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Chemical Name (300 per name) ETHYLTOLUENES	25	CAS No. (10) 9999999994	24
PARA-ETHYLTOLUENE		622-96-8	

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DETECTION OF UNSCHEDULED DNA SYNTHESIS IN PRIMARY RAT HEPATOCYTES TREAT IN VIVO WITH PARA-ETHYLTOLUENE

MEHSL STUDY NO. 20732

RECEIVED

ENVIRONMENTAL AFFAIRS & TOXICOLOGY DEPARTMENT

TOXICOLOGY DIVISION

REPORT RELEASE

MEHSL ARCHIVES

JUL 9 1984

TO MEHSL LIAISON:

DATE: July 3, 1984

SUBJECT: Detection of Unscheduled DNA Synthesis in Primary Rat Hepatocytes Treated In Vivo with Para-Ethyltoluene

REFERENCE: Request No.: 20730 Study No.: 20732 Requestor: Petrochemicals Div.

MATERIAL TESTED: Para-Ethyltoluene (PET)

TESTING LABORATORY: Mobil Environmental and Health Science Laboratory

RESULTS:

Unscheduled DNA synthesis (UDS) is synthesis of DNA during a time frame in the cell cycle when synthesis would not normally occur. This synthesis is presumed to be an active repair process responding to damage induced by genotoxic agents. As repair takes place, new bases are inserted into the DNA strand to replace induced lesions. When the cells are maintained in culture medium with a pool of excess radioactively labeled thymidine (DNA base precursor) it will incorporate the ^{3}H-thymidine to repair the damaged DNA. This incorporation can be detected by standard autoradiographic techniques. These repair processes are known to be error prone and therefore an increase in damage and repair increases the chance for mutations to occur.

A study was performed to determine if PET would induce unscheduled DNA synthesis (UDS) in hepatocytes of rats dosed orally. A single dose was administered and hepatocytes were isolated two hours later. PET was suspended in Methocel K4M Premium (Dow Chemical) and given by oral intubation at 0.5, 0.75, 1.0, 1.25 and 1.7 gm/kg. No pharmacologic effects were noted, but PET absorption into blood and liver was verified by capillary gas chromatography. PET induced a significant increase in UDS in rat hepatocytes when compared to negative control values which was not dose dependent, possibly because of severe cytotoxicity at higher doses which inhibited repair of primary DNA damage. However, the reproducibility of the response indicates that PET produced primary DNA damage observable in a narrow dose range as UDS.

Approvals:

STUDY DIRECTOR SECTION MANAGER DIRECTOR, TOXICOLOGY DIVISION

DISTRIBUTION:
All above

MOBIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

MEHSL ARCHIVES

JUL 9 1984

QUALITY ASSURANCE STATEMENT

STUDY NUMBER: 20732

TITLE: Detection of Unscheduled DNA Synthesis in Primary Rat Hepatocytes Treated *In Vivo* with Para-Ethyltoluene

Listed below are the dates that this study was reviewed by the Quality Assurance Unit and the dates that the findings were reviewed by the Study Director and Management.

DATE(S) OF QA REVIEW	DATE(S) REVIEWED BY STUDY DIRECTOR	DATE(S) REVIEWED BY MANAGEMENT
7/26/83	8/4/83	----
9/7/83	----	5/17/84
6/19/84	6/27/84	6/29/84

Manager, Quality Assurance/ Information Services

Date

DETECTION OF UNSCHEDULED DNA SYNTHESIS IN PRIMARY RAT HEPATOCYTES TREATED *IN VIVO* WITH PARA-ETHYLTOLUENE

STUDY NO.: 20732

MATERIAL:	Para-Ethyltoluene (PET)
BATCH:	N/A
LOT:	DS79-282-12-3
TACU SAMPLE #:	01038003
REQUESTING DIVISION:	Petrochemical Division
STUDY PERFORMED BY:	Mobil Environmental and Health Science Laboratory Pennington-Rocky Hill Road Pennington, NJ 08534
DATE OF INITIATION:	July 26, 1982
DATE OF COMPLETION:	May 6, 1983

STUDY NO.: 20732

_____ DATE
STUDY DIRECTOR

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SUMMARY

Unscheduled DNA synthesis (UDS) is synthesis of DNA during a time frame in the cell cycle when synthesis would not normally occur. This synthesis is presumed to be an active repair process responding to damage induced by genotoxic agents. As repair takes place, new bases are inserted into the DNA strand to replace induced lesions. When the cells are maintained in culture medium with a pool of excess radioactively labeled thymidine (DNA base precursor) it will incorporate the ^{3}H-thymidine to repair the damaged DNA. This incorporation can be detected by standard autoradiographic techniques. These repair processes are known to be error prone and therefore an increase in damage and repair increases the chance for mutations to occur.

A study was performed to determine if PET would induce unscheduled DNA synthesis (UDS) in hepatocytes of rats dosed orally. A single dose was administered and hepatocytes were isolated two hours later. PET was suspended in Methocel K4M Premium (Dow Chemical) and given by oral intubation at 0.50, 0.75, 1.00, 1.25 and 1.70 gm/kg. No pharmacologic effects were noted, but PET absorption into blood and liver was verified by capillary gas chromatography. PET induced a significant increase in UDS in rat hepatocytes when compared to negative control values which was not dose dependent, possibly because of severe cytotoxicity at higher doses which inhibited repair of primary DNA damage. However, the reproducibility of the response indicates that PET produced primary DNA damage observable in a narrow dose range as UDS.

INTRODUCTION

The purpose of this study was to investigate by measuring unscheduled DNA synthesis (UDS) in a primary culture of rat hepatocytes treated *in situ*, whether PET or an active metabolite was capable of causing primary DNA damage. DNA damage is recognized by the cellular repair system and results in the incorporation of new bases (including ^{3}H-thymidine) into the DNA. The existence and extent of DNA damage is inferred from a significant increase in nuclear radioactivity in comparison with vehicle treated hepatocytes. The detection of induced UDS is an effective means of detecting primary DNA damage by genotoxic agents. Techniques have been described which utilize hepatocytes from a single animal to conduct an *in vitro* screen at varying doses (Williams, 1977). Methods to screen for UDS in hepatocytes treated *in vivo* and then maintained *in vitro* to measure UDS have also been published (Mirsalis and Butterworth, 1980). The *in vivo* exposure permits natural biotransformation and detoxification, more closely mimicking what may happen in man.

METHODS AND MATERIALS

UDS Induction

Animals were given a single oral dose of the test agent (PET) suspended in Methocel K4M Premium (Dow Chemical). The positive control, (2-AAF; Sigma, Lot #16C-0273) was also given orally in one administration. Para-methylstyrene was administered in experiment 1 at a dose which was the approximate mid-dose of a metaphase analysis assay previously completed.

Experiment #1

Group	Dose	Concentration	Route
I	0.50 g/kg PET	0.050 g/ml	oral
II	1.00 g/kg PET	0.100 g/ml	oral
III	1.70 g/kg PET	0.170 g/ml	oral
IV	0.56 g/kg PMS	0.056 g/ml	oral
V	20.00 mg/kg 2-AAF	2.000 mg/ml	oral
VI	10 ml/kg Methocel K4M Premium (Dow Chemical)		oral

Experiment #2

Group	Dose	Concentration	Route
I	0.75 g/kg PET	0.075 g/ml	oral
II	1.00 g/kg PET	0.100 g/ml	oral
III	1.25 g/kg PET	0.125 g/ml	oral
IV	20.00 mg/kg 2-AAF	2.000 mg/ml	oral
V	10 ml/kg Methocel K4M Premium (Dow Chemical)		oral

Animal Treatment

Sixteen male Sprague-Dawley rats (for each experiment) from Taconic Farms (Germantown, N.Y.) weighing approximately 184 ± 27 gm at the first day of dosing were ear-tagged upon arrival, randomly assigned (SOP M.6.2.1) to individual cages and given food (Purina Rodent Chow) and water ad libitum. Rats were acclimated and maintained in an air-conditioned room, 85.0 ± 4.0°F, with a 12/12 hour light cycle; relative humidity ranged from 30-75%. Mobil Environmental and Health Science Laboratory is fully accredited by the American Association for Accreditation of Laboratory Animal Care.

Four animals were assigned to each PET test group; there were two positive and two negative control animals. Animals were randomly coded according to SOP M.6.2.1. All dosing was performed on consecutive days with a minimum of one animal dosed per group per day. Two hours after dosing the hepatocytes were isolated by liver perfusion.

Hepatocyte Isolation

Hepatocyte isolation was achieved by modifications of published procedures (Laishes and Williams, 1976a,b; Williams et al., 1977). Rats were killed by cervical dislocation 2 hours after dosing. Livers were perfused in situ (inferior vena cava cannulated and the portal vein sectioned) for 5 minutes with 0.5mM ethyleneglycol bis (β-aminoethyl ether)-N,N'-tetraacetic acid (EGTA) (Sigma Chemical Co., St. Louis, Mo.) in Ca^{++} and MG^{++} free Hanks' Balanced Salt Solution buffered with 0.05 MN-2-hydroxyethylpiperazine-N'2-ethanesulfonic acid (HEPES) (Sigma) to pH 7.2. A 10-minute enzyme perfusion was performed with Type I collagenase solution (Sigma Chemical Co.) made to 0.15 mg/ml in Williams' Medium E (WE) (Grand Island Biological Co., Grand Island, N.Y.). The livers were minced in fresh collagenase solution at room temperature and filtered into a centrifuge tube. Complete Williams' Medium E, containing 10% Fetal Bovine Serum (FBS) (GIBCO), 10 milliunits/ml insulin (Sigma), 1μM dexamethasone (Sigma) and 50 μg/ml Garamycin (GIBCO), was added to the suspension of primary hepatocytes to arrest collagenase activity. The cell suspension was centrifuged at 50 x g for 4 minutes.

Primary Hepatocyte Cultures

Five tissue culture plates (60-mm) were inoculated with 3 ml of complete medium containing 10^6 viable cells/ml and incubated for 2-4 hours at 37°C with 5% CO_2 in air. Unattached cells were removed and 3 ml of fresh media containing 10μCi/ml of ^{3}H-thymidine [Methyl-^{3}H]-20.0 Ci/mmole or 6.7 Ci/mmole (New England Nuclear, Boston, Mass.) were added to each plate. Cells were incubated for 18 hours at 37°C in 5% CO_2 in air.

Hepatocyte Enucleation

Following 18 hours of incubation with ^{3}H-thymidine, the cultures were washed three times with WE to remove ^{3}H-TdR. With the aid of a Cell Scraper (COSTAR, Cambridge, MA), cells from each liver were removed from the plates and pooled in a 0.001M phosphate buffer with 0.32M sucrose, 0.0015M $CaCl_2$ and 1% Triton X-100® (Sigma) (Poirier, 1981). The cells were homogenized in the buffer with a Wheaton Dounce Homogenizer (Pestle B) to release nuclei. Nuclei were centrifuged at 1000 rpm (200 xg) for 5 minutes, resuspended in fresh buffer, and fixed in 3:1 fixative (methanol:acetic acid) at 4°C. A minimum of five slides were made from the pooled cultures derived from each rat.

Autoradiography

Twenty-four hours after the slides were made, they were dipped in Kodak NTB-2 autoradiographic emulsion and dried. The coated slides were stored for 2 weeks at 4°C in light-tight containers with Drierite. The emulsions were developed in D-19, fixed and stained with 3% Giemsa (azure blend, GIBCO).

Scoring

All slides were coded and 1000 cells per animal were scored and assigned to the following categories: background (0-6 grains), >background but <50 grains or S phase (>50 grains).

Chi square analysis was performed to compare test values to negative control data; a significant increase in UDS is an indication of primary DNA damage and repair activity induced by the test agent. Statistical Analysis Systems (SAS) computer assisted analysis was used to test dose relationships; the program used Spearman non-parametric analysis for comparisons.

Criteria for Acceptability of Hepatocyte Cultures

There are two caveats in the *in vivo* procedures which an investigator must be aware of. Animal variability is greater in UDS assays than in most *in vivo* genotoxicity tests and evaluation of the data must therefore be made with this in mind. The second caveat is the potential for cytoplasmic incorporation of ^{3}H-TdR which masks low levels of UDS.

In an attempt to minimize variability introduced by the test animals, cell populations isolated from exposed livers were closely monitored for viability and cell recovery, i.e. cells harvested/liver. Liver cell population whose percent viability or total number of cells/liver were more than one standard deviation below the mean for all of the livers on test were not included in the assay.

The potential for non-nuclear ^{3}H-TdR incorporation was eliminated by enucleation of the hepatocytes; the procedure was developed in our laboratory (Skinner et al., 1982). Olson et al. (1983) have also recently reported that enucleation of hepatocytes increases the sensitivity for detection of UDS.

S-Phase Induction

A third experiment was conducted to determine whether PET has the ability to stimulate scheduled DNA synthesis (S-phase) which in early stages may be mistaken for UDS. The procedures and doses for experiment #2 were followed. Parallel cultures (four plates with HU and four without) were established for each test liver and the 2-AAF dose was increased to 25 mg/kg. The duplicate cultures contained Hydroxyurea (HU), an agent which inhibits S-phase. The slides from this experiment were scored by counting silver grains/nucleus to obtain a mean count of grains/nucleus, rather than the categorization method described earlier. In an experiment to ascertain the induction of S-phase, grains/nucleus is a more sensitive means of measurement. Student's T-test, was used to evaluate the data.

Analytical Procedures

The animals used for analytical samples were not the animals used for UDS experimentation. These experiments were conducted independently of the genetic perturbation assays.

Headspace analysis of blood from rats dosed with PET was performed by a gas chromatograph/mass spectrophotometer (GC/MS) equipped with 30 meter x 0.25 mm i.d. DB-5 fused silica capillary column. A capped vacutainer tube containing 1.0-2.0 ml blood/animal was heated at 25°C for 10 minutes and a 1cc volume of headspace was sampled and analyzed by GC/MS.

Samples of whole blood were extracted with hexane (v/v) by vortexing for one minute and centrifuged at 4000 rpm for 20 minutes. The extract was analyzed by a gas chromatograph equipped with a flame ionization detector (GC/FID) and 10 meter x 0.25 mm i.a. fused silica capillary column.

Perfused liver samples were analyzed by GC/FID. A 1 gm sample was homogenized with 0.5 ml hexane in a Brinkman polytron for 1 minute. After homogenization, the polytron stem was rinsed with 0.25 ml hexane making the total extraction volume 0.75 ml. The homogenate was centrifuged at 4000 rpm for 20 minutes; the extract was then analyzed for PET by a Hewlett Packard 5880A GC/FID.

The study was conducted from July 26, 1982 to May 6, 1983 at Mobil Oil Corporation, Toxicology Division, P.O. Box 1029, Princeton, N.J., 08540. Study personnel were: S. Irwin, technician, M. J. Skinner, Study Director. The raw data are retained in the archives and microscope slides are retained in the cytogenetics laboratory at the testing facility.

Addenda to and deviations from the protocol, and the reasons therefore, are recorded, signed, dated, and maintained with the protocol. This study was conducted in compliance with Good Laboratory Practices regulations.

RESULTS AND DISCUSSION

Unscheduled DNA synthesis (UDS) is synthesis of DNA during a time frame in the cell cycle when synthesis would not normally occur. This synthesis is presumed to be an active repair process responding to damage induced by genotoxic agents. As repair takes place, new bases are inserted into the DNA strand to replace induced lesions. When the cells are maintained in culture medium with a pool of excess radioactively labeled thymidine (DNA base precursor) it will incorporate the ^{3}H-thymidine to repair the damaged DNA. This incorporation can be detected by standard autoradiographic techniques. These repair processes are known to be error prone and therefore an increase in damage and repair increases the chance for mutations to occur.

Possible mutagenic activity had previously been demonstrated by PET at an oral dose of 1.3 gm/kg in a dominant lethal study in rats (MEHSL Study No. 832-80). Male rats given PET orally at 1.3 gm/kg in corn oil for five days, sired litters in which statistically significant increases in preimplantation losses occurred and total implanted fetuses per female were decreased. This UDS study was performed in part to clarify the results by determining whether PET does interact with the DNA.

The mean viability of hepatocytes recovered from the perfused livers was 87.02 +/- 12.8% and the mean cell recovery was 2.17 +/- 1.12 x 10^7 cells per liver (Table I). Primary hepatocyte cultures from several animals did not meet test criteria. Since all of the slides from the study were coded and evaluated, data from these cultures were collected but were not included in final tabulations. The animals from which these cultures were derived are identified with the reason for exclusion in Table II The UDS response induced by 2-AAF was highly significant (Table III).

Four animals were dosed with Para-methylstyrene (PMS), a chemical closely related to PET; there was no indication of UDS induction at this dose level. The dose selected was approximately the mid-dose of a metaphase analysis study done previously on PMS (MEHSL #2211-80). These data are independent of the PET study as this PMS treatment group was included only to estimate cytotoxicity for a subsequent study being considered for performance at a later date.

Analytical data indicate that PET is absorbed into the blood (Table IV) and can also be detected in the liver at the time of cell harvest (TABLE V).

A significant (Chi square; p= < 0.05) overall increase in UDS was evident in all assays at doses up to 1.00 gm/kg. At higher doses, UDS activity was diminished, possibly as a result of cytotoxicity. A cytotoxic effect was evident by a reduced ability of the hepatocytes from rats given 1.70 gm/kg (LD 2) to attach to the petri plates for culturing. In addition to the standard Chi Square analysis, the data were also analyzed by non-parametric procedures using the computer assisted Statistical Analysis System (SAS) under the direction of B. Milcarek , Mobil Medical Department statistician, NYC. The data were entered into the program to test correlations between four variables; S phase cells (S), UDS cells (U), background cells (BG) and dose (D). The data sets were then analyzed four ways by Spearman Correlation tests. The total data package, including data from animals excluded by test criteria, was

tested for correlation between the cited variables with and without the high dose data to ascertain the effect of apparent cytotoxicity on the correlation and then the data were analyzed in the same manner with the data from the excluded animals deleted from the analyses. The computer print-out from the analyses are included as Appendix A.

With one exception, all of the correlation coefficients as calculated between the dose and UDS response went from a negative correlation to a distinctly positive correlation when the high dose was dropped from the analysis; the exception (experiment three; without HU) went from .03643 to .42817, which is a distinct change to a more positive trend. The fact that the trend shift in correlation is so reproducible across different experiments is a strong indication that the statistically significant positive response by chi square is real (personal communication; B. Milcarek).

It was observed that within a given dose group, cell populations from some animals demonstrated increased UDS activity while others had UDS levels equal to or below that of the negative controls. This type of animal to animal variability has also been seen in other laboratories which conduct the in vivo hepatocyte assay (personal communication, Jon Mirsalis). It has been reported in the published literature that untreated control cell populations show similiar levels of UDS while different populations exposed to the same concentration of test materials in vitro or in vivo may demonstrate a wide range of sensitivity (Williams,1977). In the in vivo studies, variation may be due to different biotransformation specific to each animal; physical variables of a technical nature such as the age of the tritiated thymidine, emulsion or duration of exposure can cause variability in both the in vivo and in vitro studies (Casciano and Gaylor, 1983). To compensate for animal to animal variability, more test animals are assigned to each test group than to the negative control group and criteria to eliminate outlier cell populations are stringent.

The assay was performed three times over similiar dose ranges and despite intergroup variability, the same pattern of response was observed in each test. The third test was specifically designed to determine whether PET stimulated scheduled (S-phase) DNA synthesis which could, in the early stages of replication, be confused with UDS because of the low levels of 3H-TdR incorporation. If PET-stimulated S-phase synthesis was responsible for the observed activity, introduction of HU into parallel PET-treated hepatocyte cultures derived from the same rat liver would inhibit both S-phase synthesis and the spurious UDS activity. Data from experiment 3(Table I) demonstrate, although HU did slightly inhibit the spontaneous incidence of cells in S-phase in most cultures, it did not reduce the percentage of cells undergoing UDS. In figure 2, where the average grains per nucleus are visualized, it is apparent that PET does not stimulate S-phase synthesis and the addition of HU did not significantly alter the pattern of UDS activity. The higher background values for UDS in this experiment may be due to higher levels of radioactivity of the 3H-TdR or more sensitive developing emulsion. However, the overall pattern of response is similiar to that reported in the first two studies, a significant increase in UDS over a narrow dose range and then diminished response at the high doses.

The occurrence of responding and non-responding cell populations within a dose group and activity over a narrow dose range suggest PET may induce two competing phenomena in exposed cell populations, mediated partially by variation in individual host animal metabolism. These are increased UDS in response to perturbed DNA in some animals and in others, inhibition of repair synthesis or possible delay of general metabolic activity seen as UDS levels at or below the negative control values. At the highest doses, overt cytotoxicity was demonstrated by the failure of the cells to attach to the petri plates. This cytotoxic effect also varied between cultures established from livers treated at the same dose level.

Despite variability, a statistically significant increase in UDS was induced by PET in three separate studies, producing a similiar pattern of repair activity over a narrow dose range. It is expected, in this type of assay, that at concentrations greater than the cytotoxic level, the rate of UDS will decrease. Since the inhibitory effect of cytotoxicity on UDS precludes the extension of the dose response curve, the importance of reproducing a positive effect over the small dose range for UDS induction is critical (Mitchell et al., 1983). Therefore, the results of this study strongly suggest that PET is capable of causing primary DNA damage in this test system.

The third experiment, completed to determine whether PET induces S-phase, supported the original work. Hydroxyurea did not cause a reduction in UDS in parallel cultures. A statistically significant (t-test; $p<0.05$) increase in grain/nucleus was observed at the 0.75 g/kg dose. The response curve (Figure 2) shifted slightly to the left but considering the fact that the window of activity of UDS is so limited and the animal to animal variability is greater in <u>in vivo</u> assays, the shift is not totally unexpected nor unusual.

Although the UDS response is not dose dependent, it is apparent by the data that the reproducibly significant increase at lower dose levels is induced by PET. Therefore, para-ethyltoluene induces unscheduled DNA synthesis in liver cells of treated animals.

TABLE III

PET: NUMBER OF CELLS CLASSIFIED AS UNDERGOING UDS[a]

Experiment 1

	VEHICLE	0.5 g/kg	1.0 g/kg	1.7 g/kg	2-AAF
Total cells	2000	4000	3000	3000	1000
UDS	230	567	702	209	486
%	11.5%	14.2%	23.4%	6.97%	48.6%
Pvalue		<0.05*	<0.001**	<0.001[b]	<0.001**

Experiment 2

	VEHICLE	0.75 g/kg	1.0 g/kg	1.25 g/kg	2-AAF
Total cells	2000	2000	3000	4000	2000
UDS	151	125	299	174	982
%	7.6%	6.2%	10.0%	4.4%	49.1%
P value		<0.10	<0.001**	<0.001[b]	<0.001**

[a] 1000 cells/animal

[b] less UDS than vehicle controls due to cytotoxicity

* significant

** highly significant

TABLE IV

LEVELS OF PET IN CIRCULATING BLOOD AT VARIOUS SAMPLING TIMES AFTER DOSING

ANIMAL	MOBIL EAR TAG	DOSE (g/kg)	TIME	PPM/SAMPLE	$\bar{X}$ PPM
#4	#011-334	1.7	2 hr.	27.2, 36.4, 24.9	29.5
#5	#011-335	"	4 hr.	38.0, 40.0, 41.0	39.7
#6	#011-336	"	6 hr.	40.6, 32.3, 33.9	35.6
#1	#011-331	2.1	2 hr.	38.7, 47.5, 40.7	42.3
#2	#011-332	"	4 hr.	30.7, 23.6, 28.0	27.4
#3	#011-339	"	6 hr.	47.2, 40.1, 40.2	42.5

V

LEVELS OF PET IN LIVER AT VARIOUS SAMPLING TIMES AFTER DOSING[1]

ANIMAL	MOBIL EAR TAG	DOSE (g/kg)	TIME	PPM/SAMPLE	$\bar{X}$ PPM
#2	#011-428	1.0	2 hr.	62.0, 58.0	60.0
#4	#011-423	"	4 hr.	62.6, 60.0	61.3
#6	#011-431	1.7	2 hr.	124.0, 116.0	120.0
#8	#011-432	"	4 hr.	52.0, 56.0	54.0

[1] Livers were perfused before analysis was conducted.

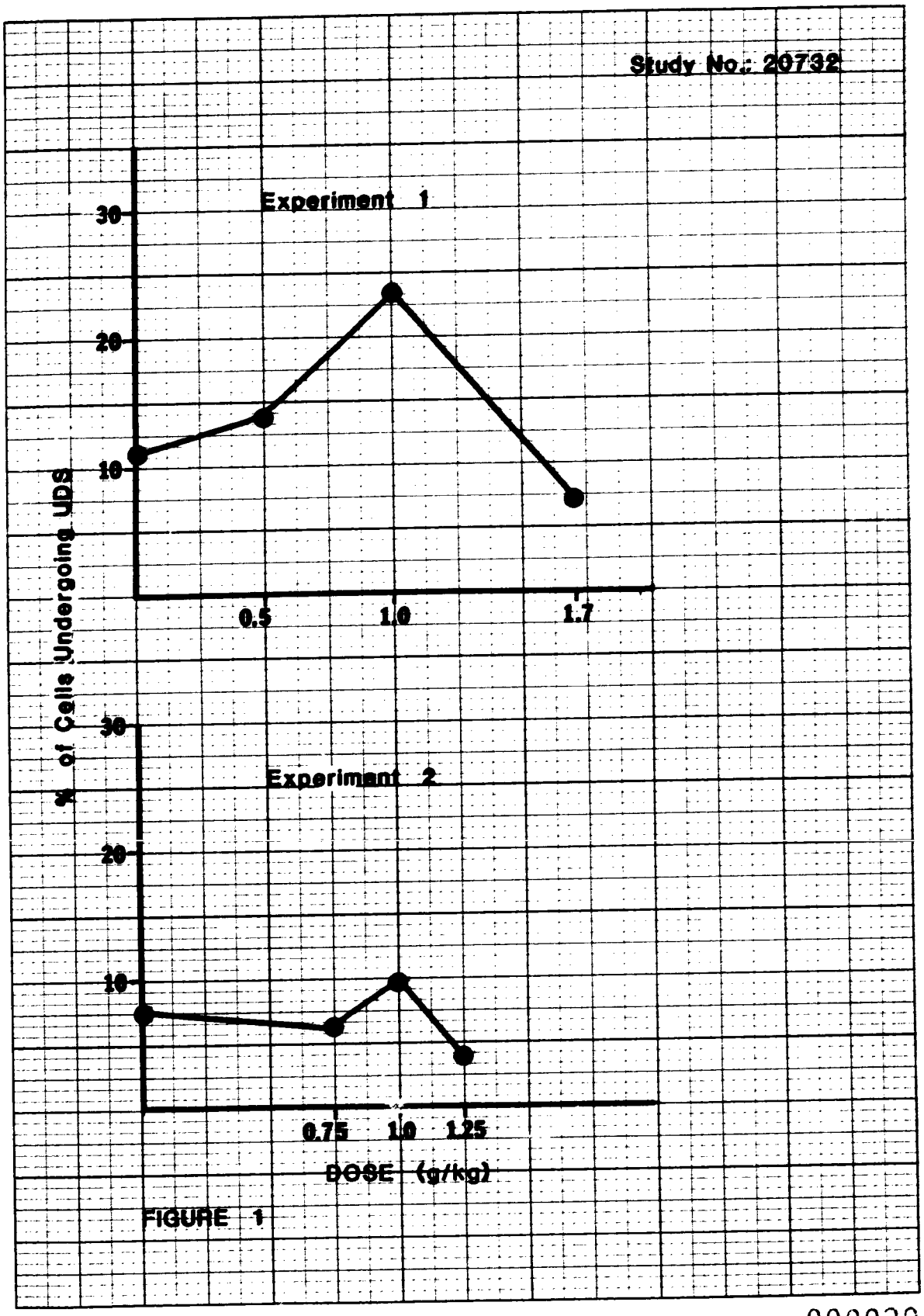
Study No.: 20732
Experiment 1
30
20
10
0.5
1.0
1.7
% of Cells Undergoing UDS
Experiment 2
30
20
10
0.75
1.0
1.25
DOSE (g/kg)

FIGURE 1

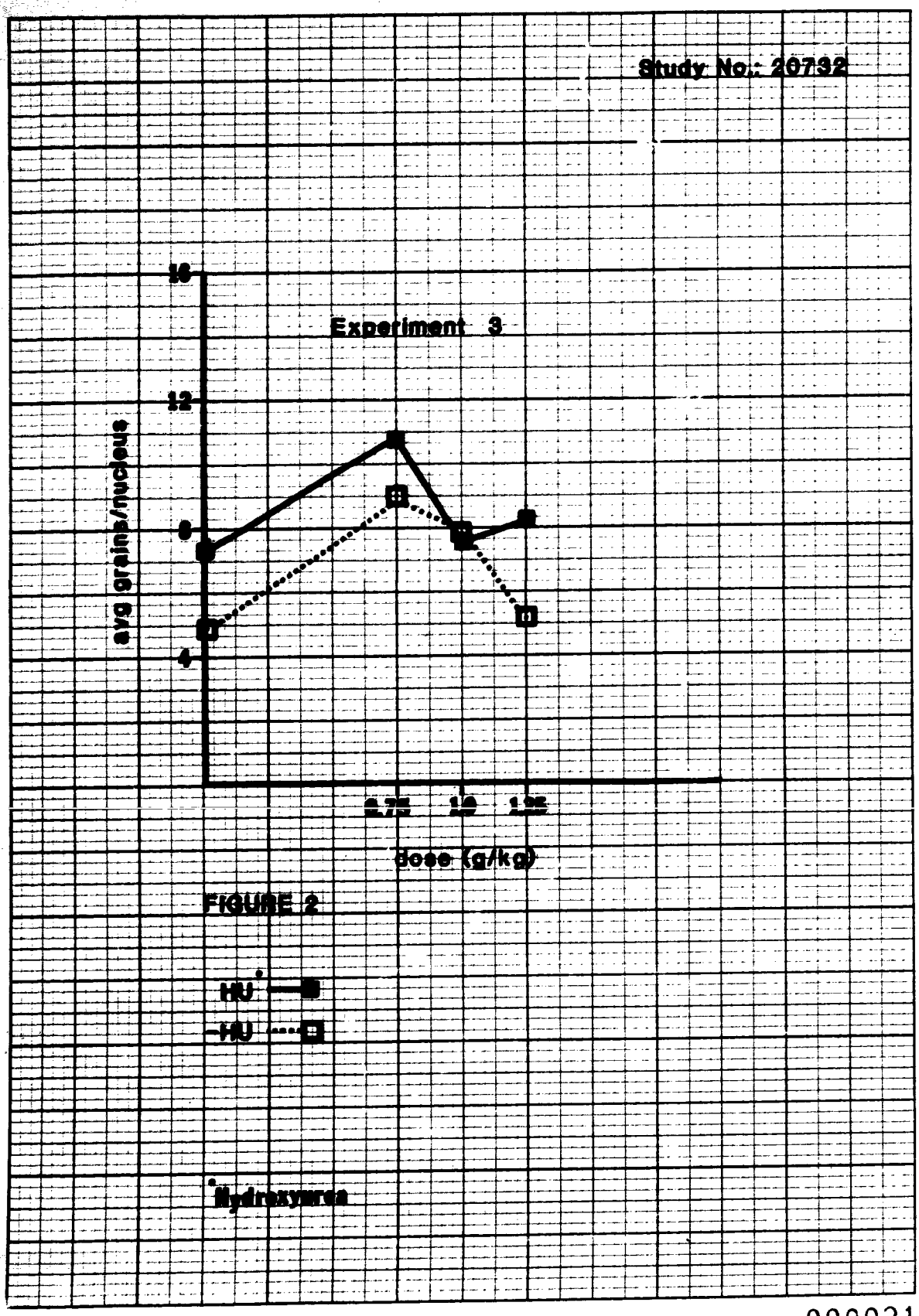
Study No.: 20732
Experiment 3
16
12
8
4
avg grains/nucleus
0.75
1.0
1.25
dose (g/kg)
HU*
-HU
*Hydroxyurea

FIGURE 2

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APPENDIX A

The following are verified copies of the computer printouts from the SAS analysis of the data from MEHSL Study No. 20732. Although the program is capable of analyzing the data by several non-parametric procedures to determine correlation coefficients, the preferred method and the method used for this study was the Spearman correlation coefficients. The appendix is set up in the following manner.

