ohmart
CORPORATION

1362

August 24, 1982

Mr. Earl Wright
Material Certification and Procedures Branch
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Reference: Coke Drum Level Gage
Letter dated June 16,1982

Dear Mr. Wright:

During a recent telephone conversation you requested additional information about an application that we submitted for approval of a prototype coke drum level gage.

A coke drum is a large vessel ranging in diameter from 20 to 30 feet and about 100 feet high. Crude oil and steam are introduced at the bottom of the vessel. Volatiles are driven off and carried out of the top of the vessel. As the volatiles are removed, the residue becomes coke. A layer of foam usually lays on the top of the coke.

As oil and steam continue to be fed into the vessel, the whole mass rises in the vessel.

The gage is used to detect the interface between the vapor and the foam - and the interface between the foam and the coke.

Earlier gages for this measurement required a source to be inserted into a well in the vessel with the detector on the outside of the vessel. This new gage utilizes a backscatter technique where both the source and the detector are on the outside of the vessel.

Coke drum level gages have been used since the late 1950's - so this is not a new application, it is merely a new technique. I am enclosing Sales literature (SDBL-1680) describing the present gaging system where the source is inserted into the drum.

Typical Environmental Conditions:

Temperature:	Ambient to 140°F
Pressure:	Atmospheric
Impact:	Accident Conditions only
Vibration:	Ranges from zero tc mild
Corrosion:	Ranges from zero to mild corrosive vapor
Fire:	Unlikely
Explosion:	Unlikely

ATTACHMENT TO SUBJECT
DOCUMENT AND ENCLOSURE

The gage brackets are designed to be welded to the vessel by the user. Usually, there is a platform on the side of the vessel at the gage location. If the weld fractures, the gage would, typically, fall only to the platform. However, if the gage did fall to the ground - perhaps 50-60 feet - there should be little damage to the source holder because it is encased by a shield which is part of the bracket.

The Model SHRM-PA source holder has been in use since the mid 1950's. Ohmart has manufactured thousands of these source holders for use with density gages and level gages.

The sealed source that will be used in the SHRM-PA is the Ohmart Model A-2102 which has an ANSI classification of 56545.

Although this is a prototype gage, Quality Control will be the same as for standard production gages. This consists of:

A. Sealed source. Examination of vendor source certificate for proper activity and leak test results. Incoming wipe test before placing source in inventory. Wipe test of complete device prior to shipment. Wipe test counting equipment can detect less than 0.005 uCi of activity on the wipe.

B. Radiation field intensity. Measure radiation field intensity of completed device prior to shipment to assure that values do not exceed 5 mR/hr at 30 cm from the surface of the device nor 100 mR/hr at 5 cm from the surface. Look for voids in cast lead and streaming from all mating surfaces adjacent to the source.

C. Mechanical parts and construction. Visual inspection of all parts before and after assembly. Visual inspection of all welds. Operation check of source OFF/ON mechanism. Visual check for proper location and attachment of all labels.

Since this gage will be tested at the site of a specific licensee, the user will be responsible for providing adequate safety measures to prevent entry into the vessel while the source is in the ON position. If field modifications are required, they will be performed by Ohmart personnel. This fact can be made a condition of the user's specific license.

Based on our testing of the prototype and on historical data we classify the device, according to NBS Handbook 129, as ANSI 34-453-555-R-1.

We trust that this additional information will permit early approval of this device.

