorporated by reference and is made a part of this registry document:

- o Federal Highway Administration letter dated September 14, 1983. with enclosures thereto.

ISSUING AGENCY:

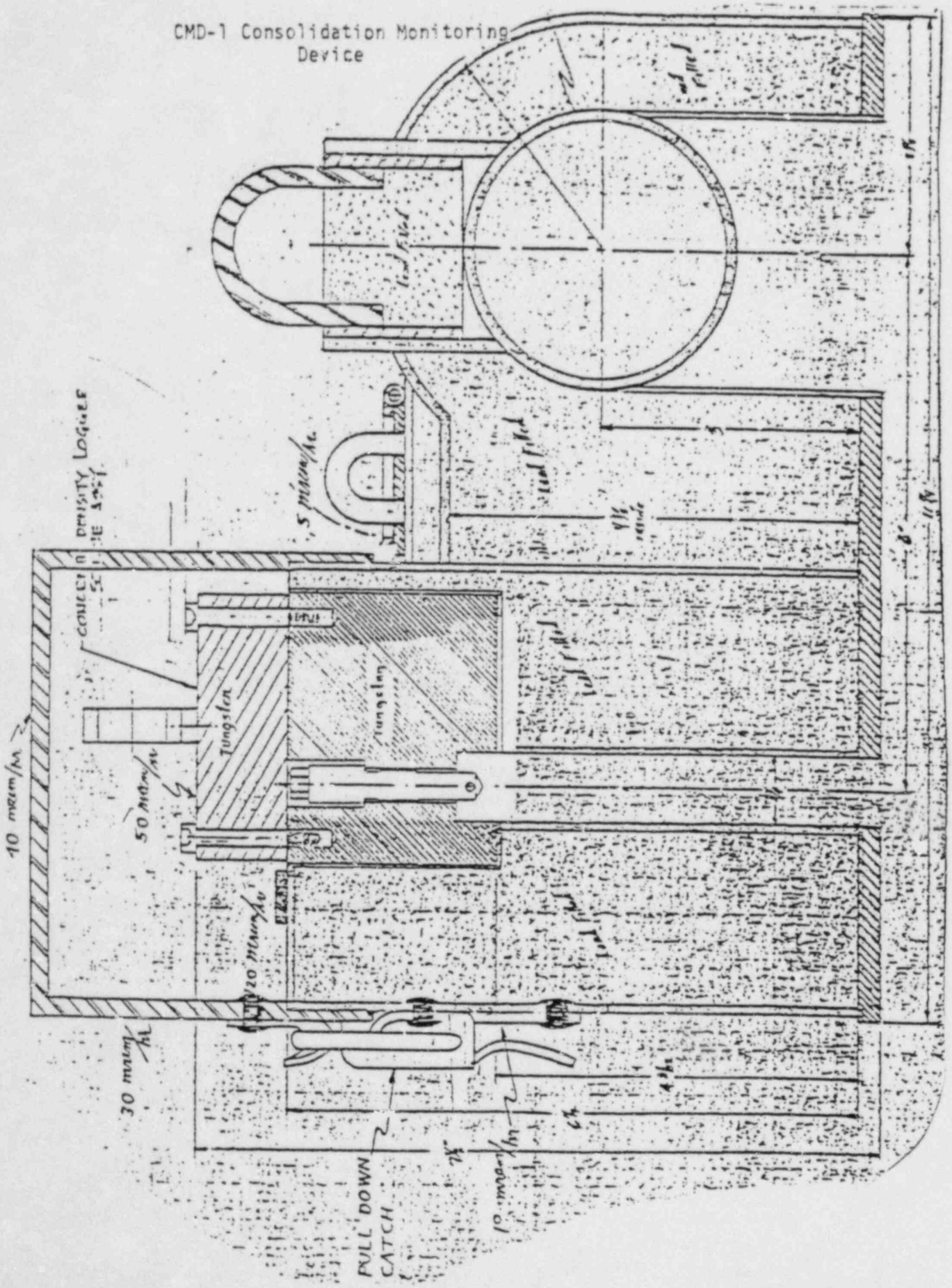
U.S. Nuclear Regulatory Commission

Date: NOV 4 1983 Reviewer: [signature]