Appendix A.1- analysis of all data including animals rejected by test criteria and the data from the high dose groups.

Appendix A.2- analysis of all data including animals rejected by test criteria but dropping the high dose groups.

Appendix A.3- analysis of data without the rejected animals, both with and without the data from the high dose groups.

Experiment 3 is listed as two separate experiments on the printout. Experiment 3(printout) is that part of the experiment where cells were not treated with hydroxyurea and experiment 4 (printout) was that part of the experiment where the cells were treated with hydroxyurea.

Michael J. Skinner 3/27/84

Michael J. Skinner Date

DATA ENTERED INTO SAS ANALYSIS PROGRAM

EXPERIMENT # 1

DOSE	ANIMAL	CELLS SCORED BG	UDS	S-PHASE	TOTAL
0.5	011-460	947	35	18	1000
0.5	011-458	801	190	9	1000
0.5	011-457	682	305	13	1000
0.5	011-451	954	37	9	1000
1.0	011-465	693	290	17	1000
1.0	011-464	650	343	7	1000
1.0	011-453	906	69	25	1000
1.7	011-447	948	39	13	1000
1.7	011-459	936	61	3	1000
1.7	011-449	877	109	14	1000
0.0	011-463	877	115	8	1000
0.0	011-450	879	115	6	1000

EXPERIMENT # 2

0.75	012-723	953	31	16	1000
0.75	012-725	890	94	16	1000
1.0	012-714	901	89	10	1000
1.0	012-722	880	93	27	1000
1.0	012-713	872	117	11	1000
1.25	012-705	953	42	5	1000
1.25	012-715	970	16	14	1000
1.25	012-712	935	62	3	1000
1.25	012-707	931	54	15	1000
0.0	012-717	910	85	5	1000
0.0	012-721	914	66	20	1000

EXPERIMENT # 3

DOSE	ANIMAL	BG	UDS	S-PHASE	TOTAL
0.75	014-574	26	71	3	100
0.75	014-575	16	78	6	100
0.75	014-593	32	65	3	100
0.75	014-583	30	67	3	100
1.0	014-586	67	32	1	100
1.0	014-567	18	82	0	100
1.0	014-579	44	56	0	100
1.0	014-572	19	79	2	100
1.25	014-565	63	35	2	100
1.25	014-569	57	39	4	100
1.25	014-584	47	53	0	100
0.0	014-590	43	55	2	100
0.0	014-580	79	21	0	100

EXPERIMENT # 4

0.75	014-574	16	79	5	100
0.75	014-575	9	88	3	100
0.75	014-593	30	70	0	100
0.75	014-583	11	87	2	100
1.0	014-586	63	34	3	100
1.0	014-567	17	82	1	100
1.0	014-579	36	62	2	100
1.0	014-572	22	73	5	100
1.25	014-565	38	62	0	100
1.25	014-569	36	62	2	100
1.25	014-584	16	84	0	100
0.0	014-590	26	73	1	100
0.0	014-580	54	46	0	100

BG = BACKGROUND LEVEL OF SILVER GRAINS (0-5 GRAINS)

UDS = UNSCHEDULED DNA SYNTHESIS (5-50 GRAINS)

S-PHASE = SCHEDULED DNA SYNTHESIS (>50 GRAINS)

The variables listed on the computer printouts are:

S = S-PHASE
N = ANIMAL NUMBER (N/A)
U = UNSCHEDULED DNA SYNTHESIS
BG = BACKGROUND
D = DOSE

6

BLANK PAGE(S)

```
*****************************************
*                                       *
* C44941                 84.044 11:46:22 *
* C44941.B.OUTLIST                      *
*                                       *
*                                       *
*****************************************
```

```
11.43.29 JOB 3507  $HASP373 C44941B  STARTED - INIT 16  [illegible]
11.43.29 JOB 3507  IEF403I C44941B  STARTED  [illegible]
11.44.30 JOB 3507  IEF404I C44941B  ENDED  [illegible]
11.44.30 JOB 3507  $HASP395 JOB C44941B [illegible]
11.44.30 JOB 3507  $HASP395 JOB C44941B [illegible]
11.44.30 JOB 3507  $HASP395 C44941B  ENDED

-- ---- JES2 JOB STATISTICS -----

 13 FEB 84 JOB EXECUTION DATE

        93 CARDS READ

       449 SYSOUT PRINT RECORDS

         0 SYSOUT PUNCH RECORDS

      1.01 MINUTES EXECUTION TIME
 1      //C44941B JOB (X,[illegible]-8434-91,D,44941 [illegible] POUTELLO RM [illegible]      JOB 3507
        // CLASS=A,MSGCLASS=Q,NOTIFY=C44941
        ***
        ***ROUTE PRINT R1
 2      // EXEC SAS,PRINT='*'
 3      XXSAS     PROC OPTIONS=,SORT=4,ENTRY CASLPA
        XX              PRINT=A,PUNCH=B,SREGION=[illegible],WORKSZ=15,
        XX              LIB='MOB.SASLIB',CYLS=20
        ************************************************************************
        ***  PRODUCT: QC SAS RELEASE 82.7                                      ***
        ***  DOCUMENTATION:  SAS USER'S GUIDE: BASICS, 1982 EDITION            ***
        ***                  SAS USER'S GUIDE: STATISTICS, 1982 EDITION        ***
        ***  FROM  SAS INSTITUTE INC., BOX 8000, CARY, NC  27511-8000          ***
        ************************************************************************
 4      XXSAS     EXEC PGM=&ENTRY,PARM='&OPTIONS,SORT=&SORT',REGION=&SREGION
 5      XXLIBRARY  DD  DSN=&LIBRARY,DISP=(MOD,PASS)
        XX              UNIT=SYSDA,SPACE=(CYL,(2,,75))
 6      XXSTEPLIB  DD  DSN=&LIB,DISP=SHR
 7      XX         DD  DSN=*.LIBRARY,DISP=(OLD,PASS),VOL=REF=*.LIBRARY
 8      XXSASHELP  DD  DSN=MOB.SAS.SASHELP,DISP=SHR
 9      XXWORK     DD  UNIT=SYSDA,SPACE=(CYL,([illegible]),MUPKSTR) SAS WORK SPACE
10      XXFT11F001 DD  SYSOUT=&PRINT,DCB=(BLKSIZE=[illegible],LRECL=[illegible],RECFM=VBA)
11      XXFT12F001 DD  SYSOUT=&PRINT,DCB=(BLKSIZE=141,LRECL=137,RECFM=VBA)
12      XXFT13F001 DD  SYSOUT=&PUNCH,DCB=(RECFM=F,BLKSIZE=80)
13      XXFT14F001 DD  DUMMY
14      XXFT15F001 DD  UNIT=SYSDA,SPACE=(150,(100,300))          CARDIN
        XX              DCB=(RECFM=FB,LRECL=80,BLKSIZE=400,BUFNO=4)
15      XXSYSOUT   DD  SYSOUT=&PRINT,DCB=BUFNO=1
16      XXSORTWK01 DD  SPACE=(CYL,(&CYLS,&CYLS)),UNIT=SYSDA
17      XXSORTWK02 DD  SPACE=(CYL,(&CYLS,&CYLS)),UNIT=SYSDA
18      XXSORTWK03 DD  SPACE=(CYL,(&CYLS,&CYLS)),UNIT=SYSDA
19      //SYSIN DD *
STMT NO. MESSAGE

 4      IEF653I SUBSTITUTION JCL - PGM=SASLPA,PARM=' SORT=4',REGION=512K
 6      IEF653I SUBSTITUTION JCL - DSN=MOB.SASLIB,DISP=SHR
 9      IEF653I SUBSTITUTION JCL - UNIT=SYSDA,SPACE=(CYL,(15,15))
```

```
   10      IEF653I SUBSTITUTION JCL - SYSOUT=[illegible]
   11      IEF653I SUBSTITUTION JCL - SYSOUT=* DCB=BLKSIZE=[illegible],LRECL=133 RECFM=[illegible]
   12      IEF653I SUBSTITUTION JCL - SYSOUT=D,DCB=(RECFM=F,BLKSIZE=80)
   15      IEF653I SUBSTITUTION JCL - SYSOUT=*,DCB=BUFL=1
   16      IEF653I SUBSTITUTION JCL - SPACE=(CYL,(20,20)),UNIT=SYSTA
   17      IEF653I SUBSTITUTION JCL - SPACE=(CYL,(20,20)),UNIT=SYSTA
   18      IEF653I SUBSTITUTION JCL - SPACE=(CYL,(20,20)),UNIT=SYSDA
IEF236I ALLOC. FOR C44941B SAS
IEF237I 326  ALLOCATED TO LIBRARY
IEF237I 4D8  ALLOCATED TO STEPLIB
IEF237I 326  ALLOCATED TO
IEF237I 4D9  ALLOCATED TO SYS00198
IEF237I 11B  ALLOCATED TO SASHELP
IEF237I 334  ALLOCATED TO WORK
IEF237I JES2 ALLOCATED TO FT11F001
IEF237I JES2 ALLOCATED TO FT12F001
IEF237I JES2 ALLOCATED TO FT13F001
IEF237I DMY  ALLOCATED TO FT14F001
IEF237I 32A  ALLOCATED TO FT15F001
IEF237I JES2 ALLOCATED TO SYSOUT
IEF237I 330  ALLOCATED TO SORTWK01
IEF237I 328  ALLOCATED TO SORTWK02
IEF237I 322  ALLOCATED TO SORTWK03
IEF237I JES2 ALLOCATED TO SYSIN
IEF142I C44941B SAS - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS84044.T114329.RA000.C44941B.LIBRARY        PASSED
IEF285I   VOL SER NOS= WORK04
IEF285I   MOB.SASLIB                                    KEPT
IEF285I   VOL SER NOS= SYSLNK.
IEF285I   SYS84044.T114329.RA000.C44941B.LIBRARY        PASSED
IEF285I   VOL SER NOS= WORK04.
IEF285I   SYSCTLG.VSYSPRC                               KEPT
IEF285I   VOL SER NOS= SYSPRC.
IEF285I   MOB.SAS.SASHELP                               KEPT
IEF285I   VOL SER NOS= SYS03A.
IEF285I   SYS84044.T114329.RA000.C44941B.R0000001       DELETED
IEF285I   VOL SER NOS= WORK09.
IEF285I   JES2.JOB03507.S00102                          SYSOUT
IEF285I   JES2.JOB03507.S00103                          SYSOUT
IEF285I   JES2.JOB03507.S00104                          SYSOUT
IEF285I   SYS84044.T114329.RA000.C44941B.R0000002       DELETED
IEF285I   VOL SER NOS= WORK06.
IEF285I   JES2.JOB03507.S00105                          SYSOUT
IEF285I   SYS84044.T114329.RA000.C44941B.R0000003       DELETED
IEF285I   VOL SER NOS= WORK07.
IEF285I   SYS84044.T114329.RA000.C44941B.R0000004       DELETED
IEF285I   VOL SER NOS= WORK05.
IEF285I   SYS84044.T114329.RA000.C44941B.R0000005       DELETED
IEF285I   VOL SER NOS= WORK02.
IEF285I   JES2.JOB03507.SI0101                          SYSIN
IEF373I STEP /SAS     / START 84044.1143
IEF374I STEP /SAS     / STOP  84044.1144 CPU    0MIN 01.47SEC SRB    0MIN 00.15SEC VIRT  1024K SYS   320K
U11-604 ***************************************************************
U11-605 *
U11-606 UCC ELEVEN (ARTS) - AUTOMATED RERUN AND TRACKING SYSTEM - VERSION 1.2
U11-605 *
U11-620 JOBNAME=C44941B ,CONTROL RECORD BUILT
U11-605 *
U11-604 ***************************************************************
SMF001I STEP /SAS     /                                 REQUESTED CORE MAIN 4464K
SMF003I STEP /SAS     / ACCESSES-ADDRESS      00-C26      30-DD8      00-C26      00-DD9      00-11B
SMF003I STEP /SAS     / ACCESSES-ADDRESS     149-C34      00-C2A      00-330      00-C28      00-322
IEF237I 326  ALLOCATED TO SYS00001
IEF285I   SY  1044.T114429.RA000.C44941B.R0000001       KEPT
```

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JES2 JOB LOG -- SYSTEM MAS1 -- WORD RECORDS

30

```
IEF285I   VOL SER NOS= WORK04.
IEF285I   SYS94044.T111755.RA000.C44241R.LTPE1F.
IEF285I   VOL SER NOS= WORK04.
IEF285I   SYS94044.T111320.RA000.C44241R.LTPE1F.
IEF285I   VOL SER NOS= WORL04.
IEF375I   JOB /C44241R / START 94041.1523
IEF376I   JOB /C44241R / STOP  94041.1521 CPU     0MIN 24.57SEC SRB     0MIN 00.00SEC


SMF004I   JOB /C44241R / COMPUTER     TIME OF LOCAL WORK =   [illegible]
SMF005I   JOB /C44241R / CHARGE 15754 BATCH  1.0
*****************************************************************************************************
*                                          SUMMARY                                                  *
*   1)  CPU                                                                                          *
*   2)  DATA TRANSFER                                                                                *
*          SUB-TOTAL (ACTUAL)                                                                        *
*   3)  I.O. (ESTIMATE)                                                                              *
*          LOCAL:   $    1.20/1000 LINES PRINTED                                                     *
*                   $    0.23/1000 CARDS READ/PUNCHED                                                *
*          REMOTE   $    5.31/1000 LINES PRINTED                                                     *
*                   $    0.19/1000 CARDS READ/PUNCHED                                                *
*                                                                                                     *
*          NOTE  USE THE JES2 JOB LOG FOR ESTIMATING 1% OF ACTUAL 10 LINES PER PAGE AND 100 CARDS PER INPUT
*****************************************************************************************************
*****************************************************************************************************
*          M O B I L   O I L   C O R P O R A T I O N   P O U G H K E E P S I E   C O M P U T E R   C E N T E R
*          JOB          C41931R                                                  E  MOVITEM 3 RS 1320
*          JOB          C44241R                                                  5  MOVITEM [illegible]
*          JOB          C44531R                                                  5  MOVIT[illegible]
*          JOB          C41931R                                                  [illegible]
*          JOB          C44241R                                                  [illegible]
*****************************************************************************************************
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```
NOTE: THE JOB C449418 HAS BEEN RUN UNDER RELEASE 82.5 OF SAS AT MOBIL OIL CORPORATION [illegible]

NOTE: SAS OPTIONS SPECIFIED ARE:
      SORT=4

1          DATA A; INPUT E 1 D1 2-4 2 N1 5-6 BG1 7-9 U1 [illegible] 12 [illegible] 13-15;
2          CARDS;

NOTE: DATA SET WORK.A HAS 14 OBSERVATIONS AND 6 VARIABLES. [illegible] OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.03 SECONDS AND [illegible]K.

17
18         PROC SORT; BY D1;

NOTE: DATA SET WORK.A HAS 14 OBSERVATIONS AND 6 VARIABLES. 36[illegible] OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.19 SECONDS AND 308K

19         PROC CORR PEARSON SPEARMAN KENDALL, VAR                          00000250
20          S1 N1 U1 BG1 D1;                                                00000260
21         TITLE EXPERIMENT 1;                                              00000270
22         TITLE2 CORRELATIONS;                                             00000280

NOTE: THE PROCEDURE CORR USED 0.10 SECONDS AND 376K AND PRINTED PAGES 1 TO 2.

23         DATA B; INPUT E 1 D2 2-4 2 N2 5-6 BG2 7-9 U2 [illegible]-12 S2 13-15;   00000690
24         CARDS;                                                           00000700

NOTE: DATA SET WORK.B HAS 14 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.02 SECONDS AND 300K.

39          ;                                                               00000450
40         PROC SORT; BY D2;                                                00000460

NOTE: DATA SET WORK.B HAS 14 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.19 SECONDS AND 508K.

41         PROC CORR PEARSON SPEARMAN KENDALL, VAR                          00000470
42          S2 N2 U2 BG2 D2;                                                00000480
43         TITLE EXPERIMENT 2;                                              00000490
44         TITLE2 CORRELATIONS;                                             00000500

NOTE: THE PROCEDURE CORR USED 0.10 SECONDS AND 376K AND PRINTED PAGES 3 TO 4.

45         DATA C; INPUT E 1 D3 2-4 2 N3 5-6 BG3 7-9 U3 10-12 S3 13-15;     00000510
46         CARDS;                                                           00000520

NOTE: DATA SET WORK.C HAS 14 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE DATA STATENENT USED 0.02 SECONDS AND 300K.

61          ;                                                               00000670
62         PROC SORT; BY D3;                                                00000680

NOTE: DATA SET WORK.C HAS 14 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.19 SECONDS AND 510K.

63         PROC CORR PEARSON SPEARMAN KENDALL, VAR                          00000690
64          S3 N3 U3 BG3 D3;                                                00000700
65         TITLE EXPERIMENT 3;                                              00000710
```

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66          TITLE2 CORRELATIONS;                                          00000720

NOTE: THE PROCEDURE CORR USED 0.10 SECONDS AND 380K AND PRINTED PAGES 5 TO 6.

67          DATA D; INPUT E 1 D4 2-4 2 N4 5-6 BG4 7-9 U4 10-12 S4 13-15.  00000730
68          CARDS;                                                        00000740

NOTE: DATA SET WORK.D HAS 14 OBSERVATIONS AND 5 VARIABLES, 366 OBS/TRK
NOTE: THE DATA STATEMENT USED 0.03 SECONDS AND 704K.

83          ;                                                             00000790
84          PROC SORT; BY D4;                                             00000800

NOTE: DATA SET WORK.D HAS 14 OBSERVATIONS AND 5 VARIABLES, 366 OBS/TRK
NOTE: THE PROCEDURE SORT USED 0.19 SECONDS AND 816K.

85          PROC CORR PEARSON SPEARMAN KENDALL; VAR                       00000820
86           S4 N4 U4 BG4 D4;                                             00000830
87          TITLE EXPERIMENT 4;                                           00000840

NOTE: THE PROCEDURE CORR USED 0.10 SECONDS AND 380K AND PRINTED PAGES 7 TO 8.

NOTE: SAS INSTITUTE INC.
      SAS CIRCLE
      PO BOX 8000
      CARY, N.C.  27511-8000
```

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SUMMARY STATISTICS / CORRELATIONS [illegible] MONDAY FEBRUARY [illegible], 198[illegible]

VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
S1	14	11.21428571	5.84447917	9.[illegible]0000	3.00000000	25.00000000
N1	14	9.92857147	7.11946720	8.50000000	1.00000000	22.00000000
U1	14	131.21428571	107.59123397	100.[illegible]0000	35.00000000	343.00000000
BG1	14	857.50000000	107.50145269	890.50000000	650.00000000	954.00000000
D1	14	0.91428571	0.61124985	1.00000000	0	1.70000000

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 14

	S1	N1	U1	BG1	D1
S1	1.00000 0.0000	-0.33595 0.2403	-0.01708 0.9538	-0.03687 0.9004	0.01845 0.9501
N1	-0.[illegible] 0	1.00000 0.0000	-0.32605 0.2553	0.34377 0.[illegible]6	0.17171 0.5572
U1	-0.01708 0.9538	-0.32605 0.2553	1.00000 0.0000	-0.98854 0.0001	-0.17082 0.5593
BG1	-0.03687 0.9004	0.34377 0.2296	-0.98854 0.0001	1.00000 0.0000	0.16973 0.5618
D1	0.01845 0.9501	0.17171 0.5572	-0.17082 0.5593	0.16973 0.5618	1.00000 0.0000

all data [illegible]

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 14

	S1	N1	U1	BG1	D1
S1	1.00000 0.0000	-0.40839 0.1471	-0.14696 0.6161	0.01436 0.9611	0.01143 0.9691
N1	-0.40839 0.1471	1.00000 0.0000	-0.09681 0.7420	0.17162 0.5574	0.30964 0.2814
U1	-0.14696 0.6161	-0.09681 0.7420	1.00000 0.0000	-0.96366 0.0001	-0.18234 0.5327
BG1	0.01436 0.9611	0.17162 0.5574	-0.96366 0.0001	1.00000 0.0000	0.16183 0.5805
D1	0.01143 0.9691	0.30964 0.2814	-0.18234 0.5327	0.16183 0.5805	1.00000 0.0000

KENDALL TAU B CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO= [illegible] / N = [illegible]

	S1	N1	U1	BG1	B1
S1	1.00000 0.0000	-0.25847 0.2072	[illegible] 0.6590	[illegible] [illegible]	[illegible] [illegible]
N1	-0.25847 0.2072	1.00000 0.0000	0.04430 0.8264	0.08840 0.6609	0.32121 0.1776
U1	-0.00041 0.6590	0.04430 0.8264	1.00000 0.0000	-0.00000 0.0000	-0.07454 0.7315
BG1	-0.02260 0.8107	0.08840 0.6609	-0.00000 0.0000	1.00000 0.0000	0.00426 0.6800
B1	0.01263 0.9510	0.32121 0.1776	-0.07454 0.7315	0.00426 0.6800	1.00000 0.0000

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VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
S2	14	15.50000000	10.46527015	14.50000000	[illegible]	44.00000000
N2	14	10.92857143	6.74217871	9.50000000	0.00000000	25.00000000
U2	14	126.85714286	146.92114952	87.00000000	16.00000000	571.00000000
BG2	14	857.64285714	148.78614970	905.50000000	411.00000000	970.00000000
D2	14	0.85714286	0.41271015	1.00000000	0	1.25000000

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 14

	S2	N2	U2	BG2	D2
S2	1.00000 0.0000	-0.00493 0.9866	0.14496 0.6210	-0.21308 0.4645	-0.00896 0.9758
N2	-0.00493 0.9866	1.00000 0.0000	-0.01663 0.9550	0.01677 0.9546	-0.32187 0.2618
U2	0.14496 0.6210	-0.01663 0.9550	1.00000 0.0000	-0.99760 0.0001	-0.13547 0.6443
BG2	0.21308 0.4645	0.01677 0.9546	-0.99760 0.0001	1.00000 0.0000	0.13440 0.6469
D2	0.00896 0.9758	-0.32187 0.2618	-0.13547 0.6443	0.13440 0.6469	1.00000 0.0000

All data ranges

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 14

	S2	N2	U2	BG2	D2
S2	1.00000 0.0000	-0.15198 0.6040	0.31498 0.2727	-0.37707 0.1838	-0.30347 0.2915
N2	-0.15198 0.6040	1.00000 0.0000	-0.11648 0.6917	0.09461 0.7477	-0.03187 0.9139
U2	0.31498 0.2727	-0.11648 0.6917	1.00000 0.0000	-0.99010 0.0001	-0.40981 0.1456
BG2	-0.37707 0.1838	0.09461 0.7477	-0.99010 0.0001	1.00000 0.0000	0.41026 0.1451
D2	-0.30347 0.2915	-0.03187 0.9139	-0.40981 0.1456	0.41026 0.1451	1.00000 0.0000

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PAGE 2 ,
CORRELATIONS

KENDALL TAU B CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 14

	B2	H2	U2	DE2	L2
B2	1.0000 0.0000	-0.17746 0.4101	0.[illegible] 0.[illegible]	[illegible] [illegible]	[illegible] [illegible]
H2	-0.17746 0.4101	1.00000 0.0000	[illegible] 0.[illegible]	[illegible] 0.[illegible]	0.[illegible] 0.[illegible]
U2	0.[illegible] 0.2066	0.01000 0.9573	1.00000 0.0000	0.[illegible] 0.0000	0.[illegible] 0.1397
BG2	-0.31225 0.1276	0.02210 0.2107	-0.05000 0.0000	1.00000 0.0000	0.34064 0.1[illegible]
D2	-0.23735 0.2767	0.07412 0.7312	-0.[illegible] 0.1374	0.31064 0.1[illegible]	1.00000 0.0000

EXPERIMENT 3 without HOS AIS
CORRELATIONS

11:37 MONDAY, FEBRUARY 13, 1984

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VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
S3	14	2.21428571	[illegible]	[illegible]	[illegible]	[illegible]
N3	14	8.64285714	[illegible]	[illegible]	[illegible]	[illegible]
U3	14	57.14285714	[illegible]	[illegible]	[illegible]	[illegible]
BG3	14	39.28571429	[illegible]	[illegible]	[illegible]	[illegible]
D3	14	0.85714286	0.41071015	1.00000000	0	1.[illegible]

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER HO RHO=0 / N = 14

	S3	N3	U3	BG3	D3
S3	1.00000 0.0000	-0.25042 0.3879	0.44238 0.1132	-0.49707 0.0693	0.13806 0.6379
N3	-0.25042 0.3879	1.00000 0.0000	-0.35220 0.2168	0.32834 0.2517	-0.23944 0.4097
U3	0.44238 0.1132	-0.35220 0.2168	1.00000 0.0000	-0.98198 0.0001	0.31840 0.2672
BG3	-0.49707 0.0693	0.32834 0.2517	-0.98198 0.0001	1.00000 0.0000	-0.22144 0.4448
D3	0.13806 0.6379	-0.23944 0.4097	0.31840 0.2672	-0.22144 0.4448	1.00000 0.0000

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO RHO=0 / N = 14

	S3	N3	U3	BG3	D3
S3	1.00000 0.0000	-0.25417 0.3864	0.35164 [illegible]	-0.50010 0.0680	0.00232 0.9937
N3	-0.25417 0.3864	1.00000 0.0000	-0.33187 0.2464	0.34945 0.2207	0.00911 0.9754
U3	0.35164 0.1597	-0.33187 0.2464	1.00000 0.0000	-0.98242 0.0001	0.03643 0.9016
BG3	-0.50010 0.0680	0.34945 0.2207	-0.98242 0.0001	1.00000 0.0000	0.03187 0.9139
D3	0.00232 0.9937	0.00911 0.9754	0.03643 0.9016	0.03187 0.9139	1.00000 0.0000

not done lately

EXPERIMENT 3
CORRELATIONS

KENDALL TAU B CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 14

	S3	N3	U3	BG3	D3
S3	1.00000 0.0000	-0.20050 0.3402	0.31844 0.1295	-0.38921 0.0644	0.00000 1.0000
N3	-0.20050 0.3402	1.00000 0.0000	-0.13681 0.3520	0.20879 0.2993	0.14825 0.4972
U3	0.31844 0.1295	-0.13681 0.3520	1.00000 0.0000	-0.93407 0.0000	0.07412 0.7319
BG3	-0.38921 0.0644	0.20879 0.2993	-0.93407 0.0000	1.00000 0.0000	0.00000 1.0000
D3	0.00000 1.0000	0.14825 0.4972	0.07412 0.7319	0.00000 1.0000	1.00000 0.0000

000040

VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
S4	14	1.64285714	1.78054136	1.00000000	0	5.00000000
N4	14	8.64285714	4.44811351	5.50000000	5.00000000	17.00000000
U4	14	70.14285714	17.28050813	77.50000000	34.00000000	88.00000000
BG4	14	28.21428571	16.61407453	24.00000000	0.00000000	63.00000000
D4	14	0.85714286	0.41271015	1.00000000	0	1.25000000

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER HO RHO=0 / N = 14

	S4	N4	U4	BG4	D4
S4	1.00000 0.0000	0.05064 0.8635	0.13458 0.6465	-0.23904 0.4105	0.05608 0.8490
N4	0.05064 0.8635	1.00000 0.0000	-0.10334 0.7252	0.09584 0.7445	-0.23944 0.4097
U4	0.13458 0.6465	-0.10334 0.7252	1.00000 0.0000	-0.99435 0.0001	0.15496 0.5968
BG4	-0.23904 0.4105	0.09584 0.7445	-0.99435 0.0001	1.00000 0.0000	-0.15786 0.5899
D4	0.05608 0.8490	-0.23944 0.4097	0.15496 0.5968	-0.15786 0.5899	1.00000 0.0000

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO RHO=0 / N = 14

	S4	N4	U4	BG4	D4
S4	1.00000 0.0000	-0.11330 0.6997	0.27253 0.3459	-0.35503 0.2129	-0.11737 0.6894
U4	-0.11330 0.6997	1.00000 0.0000	-0.23568 0.4173	0.19802 0.4974	0.00911 0.9754
U4	0.27253 0.3459	-0.23568 0.4173	1.00000 0.0000	-0.99008 0.0001	-0.00685 0.9815
BG4	-0.35503 0.2129	0.19802 0.4974	-0.99008 0.0001	1.00000 0.0000	0.02735 0.9261
D4	-0.11737 0.6894	0.00911 0.9754	-0.00685 0.9815	0.02735 0.9261	1.00000 0.0000

All Dow levels

000041

KENDALL TAU B CORRELATION COEFFICIENTS / 0000 = 101 USES 13 MISS [illegible]

	ZA	HA	UA	BG4	D4
ZA	1.00000 0.0000	0.10094 0.0002	[illegible] 0.2755	[illegible] [illegible]	[illegible] 0.4794
HA	0.10094 0.4094	1.00000 0.0000	-0.14043 0.4104	0.13266 0.4161	[illegible] [illegible]
UA	0.23256 0.2755	-0.14668 0.4104	1.00000 0.0000	-0.04091 0.0000	0.01543 0.9547
BG4	-0.29312 0.1725	0.13260 0.5104	-0.04091 0.0000	1.00000 0.0000	0.01242 0.9534
D4	-0.09526 0.6794	0.14325 0.4972	0.01242 0.9547	0.01242 0.9534	1.00000 0.0000

Q00042