Sincerely,
THE OHMART CORPORATION

H. L. Cook, Jr.
Vice President

HLC/mjw
Enclosure

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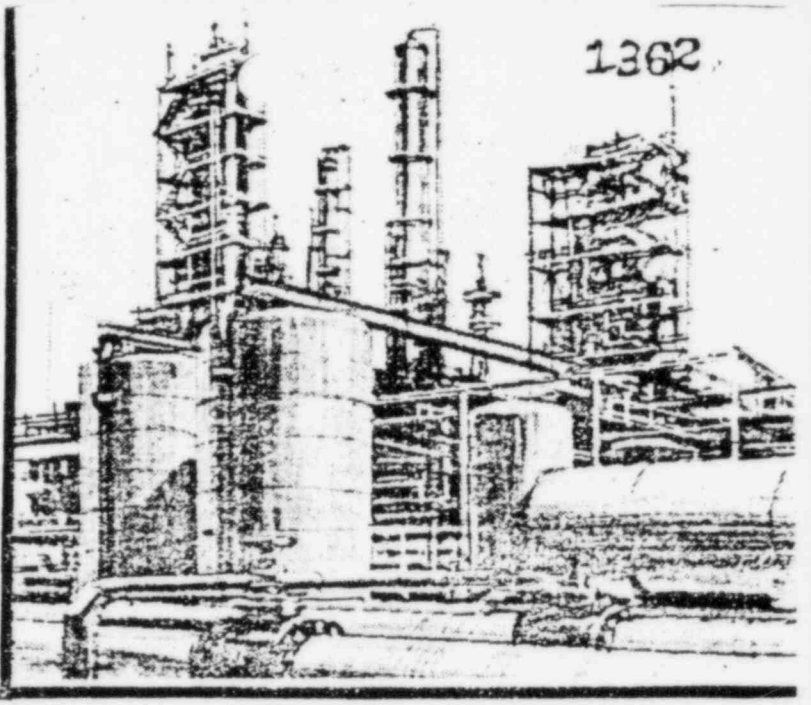


COKE DRUM LEVEL SYSTEM

- CONTROL COKE LEVEL AND FOAM BLANKET THICKNESS FOR OPTIMUM COKE DRUM EFFICIENCY

- Prevents expensive spillover
- Indicates coke level
- Indicates amount of defoaming agent to control foam blanket
- Indicates level and thickness of foam blanket

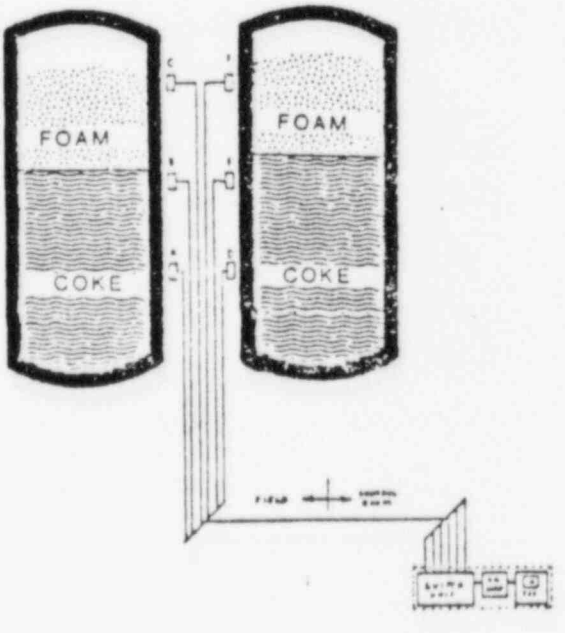
The Ohmart Coke Drum Level System is designed to provide the refinery operator with information concerning his process conditions in the delayed coker units--commonly referred to as the coke drums. Information provided by the Ohmart Coke Drum Level System will tell the operator the thickness or height of a foam layer above the coke as the individual drums are being filled. This "foam blanket" is created by the filling action in the drum, and proper control of this foam blanket can result in large savings to the refinery in terms of reduced outage and reduction of contamination problems.

Coke drums are generally operated in pairs, with a major portion of refineries having several pairs of drums. The drums are alternated with one drum being filled and cooked, while the second drum is being stripped and cleaned. During the filling operation the heated oil is pumped into the bottom of the drum and the agitation and reaction of the hot oil creates a foam layer on top of the oil. The volatiles and vapors are drawn off at the top of the drum and returned to a vacuum column for fractionating. It is very important that the operator does not overfill the drum to the point where carryover can enter the vacuum lines. This results in an expensive shutdown and cleaning process.