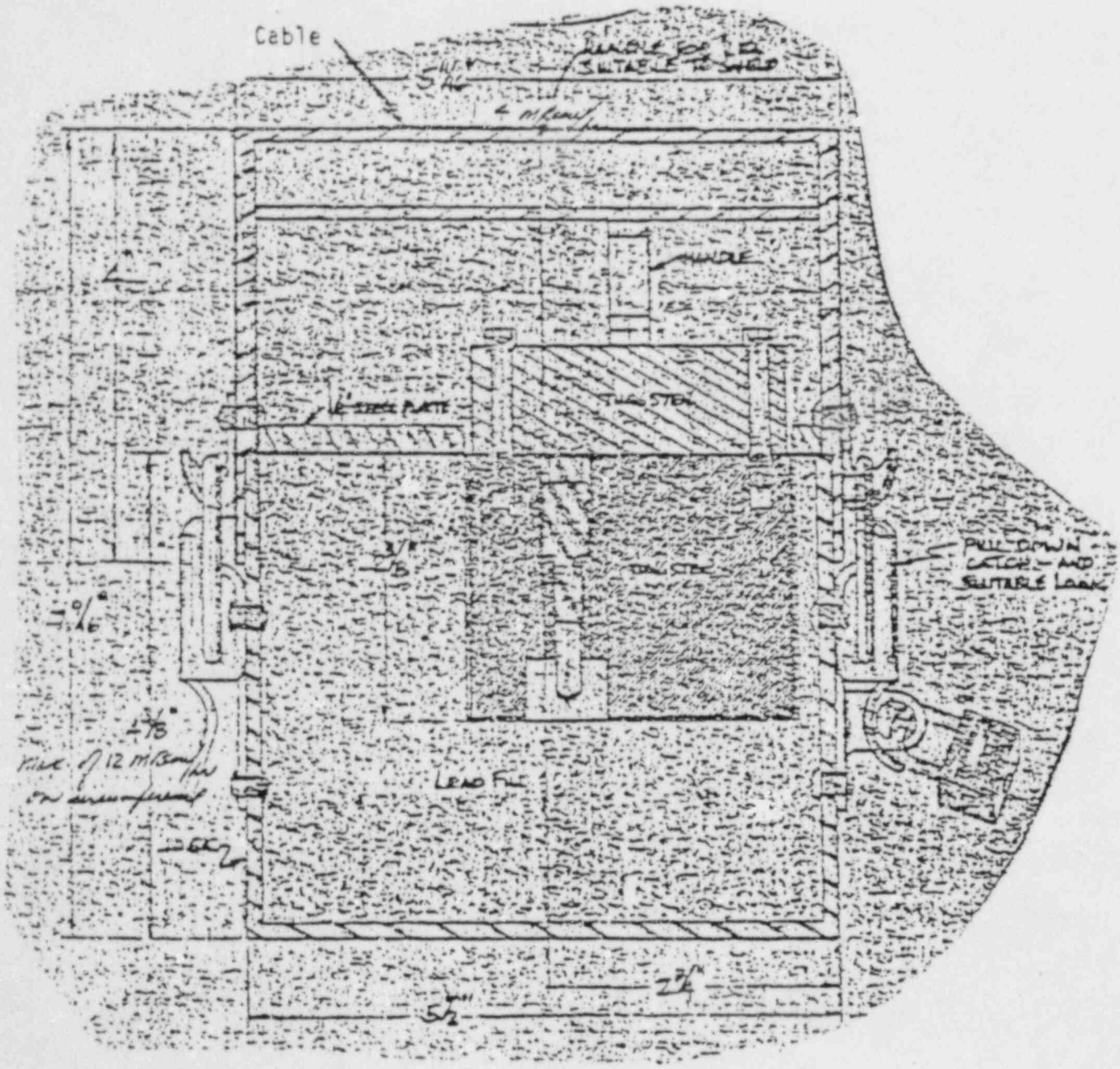
Date: _____ Concurrence: [signature]