```
J E S 2  J O B  L O G    S Y S T E M  A A A1    N O D E  N O T E B O O K

12.36.45 JOB 3874  $HASP373 C44941A  STARTED - INIT 19 - CLASS A   SYS MOB
12.36.45 JOB 3874 )IEF403I C44941A - STARTED - TIME=12.36.45
12.37.37 JOB 3874 )IEF404I C44941A - ENDED - TIME=12.37.37
12.37.38 JOB 3874 )SMF0101 JOB /C44941A / CPU   00.02 [illegible]
12.37.38 JOB 3874 )SMF0111 JOB /C44941A / 02/13/84 R. NOVIELLO RM 132[illegible]
12.37.38 JOB 3874  $HASP395 C44941A, ENDED

------ JES2 JOB STATISTICS ------

 13 FEB 84 JOB EXECUTION DATE

       77 CARDS READ

      442 SYSOUT PRINT RECORDS

        0 SYSOUT PUNCH RECORDS

     0.98 MINUTES EXECUTION TIME
  1     //C44941A JOB (X,15754-8434-91,D,44941),'R. NOVIELLO RM 132[illegible]',      JOB 3874
        // CLASS=A,MSGCLASS=0,NOTIFY=C44941                                            00000200
        ***                                                                            00000300
        ***ROUTE PRINT R1                                                              0000040
  2     // EXEC SAS,PRINT='*'                                                          00000500
  3     XXSAS     PROC OPTIONS=,SORT=4,ENTRY=SASLPA,                                  01400310
        XX              PRINT=A,PUNCH=B,SREGION='[illegible]',WRK77=15,               01400310
        XX              LIB='MOB.SASLIB',CYLS=20                                      01400310
        ***********************************************************************
        ***  PRODUCT: OS SAS RELEASE 82.3                                        ***
        ***  DOCUMENTATION: SAS USER'S GUIDE: BASICS, 1982 EDITION               ***
        ***                 SAS USER'S GUIDE: STATISTICS, 1982 EDITION           ***
        ***  FROM: SAS INSTITUTE INC., BOX 8000, CARY, NC  27511-8000            ***
        ***********************************************************************
  4     XXSAS     EXEC PGM=&ENTRY,PARM='&OPTIONS SORT=&SORT',REGION=&SREGION      01400380
  5     XXLIBRARY  DD  DSN=&LIBRARY,DISP=(MOD,PASS),                               01400390
        XX              UNIT=SYSDA,SPACE=(CYL,(2,,35))                             01400390
  6     XXSTEPLIB  DD  DSN=&LIB,DISP=SHR                                           01400410
  7     XX         DD  DSN=*.LIBRARY,DISP=(OLD,PASS),VOL=REF=*.LIBRARY             00000430
  8     XXSASHELP  DD  DSN=MOB.SAS.SASHELP,DISP=SHR
  9     XXWORK     DD  UNIT=SYSDA,SPACE=(CYL,(&WRKSZ,&WRKSZ)) SAS WORK SPACE       01400450
 10     XXFT11F001 DD  SYSOUT=&PRINT,DCB=(BLKSIZE=141,LRECL=137,RECFM=VBA)         01400460
 11     XXFT12F001 DD  SYSOUT=&PRINT,DCB=(BLKSIZE=141,LRECL=137,RECFM=VBA)         01400470
 12     XXFT13F001 DD  SYSOUT=&PUNCH,DCB=(RECFM=F,BLKSIZE=80)                      01400480
 13     XXFT14F001 DD  DUMMY
 14     XXFT15F001 DD  UNIT=SYSDA,SPACE=(400,(100,300)),          PARMCARDS        01400490
        XX              DCB=(RECFM=FB,LRECL=80,BLKSIZE=400,BUFNO=1)                01400500
 15     XXSYSOUT   DD  SYSOUT=&PRINT,DCB=BUFNO=1                                   01400520
 16     XXSORTWK01 DD  SPACE=(CYL,(&CYLS,&CYLS)),UNIT=SYSDA                        00000230
 17     XXSORTWK02 DD  SPACE=(CYL,(&CYLS,&CYLS)),UNIT=SYSDA                        00000230
 18     XXSORTWK03 DD  SPACE=(CYL,(&CYLS,&CYLS)),UNIT=SYSDA                        00000230
 19     //SYSIN DD *                                                               00000600
STMT NO. MESSAGE

   4     IEF653I SUBSTITUTION JCL - PGM=SASLPA,PARM=' SORT=4',REGION=512K
   6     IEF453I SUBSTITUTION JCL - DSN=MOB.SASLIB,DISP=SHR
   9     I[illegible]53I SUBSTITUTION JCL - UNIT=SYSDA,SPACE=(CYL,(15,15))
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   10      IEF653I SUBSTITUTION JCL - SYSOUT=*,DCB=(BLKSIZE=141,LRECL=137,RECFM=VBA)
   11      IEF653I SUBSTITUTION JCL - SYSOUT=*,DCB=(BLKSIZE=141,LRECL=137,RECFM=VBA)
   12      IEF653I SUBSTITUTION JCL - SYSOUT=B,DCB=(RECFM=F,BLKSIZE=80)
   15      IEF653I SUBSTITUTION JCL - SYSOUT=*,DCB=BUFNO=1
   16      IEF653I SUBSTITUTION JCL - SPACE=(CYL,(20,20)),UNIT=SYSDA
   17      IEF653I SUBSTITUTION JCL - SPACE=(CYL,(20,20)),UNIT=SYSDA
   18      IEF653I SUBSTITUTION JCL - SPACE=(CYL,(20,20)),UNIT=SYSDA
IEF236I ALLOC. FOR C44941A SAS
IEF237I 336  ALLOCATED TO LIBRARY
IEF237I 4D8  ALLOCATED TO STEPLIB
IEF237I 336  ALLOCATED TO
IEF237I 4D9  ALLOCATED TO SYS00272
IEF237I 11B  ALLOCATED TO SASHELP
IEF237I 320  ALLOCATED TO WORK
IEF237I JES2 ALLOCATED TO FT11F001
IEF237I JES2 ALLOCATED TO FT12F001
IEF237I JES2 ALLOCATED TO FT13F001
IEF237I DMY  ALLOCATED TO FT14F001
IEF237I 322  ALLOCATED TO FT15F001
IEF237I JES2 ALLOCATED TO SYSOUT
IEF237I 334  ALLOCATED TO SORTWK01
IEF237I 330  ALLOCATED TO SORTWK02
IEF237I 326  ALLOCATED TO SORTWK03
IEF237I JES2 ALLOCATED TO SYSIN
IEF142I C44941A SAS - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS84044.T123645.RA000.C44941A.LIBRARY        PASSED
IEF285I   VOL SER NOS= WORK10.
IEF285I   MOB.SASLIB                                     KEPT
IEF285I   VOL SER NOS= SYSLNK.
IEF285I   SYS84044.T123645.RA000.C44941A.LIBRARY        PASSED
IEF285I   VOL SER NOS= WORK10.
IEF285I   SYSCTLG.VSYSPRC                                KEPT
IEF285I   VOL SER NOS= SYSPRC.
IEF285I   MOB.SAS.SASHELP                                KEPT
IEF285I   VOL SER NOS= SYS03A.
IEF285I   SYS84044.T123645.RA000.C44941A.R0000001        DELETED
IEF285I   VOL SER NOS= WORK01.
IEF285I   JES2.JOB03874.S00102                           SYSOUT
IEF285I   JES2.JOB03874.S00103                           SYSOUT
IEF285I   JES2.JOB03874.S00104                           SYSOUT
IEF285I   SYS84044.T123645.RA000.C44941A.R0000002        DELETED
IEF285I   VOL SER NOS= WORK02.
IEF285I   JES2.JOB03874.S00105                           SYSOUT
IEF285I   SYS84044.T123645.RA000.C44941A.R0000003        DELETED
IEF285I   VOL SER NOS= WORK09.
IEF285I   SYS84044.T123645.RA000.C44941A.R0000004        DELETED
IEF285I   VOL SER NOS= WORK07.
IEF285I   SYS84044.T123645.RA000.C44941A.R0000005        DELETED
IEF285I   VOL SER NOS= WORK04.
IEF285I   JES2.JOB03874.S10101                           SYSTH
IEF373I STEP /SAS      / START 84044.1236
IEF374I STEP /SAS      / STOP  84044.1237 CPU    0MIN 01.41SEC SRB    0MIN 00.15SEC VIRT  1024K SYS   300K
SMF003I STEP /SAS      /                          REQUESTED CORE MATH 44644
SMF003I STEP /SAS      / ACCESSES-ADDRESS       00-C36        30-4D8        00-C34        00-4D9        00-11B
SMF003I STEP /SAS      / ACCESSES-ADDRESS       00-322        00-322        00-C34        00-330        00-326
IEF237I 336  ALLOCATED TO SYS00001
IEF285I   SYS84044.T123737.RA000.C44941A.R0000001        KEPT
IEF285I   VOL SER NOS= WORK10.
IEF285I   SYS84044.T123645.RA000.C44941A.LIBRARY        DELETED
IEF285I   VOL SER NOS= WORK10.
IEF285I   SYS84044.T123645.RA000.C44941A.LIBRARY        KEPT
IEF285I   VOL SER NOS= WORK10.
IEF373I JOB /C44941A / START 84044.1236
IEF374I JOB /C44941A / STOP  84044.1237 CPU    0MIN 01.41SEC SRB    0MIN 00.15SEC.
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000047

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SMF004I  JOB /C44941A / COMPUTER      3083 RELEASE MVS/3.8 SERIAL 222949 DATE 02/13/84
SMF005I ' JOB /C44941A / CHARGE 15754-8434-01 D
*****************************************************************************************************************
*                                                                                                               *
*   1)  CPU                                  QUANTITY                  RATE              COST                   *
*   2)  DATA TRANSFER                            1.41  SECS              1.[illegible]
*                                            2,417.72  KBYTES            0.053
*           SUB-TOTAL (ACTUAL)                                           = .547                                 *
*   3)  I/O  (ESTIMATE)                                                                                         *
*          LOCAL:  $    1.20/1000 LINES PRINTED                                                                 *
*                  $    0.73/1000 CARDS READ/PUNCHED                                                           *
*          REMOTE: $    0.31/1000 LINES PRINTED                                                                 *
*                  $    0.19/1000 CARDS READ/PUNCHED                                                           *
*                                                                                          TOTAL                *
*           NOTE: USE THE JES2 JOB LOG FOR ESTIMATING I/O OR ASSUME 60 LINES PER PAGE AND 10 CARDS PER INCH     *
*****************************************************************************************************************
*****************************************************************************************************************
*           M O B I L   O I L   C O R P O R A T I O N   N O R T H E A S T   C O M P U T E R   C E N T E R        *
*          JOB          C44941A                                                  R. MOVIELLO RM 1325             *
*          JOB          C44941A                                                  R. MOVIELLO RM 1325             *
*          JOB          C44941A                                                  R. MOVIELLO RM 1325             *
*          JOB          C44941A                                                  R. MOVIELLO RM 1325             *
*          JOB          C44941A                                                  R. MOVIELLO RM 1325             *
*****************************************************************************************************************
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000048

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NOTE: THE JOB C44941A HAS BEEN RUN UNDER RELEASE 82.3 OF SAS AT MOBIL OIL CORPORATION (021[illegible])

NOTE: SAS OPTIONS SPECIFIED ARE
      SORT=4

1          DATA A; INPUT E 1 D1 2-4 2 N1 5-6 BG1 7-9 U1 10-12 S1 13-15;          00000700
2          CARDS;                                                                00000800

NOTE: DATA SET WORK.A HAS 10 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.03 SECONDS AND 300K.

13         ;                                                                     00001900
14         PROC SORT; BY D1;                                                     00002000

NOTE: DATA SET WORK.A HAS 10 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.19 SECONDS AND 508K.

15         PROC CORR PEARSON SPEARMAN KENDALL; VAR                               00002100
16          S1 N1 U1 BG1 D1;                                                     00002200
17         TITLE EXPERIMENT 1;                                                   00002300
18         TITLE2 CORRELATIONS;                                                  00002400

NOTE: THE PROCEDURE CORR USED 0.10 SECONDS AND 376K AND PRINTED PAGES 1 TO 2.

19         DATA B; INPUT E 1 D2 2-4 2 N2 5-6 BG2 7-9 U2 10-12 S2 13-15;          00002500
20         CARDS;                                                                00002600

NOTE: DATA SET WORK.B HAS 10 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.02 SECONDS AND 300K.

31         ;                                                                     00003700
32         PROC SORT; BY D2;                                                     00003800

NOTE: DATA SET WORK.B HAS 10 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.19 SECONDS AND 508K

33         PROC CORR PEARSON SPEARMAN KENDALL; VAR                               00003900
34          S2 N2 U2 BG2 D2;                                                     00004000
35         TITLE EXPERIMENT 2;                                                   00004100
36         TITLE2 CORRELATIONS;                                                  00004200

NOTE: THE PROCEDURE CORR USED 0.09 SECONDS AND 376K AND PRINTED PAGES 3 TO 4.

37         DATA C; INPUT E 1 D3 2-4 2 N3 5-6 BG3 7-9 U3 10-12 S3 13-15;          [illegible]
38         CARDS;                                                                [illegible]

NOTE: DATA SET WORK.C HAS 10 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.02 SECONDS AND 300K.

49         ;                                                                     00005500
50         PROC SORT; BY D3;                                                     00005600

NOTE: DATA SET WORK.C HAS 10 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.19 SECONDS AND 510K.

51         PROC CORR PEARSON SPEARMAN KENDALL; VAR                               00005700
52          S3 N3 U3 BG3 D3;                                                     00005800
53         TITLE EXPERIMENT 3;                                                   00005900
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000049

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54          TITLE2 CORRELATIONS;

NOTE: THE PROCEDURE CORR USED 0.09 SECONDS AND 780K AND PRINTED PAGES 2 TO 4.

55          DATA D; INPUT F 1 D4 2-4 2 H4 5-6 UG4 7-9 U4 10-12 [illegible]
56          CARDS;

NOTE: DATA SET WORK.D HAS 10 OBSERVATIONS AND 7 VARIABLES. [illegible]
NOTE: THE DATA STATEMENT USED 0.02 SECONDS AND 704K.

67          ;
68          PROC SORT; BY D4;

NOTE: DATA SET WORK.D HAS 10 OBSERVATIONS AND 6 VARIABLES. [illegible] OBSERVATIONS.
NOTE: THE PROCEDURE SORT USED 0.12 SECONDS AND 710K.

69          PROC CORR PEARSON SPEARMAN KENDALL, VAR
70           S4 H4 U4 EG4 I4;
71          TITLE EXPERIMENT 4;

NOTE: THE PROCEDURE CORR USED 0.10 SECONDS AND 780K AND PRINTED PAGES 5 TO 7.

NOTE: SAS INSTITUTE INC.
      SAS CIRCLE
      PO BOX 8000
      CARY, N.C.  27511-8000
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000050

EXPERIMENT [illegible]
CORRELATIONS

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
S1	10	12.00000000	6.16441405	[illegible]	[illegible]	[illegible]
N1	10	8.50000000	7.37224973	[illegible]	[illegible]	[illegible]
U1	10	153.70000000	120.17273015	[illegible]	[illegible]	[illegible]
BG1	10	834.20000000	119.40402030	8342.00000000	650.00000000	954.00000000
D1	10	0.60000000	0.39440532	6.00000000	0	1.00000000

PROB → PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER HO: RHO=0 / N = 10

	S1	N1	U1	BG1	D1
S1	1.00000 0.0000	-0.50257 0.1380	-0.12543 0.7293	0.07517 0.8365	0.43416 0.2100
N1	[illegible] 0.1380	1.00000	-0.31759 [illegible]	[illegible] 0.3276	-0.22990 0.5228
U1	-0.12543 0.7293	-0.31759 0.3680	1.00000 0.0000	-0.99872 [illegible]	0.23755 0.5087
BG1	0.07517 0.8365	0.34790 0.3276	-0.99872 0.0001	1.00000 0.0000	-0.26236 0.4640
D1	0.43416 0.2100	-0.22990 0.5228	0.23755 0.5087	-0.26236 0.4640	1.00000 0.0000

same data as above

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO: RHO=0 / N = 10

	S1	N1	U1	BG1	D1
S1	1.00000 0.0000	-0.64635 0.0425	-0.26606 0.4575	0.14025 0.6992	0.33289 0.3473
N1	-0.64635 0.0425	1.00000 0.0000	-0.06077 0.8675	0.18788 0.6032	0.07785 0.8307
U1	-0.26606 0.4575	-0.06077 0.8675	1.00000 0.0000	-0.96049 0.0001	0.15417 0.6666
BG1	0.14025 0.6992	0.18788 0.6032	-0.96049 0.0001	1.00000 0.0000	-0.10380 0.7754
D1	0.33289 0.3473	0.07785 0.8307	0.15417 0.6666	-0.10380 0.7754	1.00000 0.0000

000051

KENDALL TAU B CORRELATION COEFFICIENTS / PROB > |R| UNDER HO: RHO = 0 / N = 40

	S1	N1	U1	BG1	D1
S1	1.00000 0.0000	-0.47187 0.0047	-0.18792 0.4690	0.06820 0.7868	0.29654 0.0936
N1	-0.47187 0.0047	1.00000 0.0000	0.04455 0.8575	0.15556 0.5313	0.10541 0.6985
U1	-0.18792 0.4690	0.04455 0.8575	1.00000 0.0000	-0.89893 0.0003	0.15990 0.5600
BG1	0.06820 0.7868	0.15556 0.5313	-0.89893 0.0003	1.00000 0.0000	-0.10541 0.6985
D1	0.29654 0.0936	0.10541 0.6985	0.15990 0.5600	-0.10541 0.6985	1.00000 0.0000

000052

CORRELATIONS

VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
S2	10	18.00000000	[illegible]	[illegible]	[illegible]	[illegible]
N2	10	11.10000000	0.06156864	[illegible]	[illegible]	[illegible]
U2	10	160.20000000	163.44712696	[illegible]	[illegible]	571.00000000
BG2	10	821.80000000	163.92973252	[illegible]	[illegible]	[illegible]
D2	10	0.70000000	0.33720877	[illegible]	0	1.00000000

PEARSON CORRELATION COEFFICIENTS / PROB > \|R\| UNDER HO:RHO=0 / N = 10

	S2	N2	U2	BG2	D2
S2	1.00000 0.0000	0.00378 0.9917	0.00889 0.9806	-0.07556 0.8356	0.34765 0.3250
N2	0.00378 0.9917	1.00000 0.0000	-0.03703 0.9191	0.03667 0.9199	-0.38078 0.2777
U2	0.00889 0.9806	-0.03703 0.9191	1.00000 0.0000	-0.99777 0.0001	0.13443 0.7112
BG2	-0.07556 0.8356	0.03667 0.9199	-0.99777 0.0001	1.00000 0.0000	-0.15724 0.6644
D2	0.34765 0.3250	-0.38078 0.2777	0.13443 0.7112	-0.15724 0.6644	1.00000 0.0000

SPEARMAN CORRELATION COEFFICIENTS / PROB > \|R\| UNDER HO:RHO=0 / N = 10

	S2	N2	U2	BG2	D2
S2	1.00000 0.0000	0.09119 0.8022	0.18237 0.6141	-0.22493 0.5321	0.18220 0.6144
N2	0.09119 0.8022	1.00000 0.0000	-0.06667 0.8548	-0.01818 0.9602	-0.14272 0.6941
U2	0.18237 0.6141	-0.06667 0.8548	1.00000 0.0000	-0.98788 0.0001	0.33735 0.3495
BG2	-0.22493 0.5321	-0.01818 0.9602	-0.98788 0.0001	1.00000 0.0000	-0.38725 0.2662
D2	0.18220 0.6144	-0.14272 0.6941	0.33735 0.3495	-0.38725 0.2662	1.00000 0.0000

000053

KENDALL TAU B CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 10

	S2	N2	U2	SG2	D2
S2	1.00000	0.00000	0.17078	0.22473	0.10663
	0.0000	1.0000	0.4725	0.3223	0.4731
N2	0.00000	1.00000	-0.03333	-0.03333	0.55333
	1.0000	0.0000	0.9287	0.9287	[illegible]
U2	0.17078	0.03333	1.00000	0.35556	[illegible]
	0.4725	0.9287	0.0000	0.2001	0.4334
SG2	-0.22473	0.03333	0.35556	1.00000	0.53333
	0.3223	0.9287	0.0001	0.0000	0.3739
D2	0.10663	-0.05556	0.21053	-0.04333	1.00000
	0.6731	0.8415	0.4386	0.8739	0.0000

000054

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
S3	10	2.00000000	1.08541008	2.00000000	0	4.00000000
N3	10	7.90000000	5.03702052	6.70000000	0.00000000	19.00000000
U3	10	58.70000000	24.80105746	66.00000000	2.00000000	82.00000000
BG3	10	37.40000000	21.24131605	31.00000000	14.00000000	79.00000000
D3	10	0.70000000	0.33729833	0.75000000	0	1.00000000

PEARSON CORRELATION COEFFICIENTS / PROB > \|R\| UNDER HO:RHO=0 / N = 10

	S3	N3	U3	BG3	D3
S3	1.00000 0.0000	-0.31278 0.3789	0.48230 0.1580	-0.54598 0.1025	0.03804 0.9169
N3	-0.31278 0.3789	1.00000 0.0000	-0.34549 0.3282	0.31169 0.3807	-0.55268 0.0975
U3	0.48230 0.1580	-0.34549 0.3282	1.00000 0.0000	-0.98229 0.0001	0.56506 0.0987
BG3	-0.54598 0.1025	0.31169 0.3807	-0.98229 0.0001	1.00000 0.0000	-0.48306 0.1773
D3	0.03804 0.9169	-0.55268 0.0975	0.56506 0.0987	-0.48306 0.1773	1.00000 0.0000

SPEARMAN CORRELATION COEFFICIENTS / PROB > \|R\| UNDER HO:RHO=0 / N = 10

	S3	N3	U3	BG3	D3
S3	1.00000 0.0000	-0.42384 0.2222	0.31788 0.3707	-0.31734 0.1257	-0.31358 0.3776
N3	-0.42384 0.2222	1.00000 0.0000	-0.22424 0.5334	0.32121 0.3655	-0.23355 0.5161
U3	0.31788 0.3707	-0.22424 0.5334	1.00000 0.0000	-0.95152 0.0001	0.42817 0.2170
BG3	-0.31734 0.1257	0.32121 0.3655	-0.95152 0.0001	1.00000 0.0000	-0.23355 0.5161
D3	-0.31358 0.3776	-0.23355 0.5161	0.42817 0.2170	-0.23355 0.5161	1.00000 0.0000

KENDALL TAU B CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / [illegible] / 40

	Z3	N3	U3	BG3	D3
Z3	1.00000 0.0000	-0.33856 0.1843	0.28013 0.2666	-0.43522 0.0256	[illegible] 0.3622
N3	0.33856 0.1843	1.00000 0.0000	-0.20000 0.4208	0.24444 [illegible]	-0.10541 [illegible]
U3	0.28013 0.2666	-0.20000 0.4208	1.00000 0.0000	-0.84667 0.0005	0.34833 0.1752
BG3	-0.43522 0.0256	0.24444 0.3252	-0.84667 0.0005	1.00000 0.0000	-0.21082 0.4736
D3	-0.05802 0.3622	-0.10541 0.4285	0.34833 0.1752	-0.21082 0.4736	1.00000 0.0000

000056

000057

VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
Z4	10	2.00000000	1.[illegible]	1.[illegible]	0	[illegible]
N4	10	7.90000000	5.08762052	4.[illegible]	[illegible]	[illegible]
U4	10	68.90000000	17.[illegible]	77.[illegible]	[illegible]	[illegible]
BG4	10	29.10000000	18.4775[illegible]475	24.[illegible]	0.00000000	63.00000000
D4	10	0.70000000	0.30729833	0.75000000	0	1.00000000

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER HO: RHO=0 / N = 10

	Z4	N4	U4	BG4	D4
Z4	1.00000 0.0000	0.16836 0.6416	0.24586 0.4937	-0.34341 0.3313	0.36901 0.2940
N4	0.16836 0.6416	1.00000 0.0000	-0.15628 0.6664	0.13369 0.7127	-0.55268 0.0975
U4	0.24586 0.4937	-0.15628 0.6664	1.00000 0.0000	-0.99479 0.0001	0.10736 0.7678
BG4	-0.34341 0.3313	0.13369 0.7127	-0.99479 0.0001	1.00000 0.0000	-0.14284 0.6938
D4	0.36901 0.2940	-0.55268 0.0975	0.10736 0.7678	-0.14284 0.6938	1.00000 0.0000

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 10

	Z4	N4	U4	BG4	D4
Z4	1.00000 0.0000	0.08671 0.8117	0.39137 0.2634	-0.48309 0.1573	0.25856 0.4707
N4	0.08671 0.8117	1.00000 0.0000	-0.30395 0.3932	0.24848 0.4888	-0.23375 0.5161
U4	0.39137 0.2634	-0.30395 0.3932	1.00000 0.0000	-0.98481 0.0001	-0.09761 0.7885
BG4	-0.48309 0.1573	0.24848 0.4888	-0.98481 0.0001	1.00000 0.0000	0.10380 0.7754
D4	0.25856 0.4707	-0.23375 0.5161	-0.09761 0.7885	0.10380 0.7754	1.00000 0.0000

KENDALL TAU B CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 12

	Z4	N4	U4	BG4	D4
Z4	1.00000 0.0000	0.02387 0.9269	0.33796 0.1965	-0.40580 0.1181	0.22646 0.4279
N4	0.02387 0.9269	1.00000 0.0000	-0.22473 0.3492	0.20000 0.4203	-0.10541 0.6835
U4	0.33796 0.1965	-0.22473 0.3492	1.00000 0.0000	-0.94388 0.0002	0.07895 0.7737
BG4	-0.40580 0.1181	0.20000 0.4203	-0.94388 0.0002	1.00000 0.0000	0.10541 0.6835
D4	0.22646 0.4279	-0.10541 0.6835	0.07895 0.7737	0.10541 0.6835	1.00000 0.0000

000058

```
*****************************************
*                                       *
* C44941                  84.046 10.50 50 *
* C44941.A.OUTLIST                      *
*                                       *
*                                       *
*****************************************
```