To avoid overfilling the drum, the refinery will set a nominal "outage" point for the operator. Outage is the term used to indicate the distance from the top of the drum to the coke level--the smaller the outage, the fuller the drum. The nominal outage for the operator allows him to fill to some capacity in the drum and still provide enough volume at the top for the foam layer. However, different grades of feedstock and changes in temperature can result in widely varying foam thicknesses and the occasional carryover would still occur which would result in shutdown and cleaning.

The Ohmart Coke Drum Level System uses a series of measuring points up the side of each drum. Each measurement point consists of a radiation source in a thermowell, and external detector at the same level. The radiation received by the detector is converted to an electrical signal and sent to a central electronics unit. As the top of the foam reaches the measurement point location, the foam causes less radiation to reach the detector resulting in an upscale reading. As the foam passes and the coke arrives at the measurement location a further upscale reading occurs. By comparing the elapsed time (or the recorder trace) with the rise of the coke, the height of the foam is determined. Measuring points at different elevations will allow the operator to follow the action of the foam blanket to see any increases, and also aid in determining the amount of defoaming agents to decrease the foam blanket. A final point near the top will tell when to stop the filling cycle and switch over to the other drum.

A typical coke drum system will consist of from two to four measurement points on each of two drums. Signals from each point go to a central electronics unit. There the signal is amplified and fed to a recorder or other indicating device. In most operations, only one measurement is being used at a particular time. This is the point being used to detect the arrival of the foam and the coke. After the coke has arrived and passed that measurement point, it is no longer used until the next filling cycle. In the Ohmart Coke Drum Level System a switching unit is provided to connect one of the individual measuring points to the amplifier unit at a time.



SDBL-1680

EQUIPMENT

The measuring point consists of a radiation source of 150 mCi of Cesium-137 in a stainless steel thermowell to be inserted through customer-supplied 2" nozzle. The detector is a model STR-P Ohmart cell which converts radiation energy directly to electrical current. The Ohmart cell is supplied with a temperature-isolated bracket to be welded to the outside of the drum.

A shipping and storage container is supplied for each two sources used. The container is designed to hold two sources and handling rods, and is normally located on the platform between the drums Container will shield the sources such that the radiation level will be less than 5 mr/hr at 12" when both sources are in the holder.

The electronics unit consists of the SWM-8 switching unit, VA amplifier, and FSS-4 power supply indicator. The SWM-8 switch has provision for eight input signals and one output signal. It also contains the calibration controls for eight inputs and the selector switch for the output. The VA amplifier accepts the signal for the SWM-8 switch and amplifies it to a 0-10VDC level. The FSS-4 unit has a front indicating meter for the signal level, and also provides a 4-20 ma DC output signal for recording. The electronics unit is housed in a PC-14 cabinet designed to mount in the control room panel or other protected location.

ohmart®

Innovative Measurement and Control

The Ohmart Corporation—Worldwide Sales and Service

• 4241 Allendorf Drive, Cincinnati, Ohio 45209 U.S.A. • Telephone: (513) 272-0131, TWX: 810-461-2255

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*Manufacturing Location

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NRC Form 374A (5-82) U.S. NUC R REGULATORY COMMISSION

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number
34-00639-03G

Docket or Reference number

Amendment No. 15

Ohmart Corporation
4241 Allendorf Drive
Cincinnati, Ohio 45209

In accordance with letter dated July 28, 1982, License Number 34-00639-03G is amended as follows:

Conditions 10. and 18. are amended to read:

10. Each device distributed pursuant to the terms and conditions of this license shall be in accordance with the following table:

Device Model Numbers	Source Model Numbers	Isotopes	Maximum Activity per source (Millicuries)
ASR-2	A2102 or A-2104	Cesium 137	4500
ASR-3	A-2102 or A-2104	Cesium 137	4000
ASR-4	A-2102	Cesium 137	2700
BAL	A-33766	Krypton 85	75
	A-4829	Krypton 85	1200
	A-36058	Krypton 85	1500
	A-4830	Strontium 90	200
	A-5799	Americium 241	1000
Beta Art Series 6000 (with BAL source holder)	A-35950	Krypton 85	75
	A-36058	Krypton 85	200
BG-1G	A-4829 or A-4834	Krypton 85	600
BG-2G	A-5840 or A-4830	Strontium 90	300
BG-2/9G	B-14315	Strontium 90	100
	B-14315	Krypton 85	1200
BG-3G	A-4832, A-4831 or A-5800	Strontium 90	1000
BG-4G	B-6815	Krypton 85	1000
BG-9G	A-4829 or A-4834	Krypton 85	1200
BG-11G	B-6815	Krypton 85	2000
BGCD-2/9G	B-14315	Strontium 90	100
	B-14315	Krypton 85	1200
BGCD-9G	A-4829	Krypton 85	1200
BGO-1G	A-4829 or A-4834	Krypton 85	600
BGO-2G	A-5840 or A-4830	Strontium 90	300
BGO-3G	A-4832, A-4831, or A-5800	Strontium 90	1000
BGO-4G	B-6815	Krypton 85	1000
BGO-9G	A-4829 or A-4834	Krypton 85	1200
BGO-11G	B-6815	Krypton 85	2000
BGOC-1G	A-4829 or A-4834	Krypton 85	600
BGOC-2G	A-5840 or A-4830	Strontium 90	300
BGOC-3G	A-4832, A-4831 or A-5800	Strontium 90	1000

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 34-00639-03G

Docket or Reference number:

Amendment No. 15

10. continued

Device Model Numbers	Source Model Numbers	Isotopes	Maximum Activity per source (Millicuries)
BGOC-4G	B-6815	Krypton 85	1000
BGOC-9G	A-4829 or A-4834	Krypton 85	1200
BGOC-11G	B-6815	Krypton 85	2000
BGOM-1G	A-4829 or A-4934	Krypton 85	600
BGOM-2G	A-5840 or A-4830	Strontium 90	300
BGOM-3G	A-4832, A-4831 or A-5800	Strontium 90	1000
BGOM-4G	B-6815	Krypton 85	1000
BGOM-9G	A-4829 or A-4834	Krypton 85	1200
BGOM-11G	B-6815	Krypton 85	2000
BGOU-9G	A-4829	Krypton 85	1200
BGTL-2/9G	B-14315	Strontium 90	100
	B-14315	Krypton 85	1200
BGTL-9G	A-4829	Krypton 85	1200
BWGL	A-5771	Cesium 137	100
CC	A-5776	Cesium 137	3
CL-10	A-2102	Cesium 137	3000
CL-12	A2102 or A-2104	Cesium 137	3750
CL-14	A-2102 or A-2104	Cesium 137	4500
CL-16	A-2102 or A-2104	Cesium 137	5250
CL-18	A-2102 or A-2104	Cesium 137	7500
CL-20	A-2102 or A-2104	Cesium 137	9400
CL-30	A-2102 or A-2104	Cesium 137	5000
CP-2	A-2102 or A-2104	Cesium 137	4000
CP-3	A-2102 or A-2104	Cesium 137	4800
CP-4	A-2102 or A-2104	Cesium 137	5000
CP-5	A-2102 or A-2104	Cesium 137	5000
CP-6	A-2102 or A-2104	Cesium 137	6000
CP-8	A-2102 or A-2104	Cesium 137	6000
CS-2	A-2102 or A-2104	Cesium 137	4500
CS-3	A-2102 or A-2104	Cesium 137	4000
CS-4	A-2102	Cesium 137	2700
ED-2	A-2102	Cesium 137	300