NOV 4 1983

CMD-1 Consolidation Monitoring Device



CMD-1 Consolidation Monitoring Device Storage Shield



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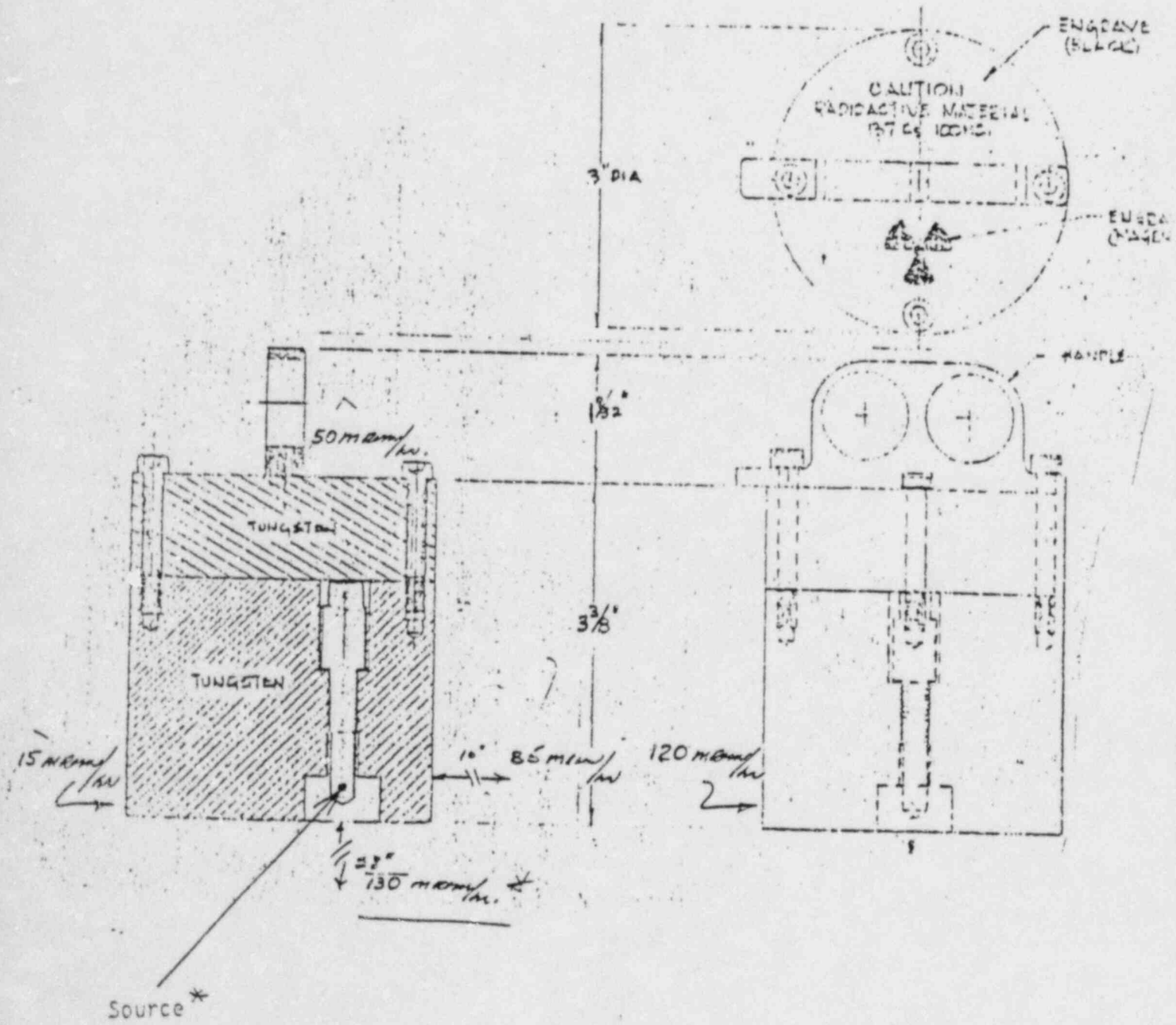
CMD-1 Consolidation Monitoring Device Source Holder