000060

000061

```
10.40.33 JOB 3064  $HASP373 C44941A  STARTED - INIT 20 - CLASS A - SYS NB83
10.40.34 JOB 3064 )IEF403I C44941A - STARTED - TIME=10.40.34
10.42.58 JOB 3064 )IEF404I C44941A - ENDED - TIME=10.42.58
10.42.58 JOB 3064 )SMF010I JOB /C44941A / CPU   00.03 15754-8434-91 D
10.42.58 JOB 3064 )SMF011I JOB /C44941A / 03/06/84 R. NOVIELLO RM 1325
10.42.58 JOB 3064  $HASP395 C44941A  ENDED

------ JES2 JOB STATISTICS ------


 06 MAR 84 JOB EXECUTION DATE


       111 CARDS READ


       675 SYSOUT PRINT RECORDS


         0 SYSOUT PUNCH RECORDS


      2.42 MINUTES EXECUTION TIME
  1      //C44941A  JOB (X,15754-8434-91,D,44941),'R. NOVIELLO RM 1325',          JOB 3064
         // CLASS=A,MSGCLASS=Q,NOTIFY=C44941                                      00000020
         ***                                                                      00000030
         ***ROUTE PRINT R1                                                         0000004
  2      // EXEC SAS,PRINT='*'                                                    00000050
  3      XXSAS      PROC OPTIONS=,SORT=4,ENTRY=SASLPA,                            01400310
         XX              PRINT=A,PUNCH=B,SREGION=512K,WRKSZ=15,                   01400310
         XX              LIB='MOD.SASLIB',CYLS=20                                 01400310
         ************************************************************************
         ***  PRODUCT: OS SAS RELEASE 82.3                                   ***
         ***  DOCUMENTATION: SAS USER'S GUIDE: BASICS, 1982 EDITION          ***
         ***                 SAS USER'S GUIDE: STATISTICS, 1982 EDITION      ***
         ***  FROM: SAS INSTITUTE INC., BOX 8000, CARY, NC  27511-8000       ***
         ************************************************************************
  4      XXSAS      EXEC PGM=&ENTRY,PARM='&OPTIONS SORT=&SORT',REGION=&SREGION   01400380
  5      XXLIBRARY  DD   DSN=&LIBRARY,DISP=(MOD,PASS),                           01400390
         XX              UNIT=SYSDA,SPACE=(CYL,(2,,35))                           01400390
  6      XXSTEPLIB  DD   DSN=&LIB,DISP=SHR                                        01400410
  7      XX         DD   DSN=*.LIBRARY,DISP=(OLD,PASS),VOL=REF=*.LIBRARY          00000130
  8      XXSASHELP  DD   DSN=MOD.SAS.SASHELP,DISP=SHR
  9      XXWORK     DD   UNIT=SYSDA,SPACE=(CYL,(&WRKSZ,&WRKSZ)) SAS WORK SPACE    01400450
 10      XXFT11F001 DD   SYSOUT=&PRINT,DCB=(BLKSIZE=141,LRECL=137,RECFM=VBA)      01400460
 11      XXFT12F001 DD   SYSOUT=&PRINT,DCB=(BLKSIZE=141,LRECL=137,RECFM=VBA)      01400470
 12      XXFT13F001 DD   SYSOUT=&PUNCH,DCB=(RECFM=F,BLKSIZE=80)                   01400480
 13      XXFT14F001 DD   DUMMY
 14      XXFT15F001 DD   UNIT=SYSDA,SPACE=(400,(100,300)),        PARMCARDS       01400490
         XX              DCB=(RECFM=FB,LRECL=80,BLKSIZE=400,BUFNO=1)              01400500
 15      XXSYSOUT   DD   SYSOUT=&PRINT,DCB=BUFNO=1                                01400520
 16      XXSORTWK01 DD   SPACE=(CYL,(&CYLS,&CYLS)),UNIT=SYSDA                     00000530
 17      XXSORTWK02 DD   SPACE=(CYL,(&CYLS,&CYLS)),UNIT=SYSDA                     00000530
 18      XXSORTWK03 DD   SPACE=(CYL,(&CYLS,&CYLS)),UNIT=SYSDA                     00000530
 19      //SYSIN DD *                                                             00000560
STMT NO. MESSAGE
-
  4      IEF653I SUBSTITUTION JCL - PGM=SASLPA,PARM=' SORT=4',REGION=512K
  6      IEF653I SUBSTITUTION JCL - DSN=MOD.SASLIB,DISP=SHR
  9      IEF653I SUBSTITUTION JCL - UNIT=SYSDA,SPACE=(CYL,(15,15))
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  10      IEF653I SUBSTITUTION JCL - SYSOUT=*,DCB=(BLKSIZE=141,LRECL=137,RECFM=VBA)
  11      IEF653I SUBSTITUTION JCL - SYSOUT=*,DCB=(BLKSIZE=141,LRECL=137,RECFM=VBA)
  12      IEF653I SUBSTITUTION JCL - SYSOUT=B,DCB=(RECFM=F,BLKSIZE=80)
  15      IEF653I SUBSTITUTION JCL - SYSOUT=*,DCB=BUFNO=1
  16      IEF653I SUBSTITUTION JCL - SPACE=(CYL,(20,20)),UNIT=SYSDA
  17      IEF653I SUBSTITUTION JCL - SPACE=(CYL,(20,20)),UNIT=SYSDA
  18      IEF653I SUBSTITUTION JCL - SPACE=(CYL,(20,20)),UNIT=SYSDA
IEF236I ALLOC. FOR C44941A SAS
IEF237I 328  ALLOCATED TO LIBRARY
IEF237I 4D8  ALLOCATED TO STEPLIB
IEF237I 328  ALLOCATED TO
IEF237I 4D9  ALLOCATED TO SYS00632
IEF237I 11B  ALLOCATED TO SASHELP
IEF237I 336  ALLOCATED TO WORK
IEF237I JES2 ALLOCATED TO FT11F001
IEF237I JES2 ALLOCATED TO FT12F001
IEF237I JES2 ALLOCATED TO FT13F001
IEF237I DMY  ALLOCATED TO FT14F001
IEF237I 32A  ALLOCATED TO FT15F001
IEF237I JES2 ALLOCATED TO SYSOUT
IEF237I 324  ALLOCATED TO SORTWK01
IEF237I 334  ALLOCATED TO SORTWK02
IEF237I 330  ALLOCATED TO SORTWK03
IEF237I JES2 ALLOCATED TO SYSIN
IEF142I C44941A SAS - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS84066.T104033.RA000.C44941A.LIBRARY        PASSED
IEF285I   VOL SER NOS= WORK05.
IEF285I   NOB.SASLIB                                     KEPT
IEF285I   VOL SER NOS= SYSLNK.
IEF285I   SYS84066.T104033.RA000.C44941A.LIBRARY        PASSED
IEF285I   VOL SER NOS= WORK05.
IEF285I   SYSCTLG.VSYSPRC                                KEPT
IEF285I   VOL SER NOS= SYSPRC.
IEF285I   NOB.SAS.SASHELP                                KEPT
IEF285I   VOL SER NOS= SYS03A.
IEF285I   SYS84066.T104033.RA000.C44941A.R0000001        DELETED
IEF285I   VOL SER NOS= WORK10.
IEF285I   JES2.JOB03064.S00102                           SYSOUT
IEF285I   JES2.JOB03064.S00103                           SYSOUT
IEF285I   JES2.JOB03064.S00104                           SYSOUT
IEF285I   SYS84066.T104033.RA000.C44941A.R0000002        DELETED
IEF285I   VOL SER NOS= WORK06.
IEF285I   JES2.JOB03064.S00105                           SYSOUT
IEF285I   SYS84066.T104033.RA000.C44941A.R0000003        DELETED
IEF285I   VOL SER NOS= WORK03.
IEF285I   SYS84066.T104033.RA000.C44941A.R0000004        DELETED
IEF285I   VOL SER NOS= WORK09.
IEF285I   SYS84066.T104033.RA000.C44941A.R0000005        DELETED
IEF285I   VOL SER NOS= WORK07.
IEF285I   JES2.JOB03064.S10101                           SYSIN
IEF373I STEP /SAS      / START 84066.1040
IEF374I STEP /SAS      / STOP  84066.1042 CPU    0MIN 01.95SEC SRB    0MIN 00.25SEC VIRT  1024K SYS   372K
SWF001I STEP /SAS      /                                REQUESTED CORE MAIN 4400K
SWF003I STEP /SAS      ' ACCESSES-ADDRESS       00-328        51-0D8        00-328        00-4D7        00-11B
SWF003I STEP /SAS      / ACCESSES-ADDRESS      271-336        00-32A        00-32A        00-C34        00-C30
IEF237I 328  ALLOCATED TO SYS00001
IEF285I   SYS84066.T104258.RA000.C44941A.R0000001        KEPT
IEF285I   VOL SER NOS= WORK05.
IEF285I   SYS84066.T104033.RA000.C44941A.LIBRARY        DELETED
IEF285I   VOL SER NOS= WORK05.
IEF285I   SYS84066.T104033.RA000.C44941A.LIBRARY        KEPT
IEF285I   VOL SER NOS= WORK05.
IEF373I J /C44941A / START 84066.1040
IEF374I J /C44941A / STOP  84066.1042 CPU    0MIN 01.95SEC SRB    0MIN 00.25SEC
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000062

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SMF004I  JOB /C44941A / COMPUTER     3083 RELEASE MVS/3.8 SERIAL 220969 DATE 03/06/84
SMF005I  JOB /C44941A / CHARGE 15754-8434-91 D
*****************************************************************************************************************
*                                        QUANTITY                    MCU'S          COST ($)                    *
*   1)  CPU                                  1.95  SECS                2.346            1.76                     *
*   2)  DATA TRANSFER                    6,140.22  KBYTES              1.535            1.15                     *
*           SUB-TOTAL (ACTUAL)                                         3.881                     $          2.91  *
*   3)  I/O  (ESTIMATE)                                                                                           *
*          LOCAL:  $   1.20/1000 LINES PRINTED                                                 $                  *
*                  $   0.73/1000 CARDS READ/PUNCHED                                            $                  *
*          REMOTE: $   0.31/1000 LINES PRINTED                                                 $                  *
*                  $   0.19/1000 CARDS READ/PUNCHED                                            $                  *
*                                                                                   TOTAL     $                  *
*           NOTE: USE THE JES2 JOB LOG FOR ESTIMATING I/O OR ASSUME 40 LINES PER PAGE AND 150 CARDS PER INCH      *
*****************************************************************************************************************
*****************************************************************************************************************
*           M O B I L   O I L   C O R P O R A T I O N   N O R T H E A S T   C O M P U T E R   C E N T E R         *
*          JOB          C44941A                                                R. NOVIELLO RM 1325                 *
*          JOB          C44941A                                                R. NOVIELLO RM 1325                 *
*          JOB          C44941A                                                R. NOVIELLO RM 1325                 *
*          JOB          C44941A                                                R. NOVIELLO RM 1325                 *
*          JOB          C44941A                                                R. NOVIELLO RM 1325                 *
*****************************************************************************************************************
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000063

000064

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NOTE: THE JOB C44941A HAS BEEN RUN UNDER RELEASE 82.3 OF SAS AT MOBIL OIL CORPORATION (02140001).

NOTE: SAS OPTIONS SPECIFIED ARE:
      SORT=4

1          DATA A; INPUT E 1 D1 2-4 2 N1 5-6 BG1 7-9 U1 10-12 S1 13-15;          00000070
2          CARDS;                                                                00000080

NOTE: DATA SET WORK.A HAS 14 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.03 SECONDS AND 300K.

17         ;                                                                     00000230
18         PROC SORT; BY D1;                                                     00000240
ERROR:                 341

341:  YOUR SERVICE AGREEMENT HAS EXPIRED.  PLEASE
      CONTACT YOUR COMPUTING INSTALLATION'S USER SERVICE
      PERSONNEL OR INSTALLATION SAS REPRESENTATIVE.

NOTE: DATA SET WORK.A HAS 14 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.19 SECONDS AND 508K.

19         DATA AA ; SET A; IF ((N1 = 21) | (N1 = 12)) THEN DELETE;              00000250

NOTE: DATA SET WORK.AA HAS 12 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.02 SECONDS AND 300K.

20         PROC PRINT; VAR N1;                                                   00000260
21         TITLE EXPERIMENT 1;                                                   00000270
22         TITLE2 ANIMALS INCLUDED IN ANALYSIS;                                  00000280
23         TITLE3 ALL DOSE LEVELS -- NOS 12 & 21 DROPPED;                        00000290

NOTE: THE PROCEDURE PRINT USED 0.06 SECONDS AND 356K AND PRINTED PAGE 1.

24         PROC CORR PEARSON SPEARMAN ; VAR                                      00000300
25          S1 N1 U1 BG1 D1;                                                     00000310
26         TITLE2 CORRELATIONS;                                                  00000320
27         TITLE3 ALL DOSE LEVELS -- NOS 12 & 21 DROPPED;                        00000330

NOTE: THE PROCEDURE CORR USED 0.09 SECONDS AND 376K AND PRINTED PAGES 2 TO 3.

28         DATA AAA; SET AA; IF (D1 < 1.70);                                     00000340

NOTE: DATA SET WORK.AAA HAS 9 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.02 SECONDS AND 300K.

29         PROC PRINT; VAR N1;                                                   00000350
30         TITLE2 ANIMALS INCLUDED IN ANALYSIS;                                  00000360
31         TITLE3 HIGHEST DOSE LEVEL DELETED -- NOS 12 & 21 DROPPED;             00000370

NOTE: THE PROCEDURE PRINT USED 0.07 SECONDS AND 356K AND PRINTED PAGE 4.

32         PROC CORR PEARSON SPEARMAN ; VAR                                      00000380
33          S1 N1 U1 BG1 D1;                                                     00000390
34         TITLE2 CORRELATIONS;                                                  00000400
35         TITLE3 HIGHEST DOSE LEVEL DELETED -- NOS 12 & 21 DROPPED;             00000410
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NOTE: THE PROCEDURE CORR USED 0.09 SECONDS AND 376K AND PRINTED PAGES 5 TO 6.

36          DATA B; INPUT E 1 D2 2-4 2 N2 5-6 BG2 7-9 U2 10-12 S2 13-15;        00000420
37          CARDS;                                                              00000430

NOTE: DATA SET WORK.B HAS 14 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.03 SECONDS AND 300K.

52          ;                                                                   00000580
53          PROC SORT; BY D2;                                                   00000590

NOTE: DATA SET WORK.B HAS 14 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.19 SECONDS AND 508K.

54          DATA BB; SET B; IF (N2 =4 | N2 = 25 | N2 = 8) THEN DELETE;          00000600

NOTE: DATA SET WORK.BB HAS 11 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.03 SECONDS AND 300K.

55          PROC PRINT; VAR N2;                                                 00000610
56          TITLE EXPERIMENT 2;                                                 00000620
57          TITLE2 ANIMALS INCLUDED IN ANALYSIS;                                00000630
58          TITLE3 ALL DOSE LEVELS -- NOS. 4,8 & 25 DROPPED;                    00000640

NOTE: THE PROCEDURE PRINT USED 0.07 SECONDS AND 356K AND PRINTED PAGE 7.

59          PROC CORR PEARSON SPEARMAN ; VAR                                    00000650
60           S2 N2 U2 BG2 D2;                                                   00000660
61          TITLE2 CORRELATIONS;                                                00000670
62          TITLE3 ALL DOSE LEVELS -- NOS. 4,8 & 25 DROPPED;                    00000680

NOTE: THE PROCEDURE CORR USED 0.09 SECONDS AND 376K AND PRINTED PAGES 8 TO 9.

63          DATA BBB; SET BB; IF (D2 < 1.25);                                   00000690

NOTE: DATA SET WORK.BBB HAS 7 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.03 SECONDS AND 300K.

64          PROC PRINT; VAR N2;                                                 00000700
65          TITLE2 ANIMALS INCLUDED IN ANALYSIS;                                00000710
66          TITLE3 HIGHEST DOSE LEVEL DELETED -- NOS. 4,8 & 25 DROPPED;         00000720

NOTE: THE PROCEDURE PRINT USED 0.06 SECONDS AND 356K AND PRINTED PAGE 10.

67          PROC CORR PEARSON SPEARMAN ; VAR                                    00000730
68           S2 N2 U2 BG2 D2;                                                   00000740
69          TITLE2 CORRELATIONS;                                                00000750
70          TITLE3 HIGHEST DOSE LEVEL DELETED -- NOS. 4,8 & 25 DROPPED;         00000760

NOTE: THE PROCEDURE CORR USED 0.09 SECONDS AND 376K AND PRINTED PAGES 11 TO 12.

71          DATA C; INPUT E 1 D3 2-4 2 N3 5-6 BG3 7-9 U3 10-12 S3 13-15;        00000770
72          CARDS;                                                              00000780

NOTE: DATA SET WORK.C HAS 14 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.02 SECONDS AND 300K.

87          ;                                                                   00000930
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000065

```
88          PROC SORT; BY D3;                                          00000930

NOTE: DATA SET WORK.C HAS 14 OBSERVATIONS AND 6 VARIABLES. 364 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.19 SECONDS AND 510K.

89          DATA CC; SET C; IF (N3 ^= 9);                              00000950

NOTE: DATA SET WORK.CC HAS 13 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.02 SECONDS AND 304K.

90          PROC PRINT; VAR N3;                                        00000960
91          TITLE EXPERIMENT 3;                                        00000970
92          TITLE2 ANIMALS INCLUDED IN ANALYSIS;                       00000980
93          TITLE3 ALL DOSE LEVELS -- NO. 9 DROPPED;                   00000990

NOTE: THE PROCEDURE PRINT USED 0.07 SECONDS AND 360K AND PRINTED PAGE 13.

94          PROC CORR PEARSON SPEARMAN ; VAR                           00001000
95           S3 N3 U3 BG3 D3;                                          00001010
96          TITLE2 CORRELATIONS;                                       00001020
97          TITLE3 ALL DOSE LEVELS -- NO. 9 DROPPED;                   00001030

NOTE: THE PROCEDURE CORR USED 0.09 SECONDS AND 380K AND PRINTED PAGES 14 TO 15.

98          DATA CCC; SET CC; IF(D3 < 1.25);                           00001040

NOTE: DATA SET WORK.CCC HAS 10 OBSERVATIONS AND 6 VARIABLES. 366 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.02 SECONDS AND 304K.

99          PROC PRINT; VAR N3;                                        00001050
100         TITLE2 ANIMALS INCLUDED IN ANALYSIS;                       00001060
101         TITLE3 HIGHEST DOSE LEVEL DELETED -- NO. 9 DROPPED;        00001070

NOTE: THE PROCEDURE PRINT USED 0.06 SECONDS AND 360K AND PRINTED PAGE 16.

102         PROC CORR PEARSON SPEARMAN ; VAR                           00001080
103          S3 N3 U3 BG3 D3;                                          00001090
104         TITLE2 CORRELATIONS;                                       00001100
105         TITLE3 HIGHEST DOSE LEVEL DELETED -- NO. 9 DROPPED;        00001110

NOTE: THE PROCEDURE CORR USED 0.09 SECONDS AND 380K AND PRINTED PAGES 17 TO 18.

ERROR: ERRORS ON PAGES 1.