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number
34-00639-03G

Docket or Reference number

Amendment No. 15

10. continued

Device Model Numbers	Source Model Numbers	Isotopes	Maximum Activity per source (Millicuries)
ED-3	A-2102	Cesium 137	500
ED-4	A-2102	Cesium 137	750
ED-5	A-2102	Cesium 137	1000
ED-6	A-2102	Cesium 137	1500
ED-8	A-2102	Cesium 137	2000
ED-10, ED-12	A-2102 or A-2104	Cesium 137	3000
ED-14	A-2102 or A-2104	Cesium 137	4000
ED-16, ED-18, ED-10	A-2102 or 2104	Cesium 137	5000
ES-2	A-2102 or A-2104	Cesium 137	4500
ES-3	A-2102 or A-2104	Cesi4000	
ES-4	A-2102 or A-2104	Cesium 137	2700
LASR-2	A-2102 or A-2104	Cesium 137	4500
LASR-3	A-2102 or A-2104	Cesium 137	4000
LASR-4	A-2102	Cesium 137	2700
LBG-1G	A-4829 or A-4834	Krypton 85	600
LBG-2G	A-5840 or A-4830	Strontium 90	300
LBG-3G	A-4832, A-4831 or A-5800	Strontium 90	1000
LBG-4G	B-6815	Krypton 85	1000
LBG-9G	A-4829 or A-4834	Krypton 85	1200
LBG-11G	B-6815	Krypton 85	2000
LR-10 or LRV-10	A-2102 or A-2104	Cesium 137	9500
LR-12 or LRV-12	A-2102 or A-2104	Cesium 137	9500
LR-14 or LRV-14	A-2102 or A-2104	Cesium 137	9500
LR-16 or LRV-16	A-2102 or A-2104	Cesium 137	9500
LR-20 or LRV-20	A-2102 or A-2104	Cesium 137	9500
LR-24 or LRV-24	A-2102 or A-2104	Cesium 137	9500
LSDG	A-2102 or A-2104	Cesium 137	5400
PG-2 through PG-4 or PGV-2 through PGV-4	A-2102	Cesium 137	1500
PG-5 or PGV-5	A-2102	Cesium 137	1050

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number: 34-00639-03G

Docket or Reference number:

Amendment No. 15

10. continued

Device Model Numbers	Source Model Numbers	Isotopes	Maximum Activity per source (Millicuries)
PG-6 or PG-8 or PGV-6 or PGV-8	A-2102	Cesium 137	1000
PR-1G	A-4829 or A-4834	Krypton 85	600
PR-9G	A-4829 or A-4834	Krypton 85	1200
RTSN-3	A-5776	Cesium 137	3
SDG	A-2102 or A-2104	Cesium 137	5400
SH-100	A-2102	Cesium 137	100
SHDP or SHSP	A-33361	Cesium 137	200
SHDP-150 or SHSP-150	A-2102	Cesium 137	150
SR-1A	A-2102	Cesium 137	1562

18. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in documents dated February 4, 1959, March 9, 1959, October 27, 1959, February 29, 1960, April 26, 1961, June 1, 1961, June 6, 1961, April 9, 1962, August 27, 1962, December 10, 1962, March 12, 1965, March 28, 1966, November 16, 1966, April 20, 1967, March 10, 1969, December 8, 1969, May 24, 1972, July 12, 1972, August 11, 1972, October 13, 1972, December 11, 1972, February 2, 1973, March 23, 1973, July 23, 1975, September 30, 1975, March 29, 1976, July 7, 1976, June 15, 1977, April 13, 1978, May 11, 1978, and July 25, 1978 and attachments thereto; and letters dated December 6, 1978, December 13, 1978, May 5, 1980, July 22, 1980; and letters (2) dated October 3, 1980 and July 28, 1982 and attachments thereto. The Nuclear Regulatory Commission's regulations shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

Date NOV 05 1982

FOR THE U.S. NUCLEAR REGULATORY COMMISSION
Original Signed By
Paul R. Quinn
By Material Licensing Branch
Division of Fuel Cycle and
Material Safety
Washington, D. C. 20555

PRQ 11/3/82