NOTE: SAS INSTITUTE INC.
      SAS CIRCLE
      PO BOX 8000
      CARY, N.C. 27511-8000
```

000066

EXPERIMENT 1
ANIMALS INCLUDED IN ANALYSIS
ALL DOSE LEVELS -- NOS 12 & 21 DROPPED

OBS	N1
1	17
2	18
3	2
4	3
5	1
6	4
7	5
8	8
9	6
10	11
11	9
12	22

000067

CORRELATIONS

ALL DOSE LEVELS -- DOS 12 & 24 DROPPED

VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
S1	12	11.83333333	6.11733565	11.00000000	1.00000000	25.00000000
N1	12	8.83333333	4.84007333	7.00000000	1.00000000	12.00000000
U1	12	142.33333333	112.28885910	112.00000000	35.00000000	343.00000000
BG1	12	845.83333333	111.89510781	878.00000000	656.00000000	954.00000000
D1	12	0.84166667	0.61564206	0.75000000	0	1.70000000

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 12

	S1	N1	U1	BG1	D1
S1	1.00000 0.0000	-0.28016 0.3778	-0.09149 0.7773	0.03714 0.9088	0.12029 0.7096
N1	-0.28016 0.3778	1.00000 0.0000	-0.23430 0.4636	0.25044 0.4324	0.13310 0.6801
U1	-0.09149 0.7773	-0.23430 0.4636	1.00000 0.0000	-0.99852 0.0001	-0.12725 0.6935
BG1	0.03714 0.9088	0.25044 0.4324	-0.99852 0.0001	1.00000 0.0000	0.12112 0.7077
D1	0.12029 0.7096	0.13310 0.6801	-0.12725 0.6935	0.12112 0.7077	1.00000 0.0000

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 12

	S1	N1	U1	BG1	D1
S1	1.00000 0.0000	-0.35439 0.2584	-0.22144 0.4891	0.08436 0.7944	0.19772 0.5375
N1	-0.354[illegible] 0.2584	[illegible] 0.0000	[illegible] 0.8883	0.09807 0.7617	0.23522 0.4618
U1	-0.22144 0.4891	-0.04553 0.8883	1.00000 0.0000	-0.96316 0.0001	-0.15951 0.6205
BG1	0.08436 0.7944	0.09807 0.7617	-0.96316 0.0001	1.00000 0.0000	0.10332 0.7493

000068

EXPERIMENT 1
CORRELATIONS
ALL DOSE LEVELS -- NOS 12 & 21 DROPPED

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 12

	S1	N1	U1	BG1	D1
D1	0.19792	0.23522	-0.15951	0.10332	1.00000
	0.5375	0.4618	0.6205	0.7493	0.0000

000069

EXPERIMENT 1
ANIMALS INCLUDED IN ANALYSIS
HIGHEST DOSE LEVEL DELETED -- NOS 12 & 24 DROPPED

OBS	M1
1	17
2	16
3	7
4	3
5	1
6	4
7	5
8	8
9	6

000070

CORRELATIONS

HIGHEST DOSE LEVEL DELETED -- NOS 12 & 21 DROPPED

VARIABLE	N	MEAN		MEDIAN	MINIMUM	MAXIMUM
S1	9	12.44444444	6.36614306	9.00000000	4.00000000	25.00000000
N1	9	7.11111111	4.25388768	5.00000000	1.00000000	18.00000000
U1	9	166.55555556	119.90215919	115.00000000	35.00000000	343.00000000
BG1	9	821.00000000	118.65796890	877.00000000	650.00000000	954.00000000
D1	9	0.55555556	0.39086798	0.50000000	0	1.00000000

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 9

	S1	N1	U1	BG1	D1
S1	1.00000 0.0000	-0.46921 0.2026	-0.22111 0.5675	0.16978 0.6623	0.56654 0.1117
N1	-0.46921 0.2026	1.00000 0.0000	-0.15562 0.6893	0.18243 0.6385	-0.59091 0.0938
U1	-0.22111 0.5675	-0.15562 0.6893	1.00000 0.0000	-0.99863 0.0001	0.40734 0.2765
BG1	0.16978 0.6623	0.18243 0.6385	-0.99863 0.0001	1.00000 0.0000	-0.44201 0.2336
D1	0.56654 0.1117	-0.59091 0.0938	0.40734 0.2765	-0.44201 0.2336	1.00000 0.0000

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 9

	S1	N1	U1	BG1	D1
S1	1.00000 0.0000	-0.59415 0.0916	-0.35294 0.3515	0.27615 0.4720	0.50993 0.1662
N1	-0.59415 0.0916	1.00000 0.0000	0.05050 0.8810	-0.01667 0.9661	-0.18708 0.6298
U1	-0.35294 0.3515	0.05050 0.8810	1.00000 0.0000	-0.97909 0.0001	0.30417 0.4262
BG1	0.27615 0.4720	-0.01667 0.9661	-0.97909 0.0001	1.00000 0.0000	-0.30290 0.4282

000071

EXPERIMENT 1
CORRELATIONS
HIGHEST DOSE LEVEL DELETED -- NOS 12 & 21 DROPPED

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 9

	S1	N1	U1	BG1	D1
D1	0.50223	-0.18708	0.30417	-0.30220	1.00000
	0.1608	0.4298	0.4262	0.4282	0.0000

000072

EXPERIMENT 2
ANIMALS INCLUDED IN ANALYSIS
ALL DOSE LEVELS -- NOS. 4,8 & 23 DROPPED

10:49 TUESDAY, MARCH 6, 1984

OBS	N2
1	14
2	21
3	5
4	2
5	6
6	19
7	7
8	11
9	10
10	12
11	9

000073

EXPERIMENT 2
CORRELATIONS
ALL DOSE LEVELS -- NOS. 4,8 & 25 DROPPED

VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
S2	11	12.90909091	7.13379645	14.00000000	3.00000000	27.00000000
N2	11	10.54545455	5.78556197	10.00000000	2.00000000	21.00000000
U2	11	68.09090909	30.68698273	66.00000000	16.00000000	117.00000000
BG2	11	919.00000000	32.11541686	914.00000000	872.00000000	970.00000000
D2	11	0.86363636	0.46588137	1.00000000	0	1.25000000

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 11

	S2	N2	U2	BG2	D2
S2	1.00000 0.0000	0.29207 0.3835	0.08866 0.7955	-0.30685 0.3587	-0.13198 0.6989
N2	0.29207 0.3835	1.00000 0.0000	-0.00425 0.9901	-0.06082 0.8590	-0.38703 0.2396
U2	0.08866 0.7955	-0.00425 0.9901	1.00000 0.0000	-0.97522 0.0001	-0.25610 0.4472
BG2	-0.30685 0.3587	-0.06082 0.8590	-0.97522 0.0001	1.00000 0.0000	0.27403 0.4148
D2	-0.13198 0.6989	-0.38703 0.2396	-0.25610 0.4472	0.27403 0.4148	1.00000 0.0000

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER H0 RHO=0 / N = 11

	S2	N2	U2	BG2	D2
S2	1.00000 0.0000	0.00457 0.9894	0.14612 0.6681	-0.25172 0.4553	-0.38884 0.2372
N2	0.00457 0.9894	1.00000 0.0000	-0.07273 0.8317	0.04100 0.9047	-0.06136 0.8578
U2	0.14612 0.6681	-0.07273 0.8317	1.00000 0.0000	-0.97950 0.0001	-0.40595 0.2154
BG2	-0.25172 0.4553	0.04100 0.9047	-0.97950 0.0001	1.00000 0.0000	0.41161 0.2085

000074

EXPERIMENT 2
CORRELATIONS
ALL DOSE LEVELS -- NO2, 4,8 & 25 DROPPED

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 11

	S2	N2	U2	BG2	D2
D2	-0.38984	-0.06136	-0.40595	0.41161	1.00000
	0.2372	0.8578	0.2154	0.2085	0.0000

000075

EXPERIMENT 2
ANIMALS INCLUDED IN ANALYSIS
HIGHEST DOSE LEVEL DELETED -- NOS. 4,8 & 25 DROPPED

OBS	N2
1	14
2	21
3	5
4	2
5	6
6	19
7	7

000076

000077

HIGHEST DOSE LEVEL DELETED -- NOS. 4,8 & 25 DROPPED

VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
S2	7	15.00000000	7.21110255	16.00000000	5.00000000	27.00000000
N2	7	10.57142857	7.41298732	7.00000000	2.00000000	21.00000000
U2	7	82.14285714	27.09507072	89.00000000	31.00000000	117.00000000
BG2	7	902.85714286	26.87271585	901.00000000	872.00000000	953.00000000
D2	7	0.64285714	0.45316348	0.75000000	0	1.00000000

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 7

	S2	N2	U2	BG2	D2
S2	1.00000 0.0000	0.44273 0.3198	-0.16378 0.7257	-0.10321 0.8257	0.22951 0.6203
N2	0.44273 0.3198	1.00000 0.0000	-0.03284 0.9443	-0.08570 0.8551	-0.51208 0.2400
U2	-0.16378 0.7257	-0.03284 0.9443	1.00000 0.0000	-0.96433 0.0005	0.31365 0.4933
BG2	-0.10321 0.8257	-0.08570 0.8551	-0.96433 0.0005	1.00000 0.0000	-0.37784 0.4034
D2	0.22951 0.6203	-0.51208 0.2400	0.31365 0.4933	-0.37784 0.4034	1.00000 0.0000

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 7

	S2	N2	U2	BG2	D2
S2	1.00000 0.0000	0.30632 0.5040	-0.05406 0.9084	-0.03604 0.9389	0.07629 0.8709
N2	0.30632 0.5040	1.00000 0.0000	-0.17857 0.7017	0.00000 1.0000	-0.20788 0.6547
U2	-0.05406 0.9084	-0.17857 0.7017	1.00000 0.0000	-0.96429 0.0005	0.60474 0.1503
BG2	-0.03604 0.9389	0.00000 1.0000	-0.96429 0.0005	1.00000 0.0000	-0.69923 0.0804

EXPERIMENT 2
CORRELATIONS
HIGHEST DOSE LEVEL DELETED -- NOS. 4,8 & 25 DROPPED

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER H: RHO=0 / N = 7

	S2	N2	U2	BG2	D2
D2	0.07628	-0.20788	0.60474	0.67923	1.00000
	0.8707	0.6547	0.1503	0.0804	0.0000

000078

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 13

	S3	N3	U3	BC3	T3
D3	-0.15621	-0.03416	-0.12810	0.21351	1.00000
	0.4103	0.9110	0.6766	0.4837	0.0000

000081

EXPERIMENT 3
ANIMALS INCLUDED IN ANALYSIS
HIGHEST DOSE LEVEL DELETED -- NO. 9 DROPPED

OBS	N3
1	17
2	14
3	17
4	2
5	3
6	4
7	5
8	6
9	7
10	8

CORRELATIONS

HIGHEST DOSE LEVEL DELETED -- NO. 9 DROPPED

VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
S3	10	2.00000000	1.88561808	2.00000000	0	6.00000000
N3	10	7.90000000	5.08702052	6.50000000	2.00000000	17.00000000
U3	10	58.70000000	24.80165763	66.00000000	2.00000000	82.00000000
BG3	10	37.40000000	21.26133685	31.00000000	16.00000000	79.00000000
D3	10	0.70000000	0.38729833	0.75000000	0	1.00000000

PEARSON CORRELATION COEFFICIENTS / PROB > \|R\| UNDER HO:RHO=0 / N = 10

	S3	N3	U3	BG3	D3
S3	1.00000 0.0000	-0.31275 0.3789	0.48230 0.1560	-0.34598 0.1025	0.03804 0.9169
N3	-0.31275 0.3789	1.00000 0.0000	-0.34549 0.3292	0.31169 0.3807	-0.55268 0.0975
U3	0.48230 0.1560	-0.34549 0.3292	1.00000 0.0000	-0.98229 0.0001	0.56596 0.0887
BG3	-0.34598 0.1025	0.31169 0.3807	-0.98229 0.0001	1.00000 0.0000	-0.48306 0.1573
D3	0.03804 0.9169	-0.55268 0.0975	0.56596 0.0887	-0.48306 0.1573	1.00000 0.0000

SPEARMAN CORRELATION COEFFICIENTS / PROB > \|R\| UNDER HO:RHO=0 / N = 10

	S3	N3	U3	BG3	D3
S3	1.00000 0.0000	-0.42384 0.2222	0.31788 0.3707	-0.51734 0.1257	-0.31358 0.3776
N3	-0.42384 0.2222	1.00000 0.0000	-0.22424 0.5334	0.32121 0.3655	-0.23355 0.5161
U3	0.31788 0.3707	-0.22424 0.5334	1.00000 0.0000	-0.95152 0.0001	0.42817 0.2170
BG3	-0.51734 0.1257	0.32121 0.3655	-0.95152 0.0001	1.00000 0.0000	-0.23355 0.5161

000083

EXPERIMENT 3
CORRELATIONS
HIGHEST DOSE LEVEL DELETED -- NO. 9 DROPPED

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 10

	S3	N3	U3	PC3	T7
D3	-0.31358	-0.23355	0.42817	0.23355	1.00000
	0.3774	0.5144	0.2170	0.5144	0.0000

000084

DATA FOR STUDY NO. 20732

DETECTION OF UNSCHEDULED DNA SYNTHESIS IN PRIMARY RAT HEPATOCYTES TREATED *IN VIVO* WITH PARA ETHYLTOLUENE

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PROTOCOL AND AMENDMENTS

PROTOCOL FOR DETECTION OF UNSCHEDULED DNA SYNTHESIS IN PRIMARY RAT HEPATOCYTES TREATED IN VIVO WITH PARA-ETHYLTOLUENE (PET) OR PARA-METHYLSTYRENE (PMS)

STUDY NO.: 20732

July 26, 1982 to September 13, 1982

cc: C. R. Mackerer
C. A. Schreiner
N. A. Dwyer

PROTOCOL FOR DETECTION OF UNSCHEDULED DNA SYNTHESIS IN PRIMARY RAT HEPATOCYTES TREATED IN VIVO WITH PARA-ETHYLTOLUENE (PET) OR PARA-METHYLSTYRENE (PMS)

STUDY NO.: 20732

INTRODUCTION

The purpose of this study is to investigate whether test agent or an active metabolite is capable of causing DNA damage by measuring unscheduled DNA synthesis (UDS) in primary rat hepatocytes treated in situ. The existence and extent of DNA damage will be inferred from a significant increase in nuclear grain counts in comparison with untreated hepatocytes. This assay has been shown to be a valuable tool in the detection of DNA damage. DNA damage is recognized by the cellular repair system and results in the incorporation of new bases (including ^{3}H-thymidine) into the DNA.

METHODS AND MATERIALS

Animals are given test agent* or vehicle (negative control) by oral intubation.

Group	Dose	Concentration	Route
I	0.5 g/kg PET	0.05 g/ml	oral
II	1.0 g/kg PET	0.10 g/ml	oral
III	1.7 g/kg PET	0.17 g/ml	oral
IV	0.56 g/kg PMS	0.056 g/ml	oral
V	2-AAF 20.0 mg/kg	2.0 mg/ml	oral
VI	10 ml/kg Methocel K4M Premium (Dow Chemical)	- -	oral

Twenty male Sprague Dawley rats from Taconic Farms (Germantown, N.Y.) weighing approximately 200 grams at the first day of dosing are ear-tagged upon arrival, randomly assigned (SOP M.6.2.1) to individual cages and given food (Purina Rodent Chow) and water ad libitum.

Rats are acclimated and maintained in an air-conditioned room, 77.5 ± 7.5°F, with a 12/12 hour light cycle; relative humidity range from 50-70%. Mobil Environmental and Health Science Laboratory is fully accredited by the American Association for Accreditation of Laboratory Animal Care.

Four animals are assigned to each test group; there are two positive and two negative control animals. Animals are randomly coded according to SOP M.6.2.1. All dosing is performed on consecutive days with a minimum of one animal per group per day. The test agent will be suspended in Methocel K4M Premium (Dow Chemical) immediately prior to dosing. Two hours after dosing the primary hepatocytes are isolated by liver perfusion.

This assay is based on the procedures described by Williams (1977) and Mirsalis and Butterworth (1980). Primary hepatocytes are obtained by liver perfusion in situ for 5 minutes with 0.5 mM ethyleneglycol bis (b-aminoethyl ether)-N, N'-

* Conversion factor: 1.0 gm PET = 1.16 ml
1.0 gm PMS = 1.12 ml

tetraacetic acid (Sigma Chemical Co., St. Louis, Mo) in Ca^{++} and Mg^{++} free Hanks' balanced salt solution buffered with 0.05M N-2-hydroxethylpiperazine-N'-2-ethanesulfonic acid (HEPES) to pH 7.2. A 10-minute enzyme perfusion is performed with collagenase solution (Type I - Sigma Chemical Co.) made to 0.15 mg/ml in Williams' Medium E (WE) (Grand Island Biological Co., Grand Island, N.Y.). The cells are minced in fresh collagenase at room temperature, filtered, and transferred to a centrifuge tube. The cell suspension is centrifuged at 50 x g for 4 minutes and resuspended in Williams' Medium E containing 10% Fetal Bovine Serum (FBS), 10 milliunits/ml insulin, 1 μM dexamethasone and 50 μg/ml Gentamycin. Viability is determined by trypan blue exclusion, 1 part cell suspension in 10 parts of 0.4 % trypan blue in 0.9% sodium chloride (GIBCO, Grand Island, N.Y.); 60 mm tissue culture plates are inoculated with 10^6 cells/ml and incubated for 2-4 hours at 37°C in 5% CO_2. Unattached cells are removed and fresh medium with 10 μCi/ml of ^{3}H-thymidine, ([Methyl-^{3}H]-20.0 Ci/mmol - New England Nuclear, Boston, Mass.) is added. Cells are incubated for 18 hours at 37°C in 5% CO_2.

Following 18 hours incubation with ^{3}H-thymidine, the cultures are washed twice in WE, homogenized in 0.001 M phosphate buffer with 0.32M sucrose, .0015M Ca Cl_2 and 1% Triton X-100 to release nuclei. Nuclei are centrifuged at 1000 rpm for 5 minutes, resuspended in fresh buffer, and fixed in 3:1 fixative (Methanol: acetic acid) at 4°C. A minimum of five slides are made for each animal.

Twenty-four hours after the slides are made, they are dipped in Kodak NTB-2 emulsion, dried. The coated slides are stored for 2 weeks at 4°C in light-tight containers with Drierite. The emulsions are developed in D-19, fixed and stained with 3% Giemsa (azure blend, GIBCO).

All slides are coded and 500 cells per animal are scored as <background, >background but <50 grains or S phase (>50 grains).

Chi square analysis will be performed to compare test values to negative control data; a significant increase in detectable UDS is an indication of primary DNA ~~damage and repair activity induced by the test agent.~~

The study will be conducted from July 26, 1982 to September 13, 1982 at Mobil Oil Corporation, Toxicology Division, P.O. Box 1029, Princeton, N.J., 08540. Study personnel will be: S. Irwin, technician, M. J. Skinner, Study Director. The raw data will be retained in the archives and microscope slides will be retained in the cytogenetics laboratory at the testing facility.

Addenda to and deviations from this protocol, and the reasons therefor, will be recorded, signed, dated, and maintained with this protocol. This study will be conducted in compliance with Good Laboratory Procedure regulations.

Michael J. Skinner, M.S. — Date
Study Director

C. A. Schreiner, Ph.D. — 7/21/82 Date
Supervisor,
Mutagenicity/Carcinogenicity

C. R. Mackerer, Ph.D. — 7/22/82 Date

REFERENCES

Mirsalis, J.C. and Butterworth, B.E. (1980): Detection of unscheduled DNA synthesis in hepatocytes isolated from rats treated with genotoxic agents: an in vivo - in vitro assay for potential carcinogens and mutagens. Carcinog 1:621-625.

Williams, G.M. (1977): Detection of chemical carcinogens by unscheduled DNA synthesis in rat liver primary culture cells. Cancer Res 37:1845-1851.

FILE:
dmr-ge/8-2-82
Disk# dec-13
Title: prot. 20732 sel #17

INTEROFFICE CORRESPONDENCE

ENVIRONMENTAL AFFAIRS
AND TOXICOLOGY DEPARTMENT
TOXICOLOGY DIVISION
PLAINSBORO, N.J.

TO File: Study No. 20732

DATE: October 22, 1982

CC C. A. Schreiner

RE: PROTOCOL ADDENDUM NUMBER 1

Animals will be given para-ethyltoluene (PET), vehicle (negative control) or positive control by oral intubation.

Group	Dose	Concentration
I	0.75 g/kg PET	0.075 g/ml
II	1.00 g/kg PET	0.100 g/ml
III	1.25 g/kg PET	0.125 g/ml
IV	10 ml/kg Methocel K4M Premium (Dow Chemical)	-
V	2-AAF 20.0 mg/kg	2.0 mg/ml

The reason for these dose changes is as follows:

1. In the detection of UDS in primary rat hepatocytes treated in vivo, PET is a suspected positive; dose relatedness could not be determined due to the cytotoxicity of PET when given at 1.7 gm/kg.

   DNA damage is recognized by the cellular repair system and results in the incorporation of new bases (including ^{3}H-thymidine) into the DNA. At the cytotoxic level, the cells are either dead or significantly damaged and are incapable of DNA repair.

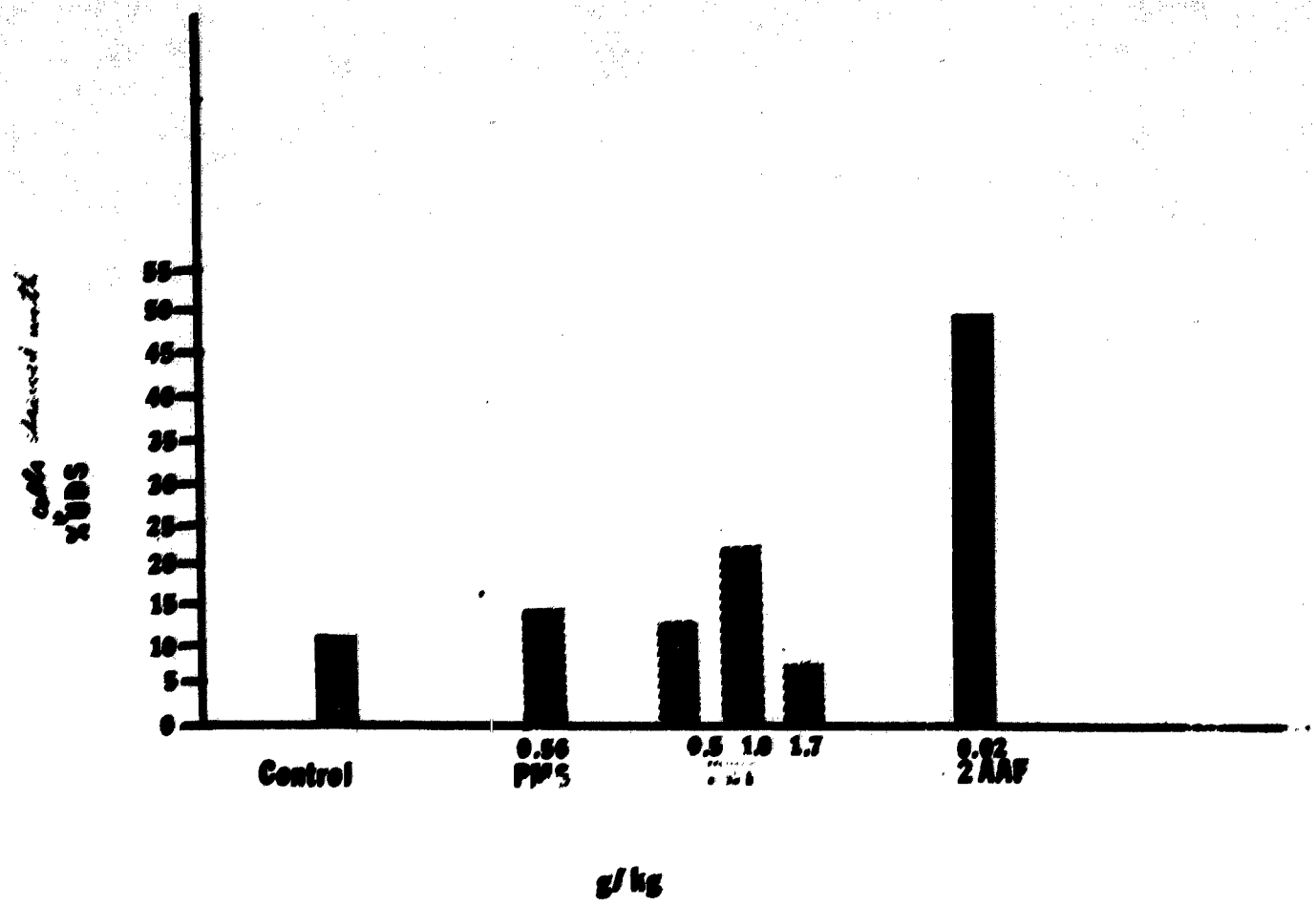
Michael J. Skinner

MJS/mel

Init.: CAS CRM
C. A. Schreiner, C. R. Mackerer

UNSCHEDULED DNA SYNTHESIS (UDS)

IN VIVO



Study No. 20732

000007

000093

INTEROFFICE CORRESPONDENCE

ENVIRONMENTAL AFFAIRS
AND TOXICOLOGY DEPARTMENT
TOXICOLOGY DIVISION

TO: FILE: STUDY NO. 20732 DATE: February 17, 1983

FROM: M. J. Skinner CC: C. A. Schreiner

SUBJECT: PROTOCOL ADDENDUM NUMBER 2

At the Para-ethyltoluene (PET) dose levels used (0.50, 0.75, 1.00, 1.25 and 1.7 g/kg) there was a noted increase in S-phase along with an increase in UDS up to 1.0 g/kg, but at 1.25 and 1.7 g/kg there was a significant decrease in both S-phase and UDS nuclei, probably due to hepatotoxicity of PET. The compound may induce S-phase and the nuclei scored as UDS may actually be cells that had entered but not completed S-phase. An experiment designed to ascertain the potential of PET to induce S-phase is scheduled. The use of an S-phase inhibitor in the cultures will eliminate ambiguity in UDS scoring. Hydroxyurea (HU) will inhibit S-phase and therefore, any nuclei scored as UDS will be true UDS and not cells which had not completed scheduled DNA synthesis.

Animals will be given PET, vehicle (negative control) or positive control by oral intubation.

Group	Dose	Concentration
I	0.75 g/kg PET	0.075 g/ml
II	1.00 g/kg PET	0.100 g/ml
III	1.25 g/kg PET	0.125 g/ml
IV	10 ml/kg Methocel K4M Premium (Dow Chemical)	
V	2-AAF, 25 mg/kg	2.5 mg/kg

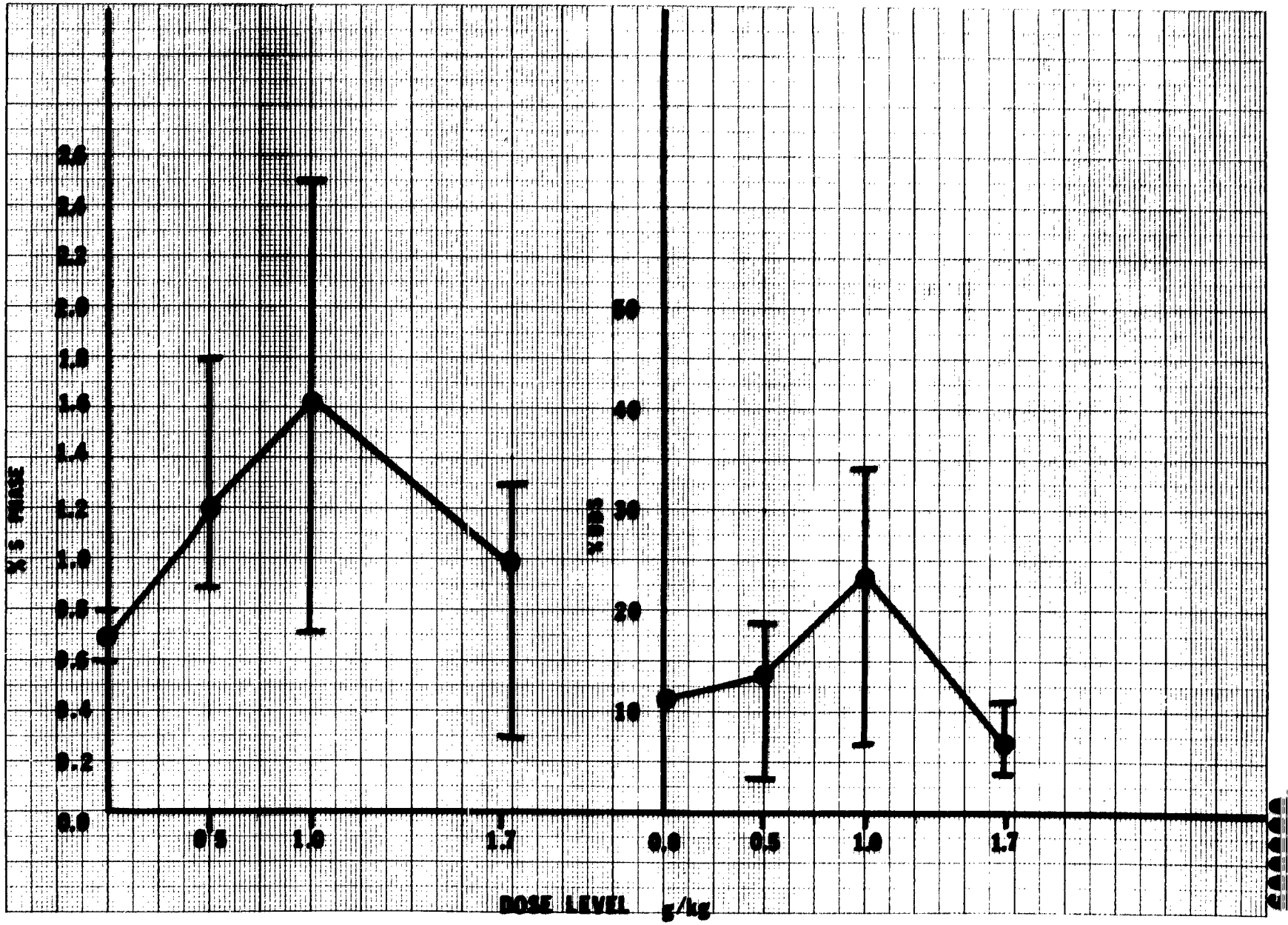
The perfusion procedures will be conducted in the same manner as described in the protocol. There will be parallel cultures set up for each animal; one, cultured in the presence of HU, and the second without HU.

M. J. Skinner

MJS:meg

Initials: CAS CRM
C. A. Schreiner, C. R. Mackerer

K+E KEUFFEL & ESSER CO. MADE IN U.S.A. 46 1510



UDS- Experiment 1

vertical lines denote range

Study No. 20732

960000

vertical lines denote range
UDS- Experiment 2
000097

000010 A

INTEROFFICE CORRESPONDENCE

ENVIRONMENTAL AFFAIRS AND
TOXICOLOGY DEPARTMENT
TOXICOLOGY DIVISION

TO: File Study 20732

DATE: August 8, 1983

FROM: M. J. Skinner

CC:

RE: Protocol Deviation

Animal number 012-717 was used in the final statistical determinations in experiment II even though it should have been eliminated by the test criteria. The cell viability was more than one standard deviation below the average for the study; however, since there were only two negative control animals and the viability was within the normal laboratory range, the data from this animal were used when comparing test data to control data. The validity of the study was not compromised.

M J Skinner 8/8/83
Michael Skinner
Study Director

INTEROFFICE CORRESPONDENCE

ENVIRONMENTAL AFFAIRS AND
TOXICOLOGY DEPARTMENT
TOXICOLOGY DIVISION

TO: File Study 20732

DATE: June 26,1984

FROM: M. J. Skinner

CC:

RE: Protocol Deviation

The environmental controls in the animal room were not capable of maintaining the temperature and humidity within the ranges specified in the protocol. The actual temperature and humidity were recorded and reported in the final study report. This deviation did not adversely effect or compromise the study.

Michael Skinner 6/26/84
Michael Skinner
Study Director

MEHSL REQUEST

CO-XXX(5-80)

REQUEST FOR TOXICITY TESTING

000012

DATE: _____

TOXICOLOGY LIAISON: C L SMART

MOBIL ENVIRONMENTAL HEALTH SCIENCE LABORATORY
TOXICOLOGY DIVISION
ENVIRONMENTAL AFFAIRS & TOXICOLOGY DEPT.
301 COLLEGE ROAD EAST
PLAINSBORO, N.J. 08536

FOR MRDC USE ONLY
PROJECT CODE _____
CATEGORY CODE _____

FROM: Petrochemicals Div.
DEPARTMENT, DIVISION, OR SUBSIDIARY

MATERIAL NAME/DESIGNATION: Para Ethylbenzene (PET)

PROJECT PURPOSE: To complete the Mutagenic Tests Covered by the AEE. The three tests are (1) Sister Chromatid Exchange (SCE), (2) Unscheduled DNA Repair In Vivo (SM) and (3) Mitotic Recomb. in Yeast (SM)

ESTIMATED COST: $11.8M

REQUESTOR: _____ DATE

APPROVED: _____ DATE
(CO-197 authority required)

AUTHORIZED BY: _____ 4/2
DIRECTOR OF TOXICOLOGY
ENVIRONMENTAL AFFAIRS & TOXICOLOGY
DATE

(DO NOT WRITE BELOW THIS LINE)
FOR TOXICOLOGY DIVISION USE ONLY

TEST REQUEST NO. 2073

ESTIMATES

TEST LABORATORY: _____
STUDY MONITOR/DIRECTOR: _____
INITIATION DATE: _____
COMPLETION DATE: _____
OTHER _____

	TEST	STUDY NO.
$4,500	Sister Chromatid Exchange	20731
$5,700	Unscheduled DNA Repair in Vivo	20732 ✓
$1,600	Mitotic Recombination in Yeast	20733

000101

REC: JUN 25 1982
C. R. MACK...

INTEROFFICE CORRESPONDENCE

ENVIRONMENTAL AFFAIRS
AND TOXICOLOGY DEPARTMENT
TOXICOLOGY DIVISION
PLAINSBORO, N. J.

TO: C. R. Mackerer

DATE: June 23, 1982

CC: Archive
P. H. Craig
P. A. Naro (w/attach.)
Quality Assurance
E. J. Singer
C. L. Smart (w/attach.)
TACU (w/attach.)

TOXICITY TEST REQUEST NO. 20730
PARA ETHYLTOLUENE (PET)

MEHSL has been requested by Petrochemicals Division to perform the following toxicity tests:

Study No.	Test
20731	Sister Chromatid Exchange
20732	Unscheduled DNA repair *in vivo*
20733	Mitotic Recombination in Yeast

A copy of the completed testing request is attached. Please assign a study director/monitor and issue a notice of intent to initiate testing.

J. H. Burger

CAI/mbo
attachments

NOTICE OF INTENTION TO INITIATE STUDIES

TO: M. J. SKINNER

FROM: C. R. Mackerer

DATE: 6/25/82 NEHSL STUDY NUMBER 20732

TEST ARTICLE PARA ETHYL TOLUENE (PET)

NAME OF TEST UNSCHEDULED DNA REPAIR IN VIVO

LIAISON C. L. SMART

You are assigned to be the STUDY DIRECTOR of the above study, to be conducted at NEHSL.

Please prepare or obtain protocol for approval, and make appropriate arrangements for initiation of the study. Test Request 20730 is attached.

TEST ARTICLE STATUS TACU

COMMENT:

DISTRIBUTION:

Signatory
Liaison
TACU
Computer
Quality Assurance
T. Casey
C. A. SCHREINER

C. R. Mackerer
C. R. Mackerer
Manager, Biochemical Toxicology

DOSING PREPARATIO

TEST ARTICLE DISPENSING RECORD (INGRAM) 27-Jun-92

TACU NUMBER	LOT NUMBER	STUDY NUMBER	SAMPLE AMOUNT	UNITS	CONSIGNEE	SAMPLE REQUEST DATE
01020060		0731-92	20.0000	MILLILITER	S IRWIN	27-Jun-92

LABEL: PET

Lot # 0579-282-12-3 per C.A. Sanniello after test was completed

DESCRIPTION OF CONTENTS: CLEAR , LIQUID ,

HANDLING INSTRUCTIONS: GOGGLES, GLOVES, RESPIRATOR

FLAMMABILITY:

FLASH POINT= -0000 TEST ARTICLE DENSITY (NEAT): UNK

CA Sanniello
TACU

CC: STUDY DIRECTOR/MONITOR
LIAISON
CONSIGNEE

a sample for study no. 0732-92
and 0731-92
SW

000105

000016

PMS

TEST ARTICLE DISPENSING RECORD (INHOUSE) 29-Jun-92

TACU NUMBER	LOT NUMBER	STUDY NUMBER	SAMPLE AMOUNT	UNITS	CONSIGNEE	SAMPLE REQUEST DATE
8284	NONE	0000-00	20.0000	MILLILITER	S IRWIN	29-Jun-92

LABEL: PMS/DNOC FREE

DESCRIPTION OF CONTENTS: CLEAR LIQUID ;

HANDLING INSTRUCTIONS: GOGGLES, GLOVES, RESPIRATOR

FLAMMABILITY:

FLASH POINT= ~~0000~~

TEST ARTICLE DENSITY (NEAT): .892

CA Fanniello
TACU

CC: STUDY DIRECTOR/MONITOR
LIAISON
CONSIGNEE

000106

000017

Mg3

TEST ARTICLE DISPENSING RECORD (INGRAM)

TACU NUMBER	LOT NUMBER	STUDY NUMBER	SAMPLE AMOUNT	UNITS	CONSIGNEE	SAMPLE REQUEST DATE
01030003		0726-02 20732	29.0000	MILLILITER	S IRWIN	14-Oct-02

LABEL: PET

DESCRIPTION OF CONTENTS: CLEAR LIQUID

HANDLING INSTRUCTIONS: SAFETY GLASSES, GLOVES, RESPIRATOR (FREEZE)

FLAMMABILITY: UNKNOWN

FLASH POINT= 0000 F TEST ARTICLE DENSITY (NEAT): UNK

CA Graziella
TACU

TEST ARTICLE RECEIVED AS SPECIFIED ABOVE: Susan E Irwin 10/15/02
CONSIGNEE DATE

CC: STUDY DIRECTOR/MONITOR
LIAISON
CONSIGNEE
SAFETY/UTILITIES COORDINATOR

000107

000018

STUDY NUMBER: 20732
STUDY DATES: 7/26/82 - 9/13/82

DATA SHEET (LIQUID)
PAGE 1 OF 2
SOP M.6.1.1

PRELIMINARY CONCENTRATION DETERMINATIONS OF TEST COMPOUNDS - LIQUID (PRE-INTUBATION)

Date of preliminary concentration determinations: 8/2/82 (Date)

Test Compound: PET (Name) Lot Number: NA (Number)

Study Number: 20732 Acute or Subacute (circle one)

The ~~Sprague Dawley~~ rats (Strain-Species) were dosed 1 (Number) times a day for 1 (Number) days.

Specific Gravity: 0.86 gm/ml

Vehicle: Methocel Kym (Compound) Concentration: 0.75 %

Group	Dose (gm/kg)	Conc. (gm/ml)[1]	Test Compound (ml)[2]	Vehicle (ml)[3]
I	0.5	0.05	0.58	9.42
II	1.0	0.10	1.16	8.84
III	1.7	0.17	1.97	8.03

Calculations:

1. All animals are dosed on a 10 ml/kg basis, therefore the ~~drug~~ chemical concentration is one factor per ml lower than the dose by: see 8/25/82

$$[\text{Conc.}] = \frac{\text{dose}}{10} = \frac{x}{10} \text{ gm/ml} \qquad x = \text{dose value}$$

2. Conversion of test compound to milliliters:

   ml of test compound = grams of test compound/specific gravity (g/ml)

   A 10 ml solution is needed.

   10 x ml compound/ml solution = amount of test compound needed

3. Amount of vehicle added:

   10 ml - amount of test compound = NA (Amt. of Vehicle) see above.

ADDITIONAL CALCULATIONS

20732-

POSITIVE CONTROLS

	Chemical	Lot #	Dose	Final Conc.
(1)	2-AAF	NA	2 mg/kg	2 mg/kg
(2)				
(3)				

Calculations of concentrations performed by: SEJ (Initials) 8/13/82 (Date)

Test compound preparations performed by: SEJ (Initials) 9/8/82 - 9/12/82 (Date)

Calculations confirmed by: [illegible] (Initials) 8/3/82 (Date)

REMARKS:

File:
JMR/3-11-81
Disk# DEC/AM-3
Title: SOP M.6.1.1

STUDY NUMBER: 20732
STUDY DATES: 10/25/82-10/27/82

DATA SHEET (LIQUID)
PAGE 1 OF 2
SOP M.6.1.1

PRELIMINARY CONCENTRATION DETERMINATIONS OF TEST COMPOUNDS - LIQUID (PRE-INTUBATION)

Date of preliminary concentration determinations: 10/15/82
Date

Test Compound: PET
Name

Lot Number: NA
Number

Study Number: 20732

Acute or Subacute (circle one)

The ~~Sprague-Dawley~~ rats
Strain-Species were dosed 1
Number times a day for 1
Number days.

Specific Gravity: 0.86 gm/ml

Vehicle: Methocel K4M
Compound

Concentration: 0.75%

Group	Dose (gm/kg)	Conc. (gm/ml)[1]	Test Compound (ml)[2]	Vehicle (ml)[3]
I	0.75	0.075	0.87	9.13
II	1.00	0.100	1.16	8.84
III	1.25	0.125	1.45	8.55

Calculations:

1. All animals are dosed on a 10 ml/kg basis, therefore the ~~drug~~ chemical concentration is one factor per ml lower than the dose by:

   see 8/29/83

$$[\text{Conc.}] = \frac{\text{dose}}{10} = \frac{x}{10} \text{ gm/ml} \qquad x = \text{dose value}$$

2. Conversion of test compound to milliliters:

   ml of test compound = grams of test compound/specific gravity (g/ml)

   A 10 ml solution is needed.

   10 x ml compound/ml solution = amount of test compound needed

3. Amount of vehicle added:

   10 ml - amount of test compound = N/A - see above
   Amt. of Vehicle

DATA SHEET (LIQUID)
PAGE 2 OF 2
SOP M.6.1.1

ADDITIONAL CALCULATIONS
20732

POSITIVE CONTROLS

	Chemical	Lot #	Dose	Final Conc.
(1)	2-AAF	NA	20.0 mg/kg	2.0 mg/ml
(2)				
(3)				

Calculations of concentrations performed by: SED (Initials) 10/15/82 (Date)

Test compound preparations performed by: S.E.D (Initials) 10/25 - 10/25/82 (Date)

Calculations confirmed by: S.E.D (Initials) 10/25/82 (Date)

REMARKS:

File:
jmk/3-11-81
Disk# DEC/MM-3
Title: sop M.6.1.1

STUDY NUMBER: 20732
STUDY DATES: 7/26/82 - 9/13/82

PRELIMINARY CONCENTRATION DETERMINATIONS OF TEST COMPOUNDS - LIQUID (PRE-INTUBATION)

Date of preliminary concentration determinations: 8/2/82 (Date)

Test Compound: PMS (Name) Lot Number: — (Number)

Study Number: 20732 Acute or Subacute (circle one)

The ~~Sprague Dawley~~ rats (Strain-Species) were dosed 1 (Number) times a day for 1 (Number) days.

Specific Gravity: ~~0.81~~ SG 0.89 gm/ml

Vehicle: Methocel KYM (Compound) Concentration: 0.75%

Group	Dose (gm/kg)	Conc. (gm/ml)[1]	Test Compound (ml)[2]	Vehicle (ml)[3]
I	0.56	0.056	.65	9.35
II	NA			
III	↓			

Calculations:

1. ~~All animals are dosed on a 10 ml/kg basis, therefore the drug~~ chemical concentration is one factor per ml lower than the dose by:

$$[\text{Conc.}] = \frac{\text{dose}}{10} = \frac{x}{10} \text{ gm/ml} \qquad x = \text{dose value}$$

2. Conversion of test compound to milliliters:

   ml of test compound = grams of test compound/specific gravity (g/ml)

   A 10 ml solution is needed.

   10 x ml compound/ml solution = amount of test compound needed

3. Amount of vehicle added:

   10 ml - amount of test compound = NA (Amt. of Vehicle)

ADDITIONAL CALCULATIONS

POSITIVE CONTROLS

	Chemical	Lot #	Dose	Final Conc.
(1)	2-AAF	NA	20 mg/kg	20 mg/ml
(2)				
(3)				

Calculations of concentrations performed by: SSD (Initials) 8/8/82 (Date)

Test compound preparations performed by: SSD (Initials) 8/8/82 - 8/9/82 (Date)

Calculations confirmed by: [illegible] (Initials) 8/8/82 (Date)

REMARKS:

File:
jmk/3-11-81
Dist: DEC/MM-3
Title: SOP M.6.1.1

I BAVAILABILITY OF PET IN BLOOD AND LIVER

INTEROFFICE CORRESPONDENCE

ENVIRONMENTAL AFFAIRS
AND TOXICOLOGY DEPARTMENT
TOXICOLOGY DIVISION
PLAINSBORO, N. J.

TO: E. L. Kreyling

DATE: July 6, 1982

CC: T. A. Roy
J. R. Meeks
M. S. Skinner
C. A. Schreiner

RE: BIOAVAILABILITY OF PARA-ETHYLTOLUENE IN RAT BLOOD VIA ORAL DOSING - STUDY NO. 20732

Six rats will be dosed with para-ethyltoluene and one rat will serve as a control. Rats #1-3 will be dosed orally with 2.1 g/kg and rats #4-6 with 1.7 g/kg. The rats will be bled via cardiac puncture according to the following schedule:

1. 2 hrs - Rats #1, 4 and 7*
2. 4 hrs - Rats #2 and 5
3. 6 hrs - Rats #3 and 6

We would like you to analyze the blood from the seven rats for the presence of PET by gas chromatography. The blood should be extracted with hexane and a head space analysis should be performed since PET is highly volatile.

Susan E. Irwin
S. E. Irwin

SEI/mel

* Rat #7 was not used as a control because there was not need to determine recoveries i.e. the procedures were capable of detecting PET and an experimental control was not necessary.

mg Schreiner 4/26/84

INTEROFFICE CORRESPONDENCE

ENVIRONMENTAL AFFAIRS
AND TOXICOLOGY DEPARTMENT
TOXICOLOGY DIVISION
PLAINSBORO, N. J.

TO: S. E. Irwin

DATE: July 13, 1982

CC: T. A. Roy
J. R. Meeks
M. S. Skinner
C. A. Schreiner

RE: p-ETHYLTOLUENE LEVELS IN RAT BLOOD FOLLOWING ORAL DOSING - STUDY #20732

Blood from six rats was analyzed by capillary gas chromatography for the hexane extraction of p-ethyltoluene. GC/MS was the means of headspace analysis. The results of the analysis are given below.

Hexane extraction of p-ethyltoluene from blood

Animal	Time Interval	PPM Found	$\bar{X}$ PPM
#1	2 hr.	38.7, 47.5, 40.7	42.3
#4	2 hr.	27.2, 36.4, 24.9	29.5
#2	4 hr.	30.7, 23.6, 28.0	27.4
#5	4 hr.	38.0, 40.0, 41.0	39.7
#3	6 hr.	47.2, 40.1, 40.2	42.5
#6	6 hr.	40.6, ~~37.3~~ 32.3, 33.9	35.6

Typo - MJS 6/4/84

From the headspace analysis it appears that the amount of p-ethyltoluene in blood increases w/time. The use of headspace analysis was more of a qualitative analysis rather than a quantitative analysis.

Ronald L. Kreyling
E. L. Kreyling

ELK/mel

INTEROFFICE CORRESPONDENCE

000026

ENVIRONMENTAL AFFAIRS
AND TOXICOLOGY DEPARTMENT
TOXICOLOGY DIVISION
PLAINSBORO, N.J.

TO: M. J. Skinner

DATE: July 30, 1982

CC: S. E. Irwin
C. R. Mackerer
J. R. Meeks
T. A. Roy
C. A. Schreiner

RE: p-ETHYLTOLUENE LEVELS IN PERFUSED LIVER OF RATS FOLLOWING ORAL DOSING - Study No. 20732

Perfused liver from five rats was analyzed by capillary gas chromatography for the presence of p-ethyltoluene. The extraction procedure consisted of homogenization of the liver sample in hexane using Sonifier (cell disrupter), centrifugation and decanting of supernatant which was analyzed for the presence of p-ethyltoluene. One fortified control sample was prepared and the extraction efficiency was found to be 64%. All samples were analyzed in duplicate and were quantitated by means of external standard. The results below are not corrected for extraction efficiency.

Animal	Dose Level	Time Interval	ppm Found in 1.0g Sample	$\bar{X}$ ppm
Control	-	-	-	-
#2	1.0g/kg	2 hr.	62.0, 58.0	60.0
#4	1.0g/kg	4 hr.	62.6, 60.0	61.3
#6	1.7g/kg	2 hr.	124.0,116.0	120.0
#8	1.7g/kg	4 hr.	52.0, 56.0	54.0

E. L. Kreyling

ELK/mel

Init.: TAR
T. A. Roy

000117

APPENDIX I

ANIMAL ACCLIMATION

Form #1
Rev. 7-24-81
000029

Animal Receipt & Acclimation Period Record

Study# 20732 Room# 310

Species Rat Strain Sprague D.O.B. 6/21

# of Animals rec'd 30 male X Date received AUG 3 1982

female

Supplier Taconic . Mean body weights male 127.5 ± 4.7 # weighed male 30

female NA female NA

Animals received in apparent (Satisfactory, Unsatisfactory) condition.

REMARKS:

Signature [illegible]

Date	Daily Observation and Remarks	Initials
8-3-82	All normal	SCD
8-4-82	all Normal	[illegible]
8-5-82	all Normal	[illegible]
8-6-82	all Normal	[illegible]
8-7-82	all Normal	[illegible]
8-8-82	all Normal	[illegible]
8-9-82	all Normal	[illegible]

Signature [illegible] Date 8/9/82

Taconic Farms

GERMANTOWN, NEW YORK 12526
Phone (518) 537-6200

CUSTOMER'S RECEIPT

#20732

INVOICE NO. 49514

TERMS: NET 10 DAYS

TO • MOBIL OIL RESEARCH CORP 1497695
BOX 1025
PURCHASING DEPT
PRINCETON NJ 08540

SHIPPED TO • MOBIL OIL
TOX LABS
301 COLLEGE RD
PLAINSBORO NJ

INVOICE DATE	DATE SHIPPED	CUSTOMER'S ORDER NUMBER	INVESTIGATOR	SHIPPED VIA
8/3/82	8/3/82	LPT20225		TACONIC TRUCK

ITEM	QUANTITY	DESCRIPTION
D1250 + 4/21	55	TAC:N(SD)FBR RATS MALES 7 WKS
D2200 + 4/21	55	TAC:N(SD)FBR RATS FEMALES 7 WKS
D1150 + 4/21	20	TAC:N(SD)FBR RATS MALES 120 - 140 GMS
60 +		DELIVERY
		Date of Birth of 55 & 55 4/4
TOTAL CASES ▶	12	RECEIVED BY Gregory A Fee

[redacted]

30732
mjs

Mobil

Animal Receipt Log

Ear Tag #	Receiving Date	Quantity	Sex	Species	Vendor	Received by (Initials)
041-435 to 011-467	AUG 3 1982	30	M	Rat	Taconic	SB

Mobil Oil Corporation
Toxicology Division - Vivarium Operations

Form #13
Rev. 12/27/79

20732

000032

Weight Check (Quarantine Period)

Date

Date	AUG 3 1982	Aug 9 1982		AUG 3 1982	Aug 9 1982		
Balance #	135	135		135	135		

Weights

Animal #							
Q11-438	119.4	165.7	Q11-459	126.1	122.1		
439	125.7	178.0	460	127.5	164.6		
440	120.6	164.3	461	126.3	169.4		
441	126.0	185.0	462	126.4	178.9		
442	124.8	175.7	463	128.3	185.2		
443	125.7	185.7	464	128.9	183.6		
444	124.4	180.4	465	131.3	185.2		
445	123.4	180.3	466	131.3	180.9		
446	124.3	171.6	467	127.2	188.6		
447	119.5	162.5					
~~448~~	126.6	178.2					
449	126.6	195.1					
450	130.0	174.5					
451	128.4	177.6					
452	124.1	184.0					
453	141.5	192.8					
454	129.4	172.6					
455	130.9	170.4					
456	127.5	173.9					
457	126.7	171.3					
458	128.3	170.3					
Initials	SEJ	ABL		SEJ	ABL		

000123

Mobil

Animal Unit Daily Checklist*

Room No. 310

#20732
mg5

DATE	Temperature and Humidity	Sanitation of Animal Racks	Food and Bedding	Water System	Sanitation of Floors	REMARKS
8-4-82	73°			8		76% Humi
8-5-82	72°					74% Humi
8-6-82	72°					
8-7-82	72°			3.2		70% Humi
8-8-82	74°			1.7		76% Humi
8-9-82	72°			3.2		

*Initials of person completing duty in appropriate box.

MOBIL
Toxicology Division
Vivarium Operations

MORTALITY CHECK

Study No. 20732

000034
Form #8
2/5/80

Animal Nos: 011-438 to 011-467 Room No. 310

DATE	TIME	OBSERVER	NO. DEAD OR MORIBUND GROUP
8-3-82	1:30	SEB	0
8-4-82	4:20	[illegible]	0
8-4-82	8:25	[illegible]	0
8-4-82	4:25	[illegible]	0
8-5-82	8:20	[illegible]	0
8-5-82	4:20	[illegible]	0
8-6-82	8:15	[illegible]	0
8-6-82	4:20	[illegible]	0
8-7-82	8:35	[illegible]	0
8-7-82	12:30	[illegible]	0
8-8-82	8:45	[illegible]	0
8-8-82	12:35	[illegible]	0
8-9-82	8:35	[illegible]	0
8-9-82	12:00	SEB	DPS 457 465 455 441 467
			Note: These five animals were Sacrificed before being [illegible] off [illegible]

* NOTE: MORTALITY RECORD FOR [illegible] LIST in VIVARIUM record - [illegible] 011-448, 453, 455, 445, 450 see SEB [illegible]

000125

MOBIL
Toxicology Division
Vivarium Operations

MORTALITY CHECK

Study No. 20732

000035A
Form #8
2/5/80

Animal Nos: 011-448, 439, 461 Room No. 310

DATE	TIME	OBSERVER	NO. DEAD OR MORIBUND GROUP
8-11-82	8:45	[illegible]	0
8-11-82	11:00	SCL	SAC ~~444~~ 456, ~~458~~, 447, 452, 442 SSW
8-11-82	4:20	[illegible]	0
8-12-82	9:10	[illegible]	0
8-12-82	10:00	QBS	SAC 440, 438, 449, 446, 464, 467, 451
8-13-82	4:15	[illegible]	0
8-13-82	8:00	[illegible]	0
8-13-82	3:30	[illegible]	0
8-14-82	10:55	RP	0
8-14-82	3.15	RP	0
8-15-82	11.20	RP	0
8-15-82	3.20	RP	0
8-16-82	8:40	[illegible]	0
8-16-82	4:15	[illegible]	0
[illegible]	8:55	[illegible]	[illegible]
8-17-82	4:15	[illegible]	0
8-18-82	8:02	[illegible]	0
8-18-82	4:20	[illegible]	0
8-19-82	5:30	[illegible]	0
8-19-82	11:00	QBS	SAC 444, 443, 459, 466, 462 not part of experiment - extra SSW 8/24/82
8-19-82	4:15	[illegible]	0
8-20-82	8:35	[illegible]	0
8-20-82	4:20	[illegible]	0
8-21-82	9:15	SCL	0
8-21-82	1:00	SCL	0
8-22-82	9:35	SCL	0

MOBIL
Toxicology Division
Vivarium Operations

MORTALITY CHECK

Study No. 30732

000035B

Form #8
2/5/80

Animal Nos: 011-448, 439, 461

Room No. 310

DATE	TIME	OBSERVER	NO. DEAD OR MORIBUND GROUP
8-22-82	1:15	SK	0
8-23-82	8:40	[illegible]	0
8-23-82	4:20	[illegible]	0
8-24-82	8:20	[illegible]	0
~~8-24-82~~	~~1:40~~	~~SCK~~	~~Sec. 448, 439, 461~~ SCK VOID
8-24-82	4:30	[illegible]	0
8-25-82	8:40	SCK	sec 448, 439, 461 not on study
8-25-82	8:45	[illegible]	0

000127

ANIMAL DOSING FORMS

Mobil Oil Environmental and Health Sciences Laboratory

CYTOGENETICS
Pretest Weight Sheet

test: UDS	compound: PET - PMS	sex: male
dates: 8/9/82 - 8/13/82	strain-species: Sprague Dawley	# 20732

Year #	Pretest wt.	test wt.	random #	Year #	Pretest wt.	test wt.	random #
0117 438	119.4 g	191.6 g	16	455	126.9	179.0	10
439	125.7	NA	27	456	127.5	193.1	7
440	120.6	204.7 g	28	457	121.7	171.3	1
441	126.0	185.0	13	458	128.3	199.5	3
442	124.8	195.6	19	459	126.1	177.1	9
443	125.7	NA	26	460	127.5	186.0	2
444	121.4	NA	24	461	126.3	NA	25
445	129.4	186.3	14	462	126.1	NA	29
446	124.3	199.3	21	463	128.3	185.2	17
447	119.5	185.0	11	464	129.9	210.0	8
448	126.6	NA	20	465	131.3	185.2	5
449	136.6	228.6	22	466	131.3	NA	23
450	130.0	189.5	18	467	127.2	190.0	12
451	128.4	205.3	4				
452	134.1	202.8	15				
453	141.9	204.7	6				
454	129.4	NA	30				

Average 193.5 ± 12.9 g

Performed by — date 8/13/82

Reviewed by — date 5/25/83

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

CYTOGENETICS
PHYSICAL OBSERVATIONS

TEST: UDS/20732 - ☒ ACUTE ☐ SUBACUTE
SEX: male
COMPOUND: PET
DOSE: I 0.5 g/kg
STRAIN:
SPECIES: Sprague Dawley rats
DATES: 8/9/82 - 8/13/82

ANIMAL #	RANDOM #	Day 1 * 8/9	Day 2 * 8/10	Day 3 * 8/11	Day 4 * 8/12	Day 5 *
011-457	1	171.3 g 1.7 ml SCD 8:00 SAC 10:00 SCD				
011-460	2		1.9 ml SCD 8:00 SAC 10:00 SCD			
011-458	3			199.5 g 2.0 ml 8:00 SCD SAC 10:00 SCD		
011-451	4				205.3 g 2.1 ml SCD 7:30 SAC 9:30 SCD	

* Record Dosing Time, Volume, and Physical Signs

SAC - sacrificed
UDS - unscheduled DNA synthesis

AMOUNT USED = 7.7 ml
AMOUNT DISCARDED = 32.7 ml

PERFORMED BY: S. E. [illegible] DATE: 8/13/82
REVIEWED BY: [illegible] DATE: 5/25/83

0000130

0000038

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

CYTOGENETICS
PHYSICAL OBSERVATIONS

TEST: UDS/20732 ☒ ACUTE ☐ SUBACUTE
SEX: male
COMPOUND: PET
DOSE: II 1.0 g/kg
STRAIN: Sprague Dawley rat
SPECIES:
DATES: 8/7/12 - 8/12/12

INITIAL #	RANDOM #	Day 1 * 8/9	Day 2 * 8/10	Day 3 * 8/11	Day 4 * 8/12	Day 5 * 8/12
011-465	5	195.3 g SCG 1.9 ml 8:15 SCC 10:05 SCG				
011-453	6		209.7 g 2.0 ml SCG 8:15 SCC 10:05 SCG			
011-456	7			193.1 g 8:15 SCG 1.9 ml SCC 10:15 SCG		
011-464	8				216.0 g SCG 2.1 ml 7:45 SCC 9:45 SCG	
446	21				←	199.3 g 2.0 ml SCG 8:06 SCC 10:00 SCG

* Record Dosing Time, Volume, and Physical Signs SCC = Sacrificed
UDS: unchanged from previous

AMOUNT USED = 9.9 ml
AMOUNT DISCARDED = 30.1 ml

PERFORMED BY: S. E. [illegible] DATE: 8/13/12
REVIEWED BY: [illegible] DATE: 5/05/13

131000

000039

CYTOGENETICS
PHYSICAL OBSERVATIONS

TEST: UDS/20730 ☒ ACUTE ☐ SUBACUTE

SEX: male

COMPOUND: PET

DOSE: III 1.7g/kg

STRAIN:
SPECIES: Sprague Dawley rats
DATES: 8/9/82 8/12/82

ANIMAL #	RANDOM #	Day 1 * 8/9	Day 2 * 8/10	Day 3 * 8/11	Day 4 * 8/12	Day 5 * 8/12
011-159	9	177.1g SCD 1.8ml 8:30 SAC 10:30 SED				
011-455	10		179.0g SCD 8:30 1.8ml SAC 10:30 SED Pos. perfusion cells not used			
011-447	11			185.0g 8:30 SCD 1.9ml SAC 10:30 SED		
011-467	12				190.9g SED 8:15 1.9ml SAC 10:15 SED	
449	22					228.6g 2.3ml SCD 8:30 SAC 10:30 SED

* Record Dosing Time, Volume, and Physical Signs SAC = sacrificed
UDS = unscheduled DNA synthesis

AMOUNT USED = 9.7ml

AMOUNT DISCARDED = 30.3ml

PERFORMED BY: S. E. [illegible] DATE: 8/13/82

REVIEWED BY: M. G. Kennedy DATE: 5/25/83

000132

000040

MOBIL OIL ENVIRONMENTAL AND WASTE SCIENCE LABORATORY

CITOGENETICS
TYPICAL OBSERVATIONS

TEST: UDS/10732 ☒ ACUTE ☐ SUBACUTE
SEX: male
COMPOUND: PMS
DOSE: III 0.5 g/kg
STRAIN:
SPECIES: Sprague Dawley
DATES: 8/9/82 - 8/12/82

ANIMAL #	DOSING #	Day 1 * 8/9	Day 2 * 8/10	Day 3 * 8/11	Day 4 * 8/12	Day 5 *
011-441	13	155.0 g 5.0 1.9 ml 8:45 Sac. 10:45 SED				
011-445	14		190.3 g 1.9 ml SED 8:45 Sac 10:45 SED			
011-452	15			202.8 g 2.0 ml 8:45 SED lesion on hand Sac 10:45 SED		
011-438	16				191.6 g 1.9 ml 8:45 SED Sac 10:45 SED	

* Record Dosing Time, Volume, and Physical Signs Sac = Sacrificed
UDS = unscheduled DNA synthesis

AMOUNT USED = 7.7 ml
AMOUNT DISCARDED = 32.3 ml

PERFORMED BY: S.E. Dunn DATE: 8/13/82
REVIEWED BY: [illegible] DATE: 5/25/83

0001133

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

CYTOGENETICS
PHYSICAL OBSERVATIONS

TEST: UDS/20732 ☒ ACUTE ☐ SUBACUTE | COMPOUND: Methacrol | STRAIN: SPECIES: S/D rats

SEX: m | DOSE: V 10 ml/kg | DATES: 8/9/82 - 8/12/82

ANIMAL #	RANDOM #	Day 1 * 8/9	Day 2 * 8/10	Day 3 *	Day 4 *	Day 5 *
011-463	17	185.2 g 13 ml 8:45 SEA SAC ~~TOXIC~~ SEA 11:00				
011-450	18		189.5 g 15 ml 8:45 SEA lesion on head SAC ~~TOXIC~~ 11:00 SEA			

* Record Dosing Time, Volume, and Physical Signs SAC = sacrificed
UDS = unscheduled DNA synthesis

AMOUNT USED = 3.8 ml

AMOUNT DISCARDED = 16.2 ml

PERFORMED BY: S. E. [illegible] DATE: 8/13/82

REVIEWED BY: [illegible] DATE: 5/25/83

0000134

0000042

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

CLINICAL CHEMISTRIES
PHYSICAL OBSERVATIONS

TEST: UDS/20738 ☒ ACUTE ☐ SUBACUTE
SEX: male
COMPOUND: 2-RAF
DOSE: VI 200 mg/kg
STRAIN:
SPECIES: SD rat
DATES: 8/7/82-8/12/82

ANIMAL #	MARKER #	Day 1 *	Day 2 *	Day 3 * 8/11	Day 4 * 8/12	Day 5 *
Oil. 442	19			195.0g 2.0ml SED 9:00 Sac. 11:00 SED		
Oil. 443	20				204.7g 2.1ml SED 9:00 Sac 11:00 SED	

* Record Dosing Time, Volume, and Physical Signs Sac: sacrificed
UDS: unscheduled DNA synthesis

AMOUNT USED = 4.1ml
AMOUNT DISCARDED = 159ml

PERFORMED BY: S.E. Smith DATE: 8/13/82
REVIEWED BY: [illegible] DATE: 5/25/83

000135

000043

VIABILITY AND CELL COUNTS

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

Unscheduled DNA Synthesis	Study # ~~30087~~ 30732	Date: 8/9/82 - 8/12/82
Cell Count - trypan blue	Test Comp. DET - PMS	Hepatocytes:

Date	Animal #	ml of * Suspension	# Viable	# Dead	Total	% Viable	Cell # cells/ml
8/9	1	15/3	264	1	265	99.6	1.77×10^6
8/9	5	15/5	180	41	221	81.5	8.84×10^5
8/9	9	15/2	221	2	223	99.1	2.23×10^6
8/9	13	9/5	147	1	148	99.3	5.94×10^5
8/9	17	15/3	203	2	205	99.0	1.37×10^6
8/10	2	15/5	282	1	283	99.6	1.13×10^6
8/10	6	15/3	232	11	243	95.5	1.62×10^6
8/10	10 ‡	poor perfusion - rat #22 replaces rat #10					
8/10	14	15/1	224	5	229	97.8	4.58×10^6
8/10	18	15/2	295	13	308	95.8	3.08×10^6
8/11	3	15/3	228	0	228	100	1.52×10^6
8/11	7	8/5	46	2	48	95.8	1.9×10^5
8/11	11	15/2	205	11	216	97.2	2.2×10^6 ~~2.2×10^6~~
8/11	15	15/2	164	0	164	100	1.6×10^6
8/11	19	15/2	243	5	248	98.0	2.48×10^6
8/12	4	15/5	196	49	245	80.0	9.8×10^5
8/12	8	15/1	226	24	250	90.4	5.0×10^6
8/12	21	15/2	132	53	185	71.3	1.8×10^6
8/12	12	15/2	136	89	225	60.4	2.2×10^6
AVERAGE						90.1 ± 12.0%	$2.26 \times 10^6 \pm 1.57 \times 10^6$

Performed by — Date — Reviewed by — Date 5/25/83

* denominator = square counted

‡ not included by [illegible]

mjs 6/4/84

000137

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

Unscheduled DNA Synthesis	Study # 20732	Date: 8/9/82 - 8/12/82
Cell Count - trypan blue	Test Comp. PET + PMS	Hepatocytes:

Date	Animal #	ml of Suspension	# Viable	# Dead	Total	% Viable	Cell # cells/ml
8/12	22	15/1	282	61	343	82.2	6.9×10^6
8/12	16	15/2	210	57	267	78.4	2.7×10^6
8/12	28	15/2	178	74	252	70.6	2.5×10^6
AVERAGE						90.1 ± 12%	$2.26 \pm 1.58 \times 10^6$

S. Edwards — Performed by — 8/12/82 Date

[illegible] — Reviewed by — 5/25/83 Date

SLIDE SCORING

STUDY NUMBER: 20732

RANDOMIZATION OF SLIDES

DATE SLIDES RANDOMIZED: 8/19/82

RANDOMIZED BY: S. E. [illegible]

ANIMAL NUMBER	RANDOM NUMBER	RANDOMIZED SLIDE NUMBER	ANIMAL NUMBER	RANDOM NUMBER	RANDOMIZED SLIDE NUMBER
011-457	1	10	446	2	16
460	2	4	449	22	19
458	3	8	440	25	18
451	4	15			
465	5	1			
453	6	13			
464	8	5			
459	9	11			
447 ~~455~~	11	9			
467	12	12			
441	13	7			
445	14	6			
452	15	17			
438	16	2			
463	17	3			
450	18	20			
442	19	14			

DECODED BY: Susan E. [illegible]
DATE DECODED: 9/7/82

REVIEWED BY: [illegible]
DATE REVIEWED: 5/25/83

File:
dmr/6-19-81
Disk# dec-7
Title: sop m.6.1.1 dm #3

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

Unscheduled DNA Synthesis	Study # 20732	Date ~~7/9/12 - 7/12/82~~ 9/7/82
	Test Comp. PMS-PET	Hepatocytes/Lymphocytes

Slide #	Animal #	Dose (mg/kg)	Background	UDS	S phase	Total
1	5	II 1.0	693	290	17	1000
2	16	IV PMS	954	40	6	"
3	17	V 0	877	115	8	"
4	2	I 0.5	947	35	18	"
5	8	II 1.0	650	343	7	"
6	14	IV PMS	597 583	396	11	"
7	13	IV PMS	700	292	8	"
8	3	I 0.5	801	190	9	"
9	11	III 1.7	948	39	13	"
10	1	I 0.5	682	305	13	"
11	9	III 1.7	936	61	3	"
12	12	III 1.7	902	91	7	"
13	6	II 1.0	906	69	25	"
14	19	VI 2-AAF	484	486	30	"
15	4	I 0.5	954	37	9	"
16	21	II 1.0	953	38	8	"
17	15	IV PMS	986	4	10	"
18	28	VI 2-AAF	807	189	4	"
19	22	III 1.7	877	109	14	"
20	18	V 0	879	115	6	"
						000141

S. E. Jones 5/25/83 [illegible] 5/25/83

APPENDIX II

ANIMAL ACCLIMATION

#20732

Taconic Farms!

GERMANTOWN, NEW YORK 12526
Phone (518) 537-6200

CUSTOMER'S RECEIPT

INVOICE NO. 51159

TERMS: NET 10 DAYS

TO • MOBIL OIL RESEARCH CORP 1487698
BOX 1025
PURCHASING DEPT
PRINCETON NJ 08540

SHIPPED TO • MOBIL OIL
TOX LABS
201 COLLEGE RD
PLAINSBORO NJ

INVOICE DATE	DATE SHIPPED	CUSTOMER'S ORDER NUMBER	INVESTIGATOR	SHIPPED VIA
10/19/82	10/19/82	LP120026		TACONIC TRUCK

ITEM	QUANTITY	DESCRIPTION
DILUTION CO 1	25	TAC NESTOFER RATS HOLES 120 .' 140 DAYS DELIVERY
TOTAL CASES ▶	2	RECEIVED BY Gregory A Fels

Received 10/19/82 GAF

D.O.B. 9/13

000144

000052

Vivar [illegible] Operations

Form #1

Animal Receipt & Acclimation Period Record

Rev. [illegible]

000053

Study# 20732 Room# 910

Species Rat Strain Sprague D.O.B.

# of Animals rec'd 25 male X Date received OCT 19 1982

female

Supplier Taconic . Mean body weights male 175±29 g # weighed male 25

female N/A female N/A

Animals received in apparent (Satisfactory, Unsatisfactory) condition.

REMARKS:

Signature Susan E [illegible]

Date	Daily Observation and Remarks	Initials
10-20-82	all seem normal	[illegible]
10-21-82	all seem normal	[illegible]
10-22-82	all seem normal	[illegible]
10-22-82	gave H2O bottles to all rats to insure they receive H2O	[illegible]
10-23-82	all seem normal	[illegible]
10-24-82	all seem normal	[illegible]
10-25-82	all seem normal	SED

Signature [illegible] Date 10/25/82

000145

Mobil

Animal Unit Daily Checklist*

Room No. 310

20732
MJS

DATE	Temperature and Humidity	Sanitation of Animal Racks	Food and Bedding	Water System	Sanitation of Floors	REMARKS
10-20-82	[illegible]		[illegible]	[illegible]		Hygrometer broken cont record Humid drained H_2O system reset
10-21-82	[illegible] 73°		[illegible]	[illegible] 6.2		
10-22-82	[illegible] 73°		[illegible]	[illegible]	[illegible]	drained H_2O system, reset
10-23-82	[illegible] 73°		[illegible]	[illegible] 6.5	[illegible]	
10-24-82	[illegible] 73°		[illegible]	[illegible] 6.0		

*Initials of person completing duty in appropriate box.

Mobil Oil Corporation
Toxicology Division - Vivarium Operations
820732

Form #13
Rev. 12/27/79

000055

Weight Check (Quarantine Period)

Date

Date	OCT 19 1982	10/25/82			OCT 19 1982	10/25/82	
Balance #	135	135			135	135	

Weights

Animal #							
012-701	126.6 g	157.7		722	132.4 g	177.9	
702	121.9	157.2		723	121.9	142.2	
703	123.7	177.1		724	123.1	150.2	
704	109.0	192.5		725	121.3	156.4	
705	126.5	147.1					
706	118.3	136.5					
707	121.7	166.8					
708	127.7	150.7					
709	113.6	137.1					
710	154.0	127.6					
711	112.5	[illegible]					
712	132.6	17[illegible].8					
713	107.8	157.7					
714	115.3	151.8					
715	117.2	150.3					
716	114.5	141.4					
717	102.5	143.2					
718	114.1	136.9					
719	102.1	140.3					
720	116.0	137.5					
721	125.9	150.5					
Initials	SW	SW			SW	SW	

000147

MORTALITY CHECK

MOBIL
Toxicology Division
Vivarium Operations

Study No. 26732

Form #8
2/5/80

Animal Nos: 612-701 TO 612-725 Room No. 310

DATE	TIME	OBSERVER	NO. DEAD OR MORIBUND GROUP
10/19/82	2:45	SED	0
10-19-82	4:13	[illegible]	0
10-20-82	8:23	[illegible]	0
10-20-82	4:19	[illegible]	0
10-21-82	8:30	[illegible]	0
10-21-82	4:08	[illegible]	0
10-22-82	8:29	[illegible]	0
10-22-82	4:21	[illegible]	0
10-23-82	8:30	[illegible]	0
10-23-82	12:34	[illegible]	0
10-24-82	10:10	[illegible]	0
10-24-82	1:40	[illegible]	0
10-25-82	11:00	SED	FOC. 721 707 722 70Y

MOBIL
Toxicology Division
Vivarium Operations

MORTALITY CHECK

Study No. 26732

000057
Form 78
2/5/80

Animal Nos: 012-701 TO 012-735 Room No. 310

DATE	TIME	OBSERVER	NO. DEAD OR MORIBUND GROUP
10-26-82	11:00	SCB	See 725, 719, 715, 717
10-26-82	4:10	MKZ	0
10-27-82	11:00	SCB	See 703, 705, 713, 727
10-27-82	4:12	MKZ	0
10-28-82	8:27	MKZ	0
10-28-82	11:00	SCB	See 719, 723, 715, 701
10-28-82	4:20	MKZ	0
10-29-82	8:28	MKZ	0
10-29-82	4:09	MKZ	0
10-30-82	11:40	RP	0
10-30-82	3:25	RP	0
10-31-82	8:47	NP	0
10-31-82	12:30	NP	0
11-1-82	8:10	MKZ	0
11-1-82	4:05	MKZ	0
11-2-82	8:31	MKZ	0
11-2-82	3:59	MKZ	0
11-3-82	8:32	MKZ	0
11-3-82	4:05	MKZ	0
11-4-82	8:31	MKZ	0
[illegible]	[illegible]	[illegible]	
11-5-82	8:25	RP	0
11-5-82	4:10	RP	0
11-6-82	9:30	SLL	0
11-6-82	1:30	SLL	0
11-7-82	9:50	SLL	0

000149

NIMAL DOSING FORMS

Mobil Oil Environmental and Health Sciences Laboratory

CYTOGENETICS
Pretest Weight Sheet

test: UDS-hept.	compound: PET	sex: male
dates: 10/25/82-10/27/82	strain-species: S/D rats	# 20732

Year #	Pretest wt.	test wt.	random #	Year #	Pretest wt.	test wt.	random #
700	120.6 g	177.4	4	718	114.6 g	NA	1
702	121.9	NA	17	719	102.1	161.2	16
703	127.9	178.7	24	720	116.0	NA	20
704	127.0	NA	18	721	126.9	178.5	21
705	126.5	165.2	11	722	172.4	177.9	19
706	115.3	NA	13	723	117.6	165.8	5
707	121.7	166.5	9	724	127.1	NA	22
708	127.7	152.3	25	725	121.3	174.4	2
709	113.6	NA	3				
710	104.0	NA	15				
711	117.5	NA	23				
712	132.0	200.2	12				
713	107.8	171.3	7				
714	115.3	162.6	6				
715	117.3	175.6	10				
716	114.5	171.3	8				
717	102.5	152.6	14				

S E [illegible] — Performed by — 10/25/82 date

[illegible] — Reviewed by — 5/25/83 date

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

CYTOGENETICS
PHYSICAL OBSERVATIONS

TEST: UDS/20732 ☒ ACUTE ☐ SUBACUTE
SEX: male
COMPOUND: PET
DOSE: I (0.75 g/kg)
STRAIN: SD
SPECIES: Rats
DATES: 10/25/82 - 10/29/82

ANIMAL #	RANDOM #	Day 1 *	Day 2 *	Day 3 *	Day 4 *	Day 5 *
012-708	25	152.3g 15g SCD 8:00 sac. 10:00 SCD				
725	2		177.4g SCD 8:00 1.9ml sac 10:00 SCD			
703	5			165.8g SCD 8:00 1.7ml sac 10:00 SCD		
701	4				177.4g SCD 8:00 1.8ml sac 10:00 SCD	

* Record Dosing Time, Volume, and Physical Signs sac - sacrifice
UDS - unscheduled DNA synthesis

AMOUNT USED = 6.9ml
AMOUNT DISCARDED = 33.1ml

PERFORMED BY: S Edwin DATE: 10/25/82 - 10/29/82
REVIEWED BY: Greg Kleiner DATE: 5/25/83

0001521

0000060

[illegible] ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

CYTOGENETICS
PHYSICAL OBSERVATIONS

TEST: UDS/20732 ☒ ACUTE ☐ SUBACUTE | COMPOUND: PET | STRAIN: SPECIES: S/D rats

SEX: male | DOSE: II 1.0 g/kg | DATES: 10/25/82 - 10/29/82

ANIMAL #	RANDOM #	Day 1 *	Day 2 *	Day 3 *	Day 4 *	Day 5 *
012-722	19	177.9 g SQ 8:15 1.8 ml Sac 10:15 SQ				
714	6		16[illegible] g SQ 8:15 1.6 ml Sac 10:15 SQ			
713	7			171.3 g SQ 8:15 1.7 ml Sac 10:15 SQ		
71[illegible]	8				171.3 g SQ 8:15 1.7 ml Sac 10:15 SQ	

* Record Dosing Time, Volume, and Physical Signs

Sac = sacrificed
UDS = unscheduled DNA Synthesis

AMOUNT USED = 6.8 ml

AMOUNT DISCARDED = 33.2 ml

PERFORMED BY: S. E. [illegible] DATE: 10/25/82 - 10/29/82

[illegible] [signature] DATE: 5/05/83

000153

000061

CYTOGENETICS
PHYSICAL OBSERVATIONS

TEST: UDS/20732 ☒ ACUTE ☐ SUBACUTE
SEX: male
COMPOUND: PEA
DOSE: III 1.25 g/kg
STRAIN:
SPECIES: S/D rats
DATES: 10/25-10 - 10/28/82

ANIMAL #	RANDOM #	Day 1 *	Day 2 *	Day 3 *	Day 4 *	Day 5 *
012 707	9	166.8 g 17 ml SC 8:30 SC 10:30 SC				
705	10		195.6 g 20 ml SC 8:30 SC 10:30 SC			
705	11			165.2 g 1.7 ml SC 8:30 SC 10:30 SC		
712	12				200.2 g 2.0 ml SC 8:30 SC 10:30 SC	

* Record Dosing Time, Volume, and Physical Signs SC = sacrificed
UDS = unscheduled DNA synthesis

AMOUNT USED = 7.4 ml
AMOUNT DISCARDED = 32 ml

PERFORMED BY: S Edgar DATE: 10/25/82 - 10/28/82
REVIEWED BY: [illegible] DATE: 5/25/83

000154

000062

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

CYTOGENETICS
PHYSICAL OBSERVATIONS

TEST: UDS/20730 ☒ ACUTE ☐ SUBACUTE
SEX: male
COMPOUND: Methacel
DOSE: IV 1 ml/kg
STRAIN: SPECIES: S/D rats
DATES: 10/25/82 - 10/27/82

ANIMAL #	MARKER #	Day 1 *	Day 2 *	Day 3 *	Day 4 *	Day 5 *
01 2-7	21	186.5g 1.8ml SQ 8:30 Sac 10:45 SQ				
7	14		156.6g 1.6ml SQ 8:30 Sac 10:45 SQ			

* Record Dosing Time, Volume, and Physical Signs Sac - sacrificed
UDS - unscheduled DNA synthesis

AMOUNT USED = 3.4ml
AMOUNT DISCARDED = 16.6ml

PERFORMED BY: S Edmunds DATE: 10/25/82 - 10/27/82
REVIEWED BY: [illegible] DATE: 5/25/83

000155

000063

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

CYTOGENETICS
PHYSICAL OBSERVATIONS

TEST: UDS/20732 ☒ ACUTE ☐ SUBACUTE | COMPOUND: 2-AAF | STRAIN: SPECIES: S/D rats

SEX: male | DOSE: V 2 mg/kg | DATES: 10/25/83 - 10/29/83

ANIMAL #	RANDOM #	Day 1 *	Day 2 *	Day 3 *	Day 4 *	Day 5 *
012-763	24	17:50 2 ml SCD 8:45 SCD				
719	16		10:45 3 SCD 8:45 1.6 ml SCD 10:45 SCD			

* Record Dosing Time, Volume, and Physical Signs SCD SCD refuse UDS-unscheduled DNA synthesis

AMOUNT USED = 3.6 ml | PERFORMED BY: J. E. Dunn | DATE: 10/27/83 - 10/29/83

AMOUNT DISCARDED = 6.4 ml | REVIEWED BY: Sigrid Kimmes | DATE: 5/25/83

0001156

0000504

VIABILITY AND CELL COUNTS

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

Unscheduled DNA Synthesis	Study # 20732	Date: 10/25/92 - 10/28/92
Cell Count - trypan blue	Test Comp. PET	Hepatocytes:

Date	Animal #	ml of Suspension *	# Viable	# Dead	Total	% Viable	Cell # cells/ml
10/25	25	15 ml / 3sq	122	1	123	99.2	8.2×10^5
10/25	19	15/2sq	213	1	214	99.5	2.14×10^6
10/25	9	15/2sq	158	–	158	100.0	1.58×10^6
10/25	21	15/1sq	202	4	206	98.1	4.12×10^6
10/26	2	15/1sq	160	1	161	99.4	3.22×10^6
10/26	6	15/2sq	237	0	237	100.0	2.37×10^6
10/26	10	15/1sq	180	0	180	0	3.6×10^6
10/26	14	15/1sq	203	32	235	86.4	4.7×10^6
10/27	5	15/5sq	301	5	306	98.4	1.22×10^6
10/27	7	15/2sq	335	1	336	99.7	3.36×10^6
10/27	11	15/2sq	247	0	247	100.0	2.47×10^6
10/27	24	15/2sq	325	2	327	99.4	3.27×10^6
10/28	4	15/5sq	85	0	85	100.0	3.4×10^5
10/28	8	15/5sq	247	0	247	100.0	9.9×10^5
10/28	12	15/3sq	286	0	286	100.0	1.89×10^6
10/28	16	15/2sq	326	0	326	100.0	3.26×10^6
AVERAGE						98.8 ± 3.35%	$2.46 \pm 1.26 \times 10^6$

Performed by — Date 10/28/92

Reviewed by — Date 5/25/93

* denominator = squares counted

SLIDE SCORING

STUDY NUMBER: 2732

RANDOMIZATION OF SLIDES

DATE SLIDES RANDOMIZED: 10/1/82

RANDOMIZED BY: S E Dum

ANIMAL NUMBER	RANDOM NUMBER	RANDOMIZED SLIDE NUMBER	ANIMAL NUMBER	RANDOM NUMBER	RANDOMIZED SLIDE NUMBER
702	4	4	702-718	1	NA
702	17	NA	717	10	14
702	24	1	720	20	NA
704	18	NA	721	21	9
705	11	2	722	19	13
706	13	NA	723	5	3
707	9	8	724	22	NA
708	25	10	725	2	15
709	3	NA			
710	15	NA			
711	23	NA			
712	12	7			
713	7	16			
714	6	11			
715	1	5			
716	8	12			
717	14	6			

DECODED BY: S E Dum
DATE DECODED: 11/15/82

REVIEWED BY: [illegible]
DATE REVIEWED: 5/25/83

File:
dmr/6-19-81
Disk# dec-7
Title: sop m.6.1.1 dm #3

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

Unscheduled DNA Synthesis	Study # 20732	Date 11/18/82
	Test Comp. PET	Hepatocytes/Lymphocytes

Slide #	Animal #	Dose (mg/kg)	Background	UDS	S phase	Total
1	24	V 2-AAF	684	310	6	1000
2	11	III 1.25	953	42	5	1000
3	5	I 0.75	953	31	16	1000
4	4	I 0.75	411	571	18	1000
5	10	III 1.25	970	16	14	1000
6	14	IV 0	910	85	5	1000
7	12	III 1.25	935	62	3	1000
8	9	III 1.25	931	54	15	1000
9	21	IV 0	914	66	20	1000
10	25	I 0.75	671	316	13	1000
11	6	II 1.0	901	89	10	1000
12	8	II 1.0	816	140	44	1000
13	19	II 1.0	886	83	27	1000
14	16	V 2-AAF	316	672	11	1000
15	2	I 0.75	890	94	16	1000
16	7	II 1.0	872	117	11	1000

Prepared by [illegible] 11/18/82

Reviewed by [illegible] 5/20/83

APPENDIX III

ANIMAL A CLIMATION

Taconic Farms

GERMANTOWN, NEW YORK 12526
Phone (518) 537-6200

CUSTOMER'S RECEIPT

INVOICE No. 54672

TERMS: NET 10 DAYS

H20732

TO • MOBIL OIL RESEARCH CORP 1407698
BOX 1025
PURCHASING DEPT
PRINCETON NJ 08540

SHIPPED TO • MOBIL OIL
TOX LABS
301 COLLEGE RD
PLAINSBORO NJ

INVOICE DATE	DATE SHIPPED	CUSTOMER'S ORDER NUMBER	INVESTIGATOR	SHIPPED VIA
[illegible]	3/22/83	LPT20226 REQH T3022	SUE	TACONIC TRUCK

ITEM	QUANTITY	DESCRIPTION
D1150 • 60 •	70	TOC INSULFER RATS MALES 120 / 140 GMS DELIVERY
TOTAL CASES ▶	2	RECEIVED BY Gregory A Fees 3/22/83

7:37 A.M

[redacted]

000072

0001164

Vivarium Operations

Form #1
Rev. 9-24-81

Animal Receipt & Acclimation Period Record

000073

Study# 20732 Room# 310

Species Rats Strain Sprague D.O.B.

# of Animals rec'd 30 male X Date received MAR 22 1983

female

Supplier Taconic Mean body weights male 124.5 ± 1.2 # weighed male 30

female N/A female N/A

Animals received in apparent (Satisfactory) Unsatisfactory) condition.

REMARKS: Have all animals H2O bottles also moved animals to room #309 since malfunction of H2O station. H2O Bottles were Sterile. Suggested request HHF 3/28/83

Signature HHFee

Date	Daily Observation and Remarks	Initials
3-23-83	all appear normal	HHF
3-24-83	all appear normal	HHF
3-25-83	all appear normal	HHF
3-26-83	all appear normal	SUC
3-27-83	all appear normal	SUC
3-28-83	all appear normal	SSD

Signature [illegible] Date 3/28/83

000165

Mobil Oil Corporation
Toxicology Division - Vivarium Operations
#20732

Form #13
Rev. 12/27/79
000074

Weight Check (Quarantine Period)

Date

Date	3-22-83	3-28-83			3-22-83	3-28-83	
Balance #	579	577			579	577	

Weights

Animal #							
014-565	122.2g	174.5		014-586	125.6g	175.9	
566	129.1	175.9		587	119.8	172.6	
567	123.0	177.5		588	126.4	177.5	
568	116.5	162.5		589	133.5	201.4	
569	133.4	188.0		590	121.3	172.5	
570	130.2	197.3		591	122.6	180.5	
571	129.3	201.7		592	115.4	170.7	
572	119.9	191.6		593	113.8	172.3	
573	123.3	192.2		594	116.5	168.1	
574	130.9	197.2					
575	118.9	175.4					
576	114.7	181.2					
577	131.8	169.5					
578	127.9	183.8					
579	116.3	165.7					
580	126.2	175.2					
581	131.7	197.7					
582	131.2	186.3					
583	131.7	178.2					
584	129.6	189.1					
585	125.4	176.8					
Initials	SEL	JW			SEL	JW	

000166

MOBIL
Toxicology Division
Vivarium Operations

MORTALITY CHECK

Study No. 20732

Form #8
2/5/80

000075

Animal Nos: 014-565 to 014-574

Room No. 310

DATE	TIME	OBSERVER	NO. DEAD OR MORIBUND GROUP
3-22-83	4:04	[illegible]	0
3-23-83	9:36	[illegible]	0
3-23-83	4:12	[illegible]	0
3-24-83	9:46	[illegible]	0
3-24-83	4:21	[illegible]	0
3-25-83	8:24	[illegible]	0
3-25-83	4:16	[illegible]	0
3-26-83	9:20	SLL	0
3-26-83	1:15	SLL	0
3-27-83	10:20	SLL	0
3-27-83	2:15	SLL	0
3-28-83	8:31	[illegible]	0

000157

MOBIL
Toxicology Division
Vivarium Operations

Study No. 20732

Form #8
2/5/80

000076

Animal Nos: 014-565 to 014-574

Room No. 310

DATE	TIME	OBSERVER	NO. DEAD OR MORIBUND GROUP
3-22-83	4:04	HH	0
3-23-83	8:36	HH	0
3-23-83	4:12	HH	0
3-24-83	8:46	HH	0
3-24-83	4:21	HH	0
3-25-83	8:34	HH	0
3-25-83	4:16	HH	0
3-26-83	9 20	SCK	0
3 26 83	1 15	SCK	0
3-27-83	10:20	SCK	0
3-27-83	2 15	SCK	0
3-28-83	8:31	HH	0
3-28-83	11:00	SED	sac. 014-570, 571, 576, 577
3-28-83	4:18	HH	0
3-29-83	10:00	SCK	0
3-29-83	11:00	SED	sac 014-560, 565, 567, 574, 575
3-29-83	4:00	RP	0
3-30-83	8 20	SCK	0
3-30-83	11:00	SED	sac 014-563, 573, 569, 579
3-30-83	4:00	RP	0
3-31-83	11:05	SED	sac 014-576, 584, 572, 583
3-31-83	4:05	RP	0
4-1-83	8:30	SCK	0
4-1-83	1 pm	SCK	not on study 014-564, 561, 562, 571, 578, 585, 587, 588, 583, 575, 576, 566, 581

000168

Mobil

Animal Unit Daily Checklist*

Room No. 310
#30738

DATE	Temperature and Humidity	Sanitation of Animal Racks	Food and Bedding	Water System	Sanitation of Floors	REMARKS
3-23-83	[illegible]		[illegible]	[illegible]		40% humidity
3-24-83	[illegible]		[illegible]	[illegible]	[illegible]	42% humidity
3-25-83	[illegible]		[illegible]	[illegible]	[illegible]	47% humidity
3-26-83	SUL 70°			[illegible]		45% humidity
3-27-83	SUL 71°			[illegible]		53% humidity
3-28-83	[illegible]		[illegible]	[illegible]		54% humidity

*Initials of person completing duty in appropriate box.

Mobil Oil Environmental and Health Sciences Laboratory

CYTOGENETICS
Pretest Weight Sheet

test: UDS hept.	compound: PET	sex: male
dates: 3/28 – 3/31/83	strain-species: S/D rats	# 20732

Year #	Pretest wt.	test wt.	random #	Year #	Pretest wt.	test wt.	random #
04-565	122.2 j	182.9	10	04-582	131.2 j	NA	17
566	129.1	NA	18	583	131.7	199.6	4
567	127.6	186.8	6	584	127.6	203.5	12
568	116.5	NA	29	585	121.4	NA	26
569	128.4	195.[illegible]	11	586	125.6	175.9	5
570	136.2	NA	25	587	119.8	NA	30
571	127.3	NA	21	588	126.4	NA	27
572	112.7	215.1	8	589	133.5	NA	23
573	123.3	207.0	15	590	121.3	172.5	13
574	130.9	205.2	17	591	122.6	186.5	9
575	118.5	189.7	2	592	115.4	NA	24
576	114.7	199.3	16	593	113.8	191.7	3
577	131.8	169.5	1	594	116.5	NA	28
578	127.7	NA	20				
579	116.3	181.9	7				
580	126.2	178.0	14				
581	131.7	NA	22				

S. E. [illegible] 3/31/83
Performed by date

[illegible] 5/5/83
Reviewed by date

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

CYTOGENETICS
PHYSICAL OBSERVATIONS

TEST: UDS Rept/20732 ☒ ACUTE ☐ SUBACUTE | COMPOUND: PET | STRAIN: SPECIES: S/D rats

SEX: Male | DOSE: I 0.75 g/kg | DATES: 3/28 - 3/31/83

ANIMAL #	RANDOM #	Day 1 *	Day 2 *	Day 3 *	Day 4 *	Day 5 *
614-577	1	169.5 g 1.7 ml 8:05 SED Sac 10:00 SED				
575	2		187.7 g 1.9 ml SED 8:00 Sac 10:00 SED			
593	3			191.7 g 1.9 ml SED 8:15 Sac 10:15 SED		
583	4				199.6 g 2.0 ml SED 8:15 Sac 10:15 SED	
574	17		205.2 g 2.1 ml 8:15 SED Sac 10:15 SED			

* Record Dosing Time, Volume, and Physical Signs Sac - sacrifice UDS - unscheduled DNA synthesis

AMOUNT USED = 7.5 ml | PERFORMED BY: S.E. [illegible] | DATE: 3/31/83

AMOUNT DISCARDED = 12.5 ml | REVIEWED BY: [illegible] | DATE: 5/25/83

000172

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MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

CYTOGENETICS
PERIPHERAL OBSERVATIONS

TEST: UDS hepatocyte ☒ ACUTE ☐ SUBACUTE
SEX: male
COMPOUND: PET
DOSE: II 1.00 g/kg
STRAIN:
SPECIES: SD rats
DATES: 3/28 - 3/31/83

ANIMAL #	RANDOM #	Day 1 *	Day 2 *	Day 3 *	Day 4 *	Day 5 *
OH-586	5	175.9 g 18 ml SQ 8:15 Sac 16:15 SQ				
567	6		165.8 g 18 ml SQ 8:30 Sac 16:30 SQ			
579	7			161.9 g 18 ml SQ 8:30 Sac 16:30 SQ		
572	8				215.1 g 22 ml SQ 8:30 Sac 16:30 SQ	

* Record Dosing Time, Volume, and Physical Signs Sac = sacrificed
SQ = unscheduled due synthesis

AMOUNT USED = 7.6 ml
AMOUNT DISCARDED = 13.4 ml

PERFORMED BY: S E [illegible] DATE: 3/31/83
REVIEWED BY: [illegible] DATE: 5/05/83

000173

000081

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

CYTOGENETICS
PHYSICAL OBSERVATIONS

TEST: UDS Prot/20732 ☒ ACUTE ☐ SUBACUTE

SEX: male

COMPOUND: PET

DOSE: III 1.25 g/kg

STRAIN:
SPECIES: SD rats

DATES: 3/28/83 - 3/31/83

ANIMAL #	RANDOM #	Day 1 *	Day 2 *	Day 3 *	Day 4 *	Day 5 *
014-591	9	196.5 g 18 ml SQ 8:30 SAC 16:30 SQ				
565	10		182.3 g 18 ml SQ 8:45 SAC 16:45 SQ			
569	11			198.1 g 2.0 ml SQ 8:45 SAC 16:45 SQ		
584	12				203.5 g 2.0 ml SQ 8:45 SAC 16:45 SQ	

* Record Dosing Time, Volume, and Physical Signs SAC - sacrifice
UDS - unscheduled DNA synthesis

AMOUNT USED = 7.6 ml

AMOUNT DISCARDED = 13.4 ml

PERFORMED BY: J. E. [illegible] DATE: 3/31/83

REVIEWED BY: M J Atkinson DATE: 5/25/83

000174

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MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

CYTOGENETICS
PHYSICAL OBSERVATIONS

TEST: UDS-Liver/72 ☒ ACUTE ☐ SUBACUTE
SEX: male
COMPOUND: Methacrylamide
DOSE: IV 10 ml/kg
STRAIN: SPECIES: S/D rat
DATES: 3/29/83 - 3/31/83

ANIMAL #	RANDOM #	Day 1 *	Day 2 *	Day 3 *	Day 4 *	Day 5 *
OM-590	13	172.5 g 17 ml 5:00 V:20 sac 16:45 5:00				
580	14		174.0 g 17.5 ml 8:45 5:00 sac 11:00 5:00			

* Record Dosing Time, Volume, and Physical Signs

AMOUNT USED = 3.5 ml
AMOUNT DISCARDED = 6.5 ml

PERFORMED BY: S. E. [illegible] DATE: 3/31/83
REVIEWED BY: [illegible] DATE: 5/25/83

000175

000083

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

CYTOGENETICS
PHYSICAL OBSERVATIONS

TEST: UDS hepatocytes ☑ ACUTE ☐ SUBACUTE
SEX: Male
COMPOUND: 2-AAF
DOSE: 25 mg/kg
STRAIN:
SPECIES: S/D rats
DATES: 3/29/83 - 3/31/83

ANIMAL #	RANDOM #	Day 1 *	Day 2 *	Day 3 *	Day 4 *	Day 5 *
014-573	15			207.0g 2 ml SQ 8:45 sac 11:00 SQ		
516	16				199.3g SQ 8:45 2.6ml sac 11:00 SQ	

* Record Dosing Time, Volume, and Physical Signs sac - sacrificed UDS - unscheduled DNA synthesis

AMOUNT USED = 4.1 ml
AMOUNT DISCARDED = 5.9 ml

PERFORMED BY: S. E. [illegible] DATE: 3/31/83
REVIEWED BY: [illegible] DATE: 5/25/83

000176

000084

VIABILITY AND CELL COUNTS

MOBIL OIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

Unscheduled DNA Synthesis	Study # 20732	Date: 3/28/83 - 4/1/83
Cell Count - trypan blue	Test Comp. DET	Hepatocytes:

Date	Animal #	ml of * Suspension	# Viable	# Dead	Total	% Viable	Cell # cells/ml
3/28	1	10/5sq	31	38	69	44.9	1.3×10^5
3/28	5	15/1sq	210	11	221	95.0	2.21×10^6
3/28	9	20/3sq	94	33	127	74.0	4.2×10^5
3/28	13	15/1sq	181	5	186	97.3	1.9×10^6
3/29	2	20/3sq	181	20	201	90.0	6.7×10^5
3/29	17	20/3sq	282	14	296	95.3	9.8×10^5
3/29	6	20/2sq	178	22	200	89.0	1.0×10^6
3/29	10	20/2sq	230	6	236	97.5	1.2×10^6
3/29	14	20/1sq	178	5	183	97.3	1.8×10^6
3/30	3	20/3sq	175	38	213	82.0	7.1×10^5
3/30	7	20/3sq	224	32	256	87.5	8.5×10^5
3/30	11	20/3sq	221	20	241	91.7	8.0×10^5
3/30	15	20/1sq	215	39	254	84.6	2.5×10^6
3/31	4	20/2sq	217	25	242	89.7	1.2×10^6
3/31	8	20/2sq	134	38	172	77.5	8.6×10^5
3/31	12	20/2sq	203	13	216	94.0	1.1×10^6
3/31	16	20/2sq	219	19	238	92.0	1.2×10^6
AVERAGE						87.00 ± 12.8	

Performed by — Date 4/1/83 — Reviewed by — Date 5/25/83

* denominator = squares counted

GRAIN COUNTS

STUDY NUMBER: 20732

RANDOMIZATION OF SLIDES

DATE SLIDES RANDOMIZED: 4/4/83

RANDOMIZED BY: S. E. Jones

ANIMAL NUMBER	RANDOM NUMBER	RANDOMIZED SLIDE NUMBER	ANIMAL NUMBER	RANDOM NUMBER	RANDOMIZED SLIDE NUMBER
014-575	2	6	014-575	2H*	7
593	3	21	593	3H	15
583	4	13	583	4H	9
586	5	19	586	5H	8
567	6	28	567	6H	25
579	7	14	579	7H	20
572	8	30	572	8H	22
591	9	1	591	9H	3
565	10	10	565	10H	29
569	11	17	569	11H	27
584	12	4	584	12H	16
590	13	24	590	13H	32
580	14	12	580	14H	2
573	15	26	573	15H	31
576	16	5	576	16H	23
574	17	18	574	17H	11

H = hydroxyurea

DECODED BY: S. E. Jones
DATE DECODED:

REVIEWED BY: [illegible]
DATE REVIEWED: 5/25/83

File:
dmr/6-19-81
Disk# dec-7
Title: sop m.6.1.1 dm #3

Date 4/29/93 SE Dm 20732 Slide # 6 000089

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	8 ✓	36	5	71	12
2	7 ✓	37	19	72	12
3	7 ✓	38	6	73	9
4	9 ✓	39	8	74	7
5	14	40	21	75	7
6	10	41	10	76	750
7	4	42	8	77	9
8	12	43	23	78	13
9	7	44	4	79	12
10	10	45	11	80	750
11	13	46	750	81	16
12	6	47	22	82	19
13	0	48	12	83	750
14	11	49	6	84	20
15	7	50	24	85	13
16	11	51	12	86	12
17	2	52	5	87	10
18	12	53	21	88	1
19	8	54	3	89	22
20	8	55	14	90	4
21	13	56	5	91	12
22	11	57	19	92	4
23	20	58	9	93	13
24	8	59	11	94	5
25	4	60	9	95	2
26	12	61	8	96	16
27	8	62	750	97	13
28	9	63	15	98	9
29	11	64	23	99	17
30	20	65	11	100	8
31	9	66	750		
32	7	67	12		
33	7	68	7		
34	3	69	3		
35	16	70	15		

6 Sphaer

10.6 ± 5.5

000181

Sup Skinner 5/25/93

Date 5/2/83 S.E. Dmi 20752 Slide # 090090 (3) 075

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	2	36	6	71	6
2	10	37	750	72	3
3	5	38	21	73	16
4	3	39	3	74	5
5	4	40	14	75	9
6	12	41	3	76	9
7	4	42	5	77	3
8	7	43	10	78	18
9	6	44	5	79	10
10	10	45	6	80	5
11	9	46	5	81	10
12	11	47	12	82	13
13	8	48	2	83	6
14	15	49	5	84	6
15	9	50	10	85	20
16	13	51	8	86	1
17	5	52	8	87	12
18	8	53	11	88	9
19	5	54	7	89	1
20	16	55	6	90	750
21	3	56	6	91	12
22	7	57	3	92	7
23	14	58	5	93	750
24	10	59	7	94	12
25	11	60	8	95	5
26	14	61	9	96	7
27	5	62	12	97	14
28	4	63	25	98	5
29	7	64	4	99	9
30	8	65	18	100	4
31	6	66	3	101	7
32	16	67	9		
33	19	68	9		
34	9	69	3		
35	4	70	5		

3 Sphere

8.31 ± 4.83

[illegible] 5/25/83

000182

000091

Date 5/2/83 S.E. Jm 30732 Slide # 13

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	4	36	8	71	18
2	6	37	16	72	14
3	7	38	9	73	10
4	3	39	10	74	4
5	5	40	16	75	6
6	5	41	17	76	[illegible]
7	12	42	3	77	5
8	24	43	7	78	5
9	19	44	17	79	9
10	13	45	5	80	9
11	12	46	7	81	7
12	7	47	5	82	5
13	5	48	7	83	[illegible]
14	7	49	6	84	11
15	13	50	14	85	7
16	6	51	5	86	>50
17	5	52	12	87	>50
18	5	53	12	88	10
19	5	54	4	89	7
20	10	55	4	90	2
21	14	56	8	91	8
22	>50	57	4	92	4
23	6	58	18	93	3
24	9	59	7	94	7
25	6	60	13	95	8
26	11	61	8	96	5
27	5	62	20	97	4
28	9	63	11	98	7
29	1	64	13	99	9
30	7	65	12	100	13
31	14	66	9		
32	7	67	6		
33	8	68	15		
34	19	69	4		
35	4	70	2		

35 plates

8.60 ± 4.45

000183

Sue Kleiner 5/25/83

Date 5/2/83 S.E. Jones 26722 Slide # 10 (11) 0.75

000092

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	6	36	7	71	4
2	750	37	3	72	4
3	13	38	9	73	10
4	3	39	10	74	10
5	11	40	8	75	5
6	6	41	6	76	8
7	2	42	12	77	5
8	9	43	16	78	7
9	13	44	9	79	12
10	5	45	10	80	8
11	10	46	12	81	2
12	9	47	15	82	3
13	3	48	5	83	10
14	4	49	9	84	6
15	10	50	3	85	9
16	15	51	4	86	15
17	4	52	10	87	10
18	10	53	24	88	6
19	13	54	8	89	11
20	28	55	750	90	7
21	13	56	11	91	6
22	8	57	13	92	5
23	8	58	6	93	5
24	3	59	5	94	13
25	19	60	8	95	13
26	13	61	8	96	16
27	7	62	3	97	7
28	4	63	4	98	14
29	10	64	10	99	8
30	12	65	10	100	750
31	5	66	9		
32	5	67	12		
33	6	68	13		
34	5	69	8		
35	12	70	6		

35 photons

8.67 ± 4.41

000184

Sarah Skinner 5/25/83

Date 5/2/83 S.E. Drum 20732 Slide # 000093 (5) 1.0

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	1	36	6	71	15
2	4	37	2	72	3
3	5	38	6	73	2
4	6	39	4	74	4
5	2	40	4	75	1
6	5	41	4	76	12
7	4	42	5	77	>50
8	3	43	5	78	5
9	12	44	5	79	4
10	4	45	6	80	5
11	2	46	3	81	5
12	6	47	9	82	5
13	4	48	6	83	7
14	5	49	11	84	5
15	2	50	4	85	7
16	1	51	4	86	2
17	5	52	8	87	7
18	2	53	8	88	5
19	4	54	2	89	7
20	4	55	6	90	2
21	8	56	7	91	4
22	2	57	2	92	2
23	5	58	3	93	3
24	5	59	6	94	3
25	4	60	12	95	6
26	5	61	4	96	6
27	4	62	7	97	5
28	5	63	4	98	5
29	6	64	3	99	2
30	1	65	4	100	6
31	9	66	1		
32	5	67	9		
33	3	68	17		
34	10	69	5		
35	4	70	2		

1 Sphere
5.05 ± 2.88
Superkinner 5/25/83

000185

Date 5/5/83 SS. Bin 20732 Slide # 000094 (c) 1.0

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	9	36	9	71	8
2	6	37	15	72	14
3	2	38	7	73	7
4	7	39	7	74	9
5	4	40	4	75	6
6	7	41	23	76	15
7	11	42	7	77	17
8	14	43	19	78	12
9	10	44	12	79	6
10	6	45	17	80	7
11	14	46	11	81	24
12	4	47	11	82	8
13	6	48	8	83	14
14	9	49	9	84	6
15	2	50	11	85	3
16	11	51	12	86	25
17	9	52	6	87	3
18	14	53	5	88	5
19	10	54	9	89	5
20	5	55	12	90	4
21	10	56	9	91	20
22	12	57	12	92	7
23	13	58	13	93	9
24	SM ~~17~~ 7	59	10	94	10
25	11	60	6	95	5
26	8	61	8	96	27
27	10	62	8	97	15
28	10	63	9	98	14
29	4	64	9	99	7
30	15	65	12	100	7
31	2	66	12		
32	11	67	10		
33	2	68	5		
34	9	69	8		
35	15	70	2		

9.66 ±4.95

[illegible] 5/05/83

000186

Date 5/2/83 S.E. Davis 20732 Slide # 000095 (7) 10

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	2	32	11	71	6
2	3	33	4	72	15
3	6	34	6	73	10
4	2	35	7	74	8
5	10	36	12	75	7
6	5	37	11	76	4
7	4	38	7	77	9
8	5	39	8	78	5
9	8	40	1	79	7
10	6	41	8	80	4
11	4	42	4	81	4
12	1	43	2	82	9
13	3	44	11	83	8
14	9	45	5	84	7
15	5	46	8	85	6
16	1	47	3	86	12
17	1	48	4	87	13
18	3	49	12	88	14
19	9	50	6	89	1
20	5	51	5	90	18
21	3	52	7	91	4
22	2	53	5	92	13
23	4	54	14	93	7
24	10	55	17	94	10
25	7	56	17	95	2
26	2	57	4	96	2
27	3	58	11	97	2
28	8	59	[illegible]	98	1
29	11	60	14	99	[illegible]
30	6	61	13	100	8
31	13	62	1		
32	5	63	6		
33	7	64	4		
34	2	65	5		
35	3	66	6		

6.93 ± 4.32

[illegible] 5/25/83

000187

Date 5/4/83 S. E. [illegible] 20732 Slide # 000096 1.0

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	7	36	8	71	14
2	3	37	9	72	9
3	13	38	6	73	22
4	6	39	14	74	9
5	9	40	15	75	4
6	9	41	5	76	8
7	10	42	3	77	6
8	13	43	750	78	8
9	14	44	9	79	6
10	2	45	6	80	13
11	10	46	12	81	7
12	5	47	4	82	10
13	5	48	7	83	6
14	7	49	12	84	2
15	6	50	4	85	11
16	11	51	7	86	7
17	19	52	12	87	4
18	7	53	17	88	23
19	10	54	4	89	6
20	6	55	23	90	9
21	9	56	4	91	9
22	6	57	8	92	4
23	7	58	10	93	6
24	5	59	8	94	12
25	7	60	24	95	12
26	11	61	14	96	7
27	15	62	750	97	8
28	2	63	13	98	14
29	2	64	17	99	11
30	9	65	22	100	20
31	5	66	11		
32	4	67	18		
33	5	68	14		
34	5	69	13		
35	7	70	8		

2.5 phosin.
9.46 ± 5.06
000188
[illegible] 5/05/83

Date 4/27/83 S.E. Drum 30732 Slide # 1 (1) 000047 1.25

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	29	36	19	71	5
2	14	37	30	72	8
3	1	38	5	73	22
4	3	39	18	74	32
5	23	40	23	75	16
6	32	41	31	76	43
7	18	42	19	77	24
8	18	43	2	78	30
9	21	44	>50	79	31
10	24	45	11	80	10
11	14	46	26	81	25
12	3	47	17	82	34
13	20	48	31	83	11
14	18	49	20	84	20
15	22	50	26	85	14
16	11	51	35	86	>50
17	17	52	21	87	16
18	11	53	18	88	34
19	4	54	26	89	16
20	21	55	20	90	12
21	11	56	24	91	28
22	>50	57	19	92	20
23	29	58	26	93	23
24	4	59	6	94	43
25	19	60	34	95	19
26	31	61	41	96	17
27	10	62	33	97	19
28	17	63	30	98	>50
29	17	64	14	99	32
30	>50	65	13	100	11
31	27	66	7		
32	1	67	22		
33	4	68	1		
34	12	69	23		
35	20	70	18		

Tsphan

1961 ± 9.62 000189

Sig Lehmer 5/25/83

Date 5/25/83 S.S. Shrimp 20732 Slide # 10 000098

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	5	36	3	71	3
2	2	37	1	72	6
3	2	38	3	73	2
4	9	39	1	74	7
5	7	40	2	75	6
6	7	41	3	76	1
7	3	42	5	77	8
8	4	43	1	78	7
9	4	44	4	79	1
10	2	45	2	80	5
11	7	46	7	81	12
12	1	47	4	82	6
13	1	48	8	83	5
14	3	49	750	84	0
15	1	50	1	85	3
16	6	51	3	86	9
17	3	52	0	87	3
18	10	53	6	88	7
19	7	54	4	89	14
20	4	55	3	90	5
21	4	56	5	91	6
22	5	57	22	92	2
23	4	58	1	93	3
24	5	59	4	94	5
25	1	60	7	95	4
26	1	61	6	96	4
27	11	62	1	97	4
28	4	63	9	98	10
29	4	64	3	99	8
30	2	65	3	100	10
31	8	66	4		
32	12	67	8		
33	3	68	750		
34	3	69	10		
35	8	70	8		

2 Sphere.

4.91 ± 3.47 000190

Ingolkinner 5/25/83

Date 5/2/87 S.E.D. 20732 Slide # 17 (A) 000099 1.25

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	5	36	8	71	1
2	3	37	2	72	0
3	8	38	5	73	6
4	4	39	3	74	5
5	8	40	-	75	6
6	2	41	2	76	2
7	6	42	3	77	5
8	5	43	6	78	6
9	8	44	5	79	4
10	1	45	8	80	8
11	>50	46	8	81	4
12	0	47	2	82	>50
13	5	48	2	83	7
14	15	49	5	84	4
15	5	50	10	85	8
16	1	51	9	86	2
17	3	52	1	87	7
18	5	53	2	88	0
19	10	54	2	89	6
20	7	55	4	90	14
21	3	56	0	91	7
22	3	57	9	92	16
23	>50	58	6	93	4
24	4	59	4	94	2
25	0	60	7	95	5
26	1	61	5	96	6
27	>50	62	7	97	2
28	5	63	3	98	16
29	9	64	1	99	3
30	6	65	1	100	6
31	6	66	6		
32	9	67	4		
33	6	68	6		
34	5	69	6		
35	4	70	4		

4 Sphere

5.01 ± 3.31, 000191

Sigfrid Kumer, 5/25/83

Date 4/27/87 S E [illegible] 20732 Slide # 4 000125

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	10	36	6	71	3
2	7	37	3	72	9
3	3	38	13	73	7
4	10	39	3	74	3
5	5	40	12	75	11
6	11	41	4	76	12
7	3	42	9	77	5
8	6	43	4	78	3
9	3	44	4	79	5
10	7	45	3	80	6
11	27	46	8	81	6
12	8	47	6	82	5
13	5	48	9	83	3
14	3	49	2	84	4
15	9	50	5	85	6
16	7	51	4	86	3
17	6	52	19	87	5
18	10	53	6	88	4
19	5	54	4	89	2
20	5	55	6	90	2
21	11	56	8	91	2
22	3	57	6	92	7
23	4	58	4	93	7
24	12	59	15	94	7
25	3	60	6	95	5
26	2	61	4	96	4
27	5	62	3	97	20
28	1	63	14	98	4
29	5	64	8	99	7
30	17	65	2	100	14
31	10	66	9		
32	13	67	21		
33	5	68	5		
34	10	69	8		
35	6	70	5		

669÷406

Sm J Skinner 5/25/85

000192

206633

Date 5/3/83 S.E. Dunn 20732 Slide # 000107 (73) 0

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	6	36	9	71	6
2	6	37	2	72	5
3	6	38	9	73	6
4	3	39	3	74	1
5	11	40	13	75	5
6	5	41	10	76	13
7	7	42	7	77	6
8	3	43	6	78	10
9	6	44	15	79	4
10	2	45	6	80	5
11	1	46	7	81	7
12	3	47	4	82	5
13	7	48	7	83	4
14	9	49	5	84	5
15	-	50	6	85	6
16	4	51	1	86	7
17	3	52	4	87	3
18	6	53	2	88	1
19	5	54	7	89	2
20	10	55	3	90	4
21	5	56	10	91	5
22	6	57	5	92	9
23	7	58	4	93	12
24	11	59	5	94	10
25	10	60	3	95	5
26	5	61	9	96	9
27	1	62	7	97	750
28	5	63	5	98	9
29	7	64	2	99	2
30	6	65	7	100	7
31	5	66	3		
32	11	67	9		
33	5	68	750		
34	7	69	7		
35	8	70	5		

2 Sphaer

6.36 ± 3.16

Sergio Kimura 5/25/83

000193

Date 5/6/83 S.E. [illegible] 20732 Slide # 12 000102 (17) ()

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	4	36	5	71	7
2	4	37	5	72	3
3	2	38	10	73	2
4	3	39	3	74	4
5	2	40	0	75	4
6	1	41	3	76	4
7	6	42	1	77	8
8	4	43	0	78	1
9	2	44	2	79	0
10	1	45	2	80	3
11	7	46	3	81	3
12	2	47	2	82	4
13	2	48	16	83	1
14	6	49	2	84	2
15	4	50	1	85	5
16	2	51	1	86	9
17	7	52	7	87	0
18	1	53	7	88	1
19	5	54	3	89	2
20	6	55	1	90	3
21	0	56	2	91	6
22	5	57	4	92	2
23	4	58	4	93	6
24	4	59	8	94	4
25	6	60	3	95	4
26	2	61	3	96	4
27	3	62	3	97	0
28	11	63	7	98	1
29	0	64	1	99	2
30	0	65	10	100	10
31	1	66	2		
32	3	67	2		
33	1	68	8		
34	5	69	4		
35	4	70	2		

3.56 ± 2.62

[illegible] 5/25/83

000194

Date 5/3/83 S.E. Jm 20732 Slide # 000103 (R) JAN

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	55	36	4	71	7
2	8	37	5	72	9
3	3	38	9	73	7
4	20	39	16	74	14
5	18	40	20	75	21
6	19	41	33	76	38
7	13	42	2	77	16
8	6	43	32	78	42
9	750	44	6	79	27
10	12	45	22	80	15
11	9	46	23	81	12
12	>50	47	25	82	10
13	18	48	8	83	9
14	3	49	12	84	7
15	22	50	13	85	40
16	21	51	9	86	7
17	16	52	12	87	16
18	19	53	22	88	5
19	12	54	11	89	5
20	7	55	750	90	26
21	8	56	25	91	18
22	16	57	8	92	9
23	14	58	2	93	10
24	6	59	27	94	29
25	3	60	7	95	13
26	750	61	19	96	15
27	13	62	12	97	20
28	14	63	2	98	24
29	12	64	16	99	15
30	7	65	6	100	750
31	750	66	19		
32	3	67	20		
33	36	68	27		
34	29	69	9		
35	17	70	7		

6 Sphere

15.26 = 9.96

[illegible] 5/25/83

000195

Date 4/27/83 SCDM 20732 Slide # 5 (1L) 000104

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	14	36	5	71	14
2	18	37	19	72	12
3	14	38	12	73	26
4	21	39	6	74	9
5	12	40	27	75	21
6	2	41	17	76	11
7	16	42	13	77	15
8	13	43	21	78	22
9	24	44	16	79	13
10	18	45	5	80	11
11	20	46	14	81	8
12	14	47	11	82	12
13	5	48	14	83	11
14	23	49	7	84	15
15	17	50	16	85	6
16	18	51	38	86	7
17	21	52	19	87	11
18	17	53	9	88	17
19	10	54	>50	89	17
20	14	55	28	90	15
21	15	56	19	91	7
22	6	57	10	92	9
23	11	58	11	93	6
24	28	59	13	94	5
25	9	60	20	95	9
26	10	61	11	96	9
27	10	62	17	97	>50
28	25	63	9	98	13
29	23	64	8	99	15
30	23	65	19	100	14
31	16	66	8		
32	>50	67	6		
33	12	68	>50		
34	15	69	>50		
35	7	70	23		

5 5 phase

14.23* 6.36 000196

Sn gatkinner 5/25/83

Date 4/27/87 S.E. [illegible] 20732 Slide # 7 (24) 000035

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	11	36	14	71	16
2	20	37	25	72	14
3	4	38	10	73	11
4	6	39	10	74	21
5	7	40	14	75	24
6	15	41	24	76	13
7	9	42	14	77	18
8	13	43	16	78	6
9	18	44	15	79	19
10	11	45	15	80	11
11	18	46	16	81	32
12	10	47	15	82	7
13	750	48	14	83	11
14	22	49	14	84	14
15	7	50	15	85	29
16	9	51	3	86	28
17	15	52	5	87	15
18	750	53	5	88	10
19	13	54	24	89	8
20	3	55	4	90	5
21	10	56	6	91	10
22	12	57	22	92	6
23	4	58	6	93	11
24	15	59	7	94	13
25	16	60	6	95	21
26	13	61	8	96	750
27	14	62	9	97	11
28	8	63	9	98	15
29	15	64	7	99	18
30	10	65	16	100	15
31	11	66	9		
32	11	67	12		
33	10	68	18		
34	2	69	18		
35	7	70	25		

3 S phase

000197

12.98± 6.29

[illegible] 5/05/85

000166

~~Date~~ Slide SE Jun 20732 Slide # 15 (34)

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	21	36	6	71	2
2	1	37	15	72	19
3	4	38	6	73	1
4	4	39	17	74	3
5	4	40	9	75	10
6	8	41	11	76	12
7	13	42	5	77	18
8	6	43	11	78	6
9	10	44	15	79	5
10	15	45	9	80	11
11	11	46	9	81	1
12	6	47	6	82	7
13	5	48	5	83	16
14	9	49	6	84	7
15	5	50	3	85	1
16	5	51	22	86	2
17	4	52	5	87	20
18	3	53	13	88	9
19	1	54	11	89	22
20	1	55	19	90	4
21	2	56	4	91	15
22	10	57	6	92	10
23	13	58	14	93	12
24	2	59	6	94	10
25	16	60	22	95	19
26	5	61	10	96	16
27	21	62	4	97	7
28	7	63	13	98	16
29	10	64	7	99	10
30	5	65	13	100	17
31	9	66	17		
32	10	67	13		
33	7	68	13		
34	6	69	5		
35	13	70	14		

9.44 ± 5.66 000198

[illegible] 5/25/83

Date 5/2/83 S.E. Drain 20732 Slide # 9 000100.05 (44)

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	12	36	15	71	10
2	17	37	17	72	15
3	6	38	6	73	8
4	16	39	24	74	7
5	6	40	4	75	11
6	8	41	13	76	7
7	23	42	9	77	11
8	7	43	13	78	5
9	8	44	10	79	6
10	11	45	16	80	12
11	6	46	7	81	9
12	10	47	11	82	6
13	6	48	9	83	8
14	10	49	9	84	4
15	18	50	9	85	9
16	5	51	10	86	5
17	9	52	9	87	>50
18	6	53	7	88	30
19	12	54	6	89	4
20	12	55	8	90	17
21	15	56	28	91	15
22	10	57	13	92	26
23	10	58	6	93	12
24	14	59	7	94	6
25	6	60	10	95	11
26	10	61	10	96	18
27	5	62	15	97	10
28	7	63	20	98	17
29	10	64	15	99	4
30	26	65	7	100	6
31	3	66	15	~~29~~ 50	
32	11	67	>50		
33	6	68	29		
34	8	69	8		
35	6	70	10		

2 sphere

000199

10.99 ± 5.83

M J Kinney 5/25/83

Date 5/2/83 S.E. Dunn 2073 Slide # 000109 (19H) 035

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	7	36	3	71	5
2	19	37	10	72	9
3	3	38	10	73	11
4	9	39	15	74	>50
5	16	40	8	75	19
6	13	41	9	76	12
7	11	42	7	77	2
8	2	43	7	78	7
9	10	44	6	79	10
10	10	45	5	80	8
11	6	46	13	81	13
12	9	47	11	82	4
13	9	48	11	83	12
14	8	49	16	84	>50
15	13	50	6	85	>50
16	11	51	5	86	4
17	24	52	4	87	10
18	9	53	9	88	7
19	5	54	7	89	13
20	11	55	10	90	5
21	9	56	14	91	4
22	9	57	16	92	>50
23	7	58	20	93	11
24	14	59	6	94	7
25	11	60	17	95	7
26	9	61	6	96	4
27	3	62	13	97	17
28	7	63	16	98	4
29	6	64	9	99	12
30	10	65	>50	100	3
31	6	66	10		
32	13	67	7		
33	13	68	18		
34	14	69	12		
35	14	70	18		

55 phos

000200

9.73 ± 4.50

M.J. Kinney 5/05/83

Date 4/12/93 S.E. Sinai 20732 Slide # 8 (SN)

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	5	36	1	71	2
2	11	37	7	72	3
3	5	38	4	73	4
4	5	39	13	74	7
5	6	40	5	75	2
6	2	41	7	76	11
7	8	42	9	77	8
8	11	43	4	78	4
9	6	44	2	79	2
10	13	45	4	80	8
11	2	46	2	81	4
12	3	47	750	82	2
13	11	48	1	83	6
14	2	49	3	84	7
15	5	50	6	85	2
16	5	51	5	86	6
17	6	52	12	87	3
18	1	53	4	88	9
19	2	54	1	89	17
20	4	55	2	90	3
21	2	56	8	91	2
22	4	57	3	92	11
23	6	58	1	93	6
24	5	59	0	94	4
25	3	60	2	95	4
26	11	61	8	96	4
27	2	62	1	97	6
28	5	63	3	98	2
29	3	64	750	99	11
30	5	65	750	100	2
31	5	66	6		
32	5	67	4		
33	4	68	12		
34	2	69	5		
35	2	70	6		

3 s phoin

5.05 + 3.35 000201

[illegible] 5/05/93

000110

Date 5/3/83 S.E. Jones 20752 Slide # 25

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	12	36	6	71	16
2	8	37	15	72	12
3	8	38	2	73	12
4	10	39	5	74	8
5	14	40	6	75	8
6	7	41	6	76	8
7	21	42	11	77	8
8	12	43	8	78	6
9	10	44	13	79	7
10	10	45	9	80	9
11	5	46	9	81	5
12	6	47	26	82	3
13	5	48	10	83	7
14	7	49	4	84	6
15	5	50	12	85	14
16	2	51	18	86	15
17	10	52	12	87	6
18	8	53	15	88	6
19	7	54	9	89	4
20	11	55	10	90	7
21	6	56	10	91	6
22	7	57	15	92	6
23	4	58	15	93	13
24	9	59	17	94	4
25	6	60	8	95	9
26	12	61	10	96	11
27	7	62	5	97	10
28	15	63	5	98	12
29	14	64	5	99	750
30	4	65	14	100	8
31	10	66	17		
32	8	67	6		
33	11	68	5		
34	7	69	9		
35	11	70	7		

1 S phase

9.22 ± 4.22

000202

5/25/83

Date 5/2/83 S.E. [illegible] 20732 Slide # 20 (70) 000[illegible]1.0

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	12	36	1	71	11
2	5	37	6	72	6
3	4	38	3	73	7
4	2	39	9	74	10
5	0	40	11	75	5
6	2	41	13	76	7
7	8	42	5	77	9
8	15	43	3	78	2
9	5	44	9	79	4
10	4	45	5	80	5
11	6	46	7	81	2
12	10	47	1	82	9
13	6	48	4	83	2
14	2	49	2	84	6
15	5	50	2	85	6
16	3	51	7	86	2
17	10	52	3	87	9
18	7	53	10	88	4
19	12	54	4	89	8
20	15	55	14	90	5
21	8	56	5	91	8
22	10	57	6	92	3
23	14	58	5	93	5
24	7	59	7	94	12
25	14	60	7	95	3
26	7	61	7	96	8
27	3	62	13	97	8
28	9	63	10	98	7
29	8	64	6	99	8
30	10	65	2	100	2
31	5	66	6		
32	9	67	8		
33	5	68	9		
34	5	69	8		
35	1	70	3		

6.49 ± 3.46

[illegible] 5/05/83

000203

Date 5/1/82 S.E. Jimi 20/52 Slide # 22 000112 1.0

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	13	36	750	71	14
2	8	37	5	72	[illegible]
3	4	38	4	73	25
4	750	39	5	74	13
5	15	40	7	75	10
6	14	41	17	76	13
7	12	42	8	77	16
8	12	43	12	78	11
9	5	44	5	79	12
10	5	45	11	80	6
11	5	46	7	81	10
12	750	47	18	82	20
13	9	48	20	83	8
14	7	49	8	84	17
15	11	50	10	85	23
16	8	51	8	86	750
17	8	52	11	87	7
18	16	53	6	88	9
19	5	54	11	89	5
20	8	55	4	90	3
21	13	56	4	91	6
22	6	57	750	92	6
23	9	58	5	93	3
24	12	59	5	94	3
25	5	60	12	95	17
26	19	61	3	96	19
27	12	62	12	97	7
28	21	63	13	98	13
29	7	64	6	99	2
30	11	65	10	100	8
31	14	66	14		
32	21	67	25		
33	9	68	5		
34	5	69	28		
35	6	70	15		

5 spheres

10.38 ± 5.61

[illegible] 5/05/83

000204

Date 4/29/83 S.E. Dunn 20732 Slide # 3 (9H)

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	18	36	4	71	4
2	22	37	35	72	14
3	23	38	1	73	6
4	22	39	3	74	3
5	1	40	10	75	32
6	14	41	13	76	13
7	20	42	25	77	9
8	21	43	15	78	29
9	25	44	22	79	37
10	18	45	15	80	23
11	18	46	17	81	13
12	17	47	4	82	24
13	4	48	5	83	34
14	5	49	2	84	22
15	24	50	14	85	30
16	14	51	18	86	10
17	10	52	9	87	24
18	4	53	24	88	7
19	0	54	15	89	15
20	13	55	15	90	14
21	19	56	25	91	26
22	19	57	21	92	27
23	250	58	16	93	30
24	16	59	47	94	24
25	24	60	24	95	29
26	14	61	18	96	26
27	15	62	19	97	14
28	26	63	9	98	27
29	23	64	21	99	23
30	29	65	6	100	15
31	23	66	27		
32	10	67	1		
33	21	68	2		
34	19	69	19		
35	4	70	15		

15 phase

17.57 ± 9.30

000205

mgl 5/6/83

Date 5/4/83 S.E. Dr. 20732 Slide # 27 TOR

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	10	36	6	71	7
2	5	37	6	72	9
3	6	38	10	73	4
4	5	39	8	74	6
5	2	40	3	75	16
6	6	41	0	76	14
7	11	42	15	77	3
8	6	43	13	78	3
9	8	44	5	79	10
10	9	45	11	80	5
11	4	46	2	81	12
12	7	47	5	82	6
13	12	48	6	83	6
14	8	49	5	84	10
15	8	50	11	85	6
16	8	51	7	86	9
17	10	52	4	87	6
18	31	53	11	88	10
19	9	54	9	89	6
20	4	55	6	90	13
21	4	56	5	91	3
22	1	57	5	92	5
23	7	58	10	93	5
24	3	59	10	94	7
25	1	60	5	95	5
26	7	61	3	96	4
27	3	62	5	97	10
28	13	63	3	98	9
29	15	64	9	99	7
30	4	65	19	100	8
31	4	66	5		
32	4	67	7		
33	5	68	4		
34	7	69	5		
35	14	70	10		

7.36 ± 4.29

[illegible] 5/6/83

000206

Date 5/3/83 S.E. Jm 20732 Slide # 27 (114)

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	6	36	3	71	12
2	9	37	6	72	5
3	6	38	12	73	0
4	13	39	5	74	5
5	8	40	2	75	6
6	6	41	6	76	14
7	4	42	17	77	5
8	5	43	10	78	7
9	3	44	4	79	20
10	6	45	11	80	6
11	14	46	10	81	14
12	5	47	4	82	7
13	6	48	4	83	2
14	10	49	5	84	9
15	14	50	3	85	9
16	13	51	5	86	9
17	2	52	6	87	6
18	7	53	11	88	15
19	16	54	1	89	10
20	5	55	12	90	3
21	9	56	9	91	10
22	3	57	7	92	7
23	2	58	6	93	750
24	20	59	3	94	750
25	4	60	10	95	15
26	3	61	5	96	8
27	5	62	2	97	8
28	4	63	3	98	12
29	7	64	4	99	3
30	22	65	4	100	7
31	12	66	5		
32	6	67	7		
33	7	68	6		
34	16	69	6		
35	8	70	8		

D S Phan

7.61 ± 4.51

5/5/83

000207

Date 5/2/83 S.E. [illegible] 20732 Slide # 16 (12N)

000116

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	3	36	6	71	10
2	12	37	6	72	13
3	8	38	12	73	6
4	4	39	8	74	7
5	17	40	16	75	6
6	4	41	20	76	13
7	16	42	7	77	20
8	8	43	11	78	5
9	10	44	7	79	5
10	13	45	10	80	6
11	8	46	14	81	8
12	7	47	14	82	23
13	8	48	13	83	13
14	7	49	13	84	12
15	6	50	6	85	12
16	4	51	7	86	13
17	11	52	11	87	13
18	5	53	5	88	16
19	11	54	8	89	12
20	8	55	18	90	18
21	16	56	3	91	15
22	8	57	6	92	12
23	8	58	12	93	10
24	7	59	11	94	7
25	1	60	13	95	3
26	3	61	10	96	10
27	8	62	24	97	6
28	5	63	12	98	15
29	15	64	11	99	16
30	7	65	3	100	10
31	18	66	10		
32	4	67	12		
33	4	68	9		
34	10	69	6		
35	7	70	6		

9.94 ± 4.74

[illegible] 5/25/83

000208

Date [illegible] S.E. [illegible] 3073 Slide # 32 (PN) 000117

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	6	36	5	71	3
2	12	37	9	72	5
3	17	38	9	73	13
4	4	39	4	74	10
5	12	40	6	75	8
6	10	41	5	76	10
7	9	42	11	77	6
8	10	43	13	78	12
9	5	44	13	79	6
10	12	45	5	80	5
11	11	46	7	81	6
12	15	47	8	82	17
13	6	48	5	83	14
14	20	49	3	84	16
15	11	50	5	85	4
16	4	51	14	86	19
17	11	52	11	87	12
18	13	53	13	88	6
19	6	54	5	89	4
20	11	55	7	90	14
21	12	56	8	91	19
22	10	57	9	92	8
23	7	58	13	93	5
24	6	59	750	94	7
25	12	60	8	95	8
26	2	61	9	96	10
27	6	62	6	97	4
28	10	63	5	98	15
29	9	64	15	99	16
30	11	65	4	100	17
31	4	66	3		
32	6	67	5		
33	3	68	16		
34	5	69	5		
35	19	70	4		

1.5 phase

9.15 ± 4.57 000209

Sgt [illegible] 5/6/93

Date 4/29/83 SS Dose 20732 Slide # 2 TGH

000118

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	0	36	9	71	7
2	6	37	2	72	2
3	7	38	6	73	1
4	6	39	1	74	7
5	2	40	5	75	9
6	8	41	16	76	6
7	8	42	3	77	7
8	5	43	3	78	5
9	6	44	2	79	6
10	2	45	4	80	8
11	5	46	2	81	3
12	5	47	1	82	5
13	13	48	1	83	4
14	7	49	3	84	15
15	11	50	11	85	8
16	6	51	6	86	10
17	6	52	4	87	1
18	7	53	7	88	13
19	3	54	4	89	4
20	4	55	8	90	5
21	4	56	1	91	6
22	5	57	6	92	2
23	3	58	7	93	11
24	8	59	5	94	5
25	12	60	1	95	2
26	3	61	9	96	4
27	5	62	2	97	7
28	5	63	3	98	7
29	6	64	7	99	2
30	2	65	2	100	11
31	2	66	3		
32	0	67	3		
33	10	68	4		
34	12	69	9		
35	0	70	7		

5.44 ± 3.41

m Gatkinnes 5/25/83

000210

Dose studies 5.0 Gray 2073 Slide # 31 (DR) 000119

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	4	36	8	71	31
2	4	37	250	72	23
3	8	38	250	73	25
4	12	39	13	74	7
5	11	40	10	75	19
6	19	41	15	76	22
7	32	42	21	77	7
8	18	43	13	78	9
9	19	44	9	79	15
10	16	45	22	80	11
11	33	46	30	81	2
12	14	47	15	82	39
13	14	48	5	83	17
14	48	49	34	84	30
15	31	50	23	85	9
16	14	51	13	86	15
17	250	52	7	87	16
18	24	53	17	88	14
19	24	54	31	89	24
20	250	55	32	90	14
21	15	56	28	91	13
22	5	57	15	92	35
23	12	58	18	93	20
24	15	59	7	94	26
25	13	60	23	95	40
26	11	61	19	96	22
27	10	62	18	97	33
28	17	63	20	98	14
29	30	64	20	99	35
30	18	65	45	100	28
31	6	66	20		
32	25	67	14		
33	11	68	23		
34	14	69	26		
35	22	70	28		

45 phase

18.80 ± 9.36

Sm Falkner 5/25/83

000211

Date 5/3/83 S.E. Dami 2073 a Slide # 23 000120 NAF

Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus	Nucleus #	Grains/Nucleus
1	19	36	19	71	15
2	21	37	5	72	17
3	31	38	20	73	21
4	19	39	750	74	30
5	5	40	13	75	12
6	14	41	12	76	8
7	18	42	28	77	20
8	17	43	17	78	12
9	24	44	39	79	22
10	33	45	17	80	13
11	17	46	30	81	23
12	5	47	17	82	37
13	23	48	5	83	12
14	12	49	5	84	4
15	22	50	22	[illegible]	17
16	11	51	6	[illegible]	15
17	14	52	20	[illegible]	8
18	750	53	11	[illegible]	8
19	16	54	25	[illegible]	14
20	24	55	15	[illegible]	12
21	18	56	15	[illegible]	16
22	20	57	20	[illegible]	15
23	750	58	11	92	9
24	17	59	9	94	16
25	16	60	11	95	12
26	5	61	19	96	10
27	10	62	24	97	20
28	16	63	10	98	12
29	16	64	16	99	3
30	21	65	12	100	15
31	750	66	17		
32	15	67	18		
33	7	68	15		
34	38	69	12		
35	15	70	21		

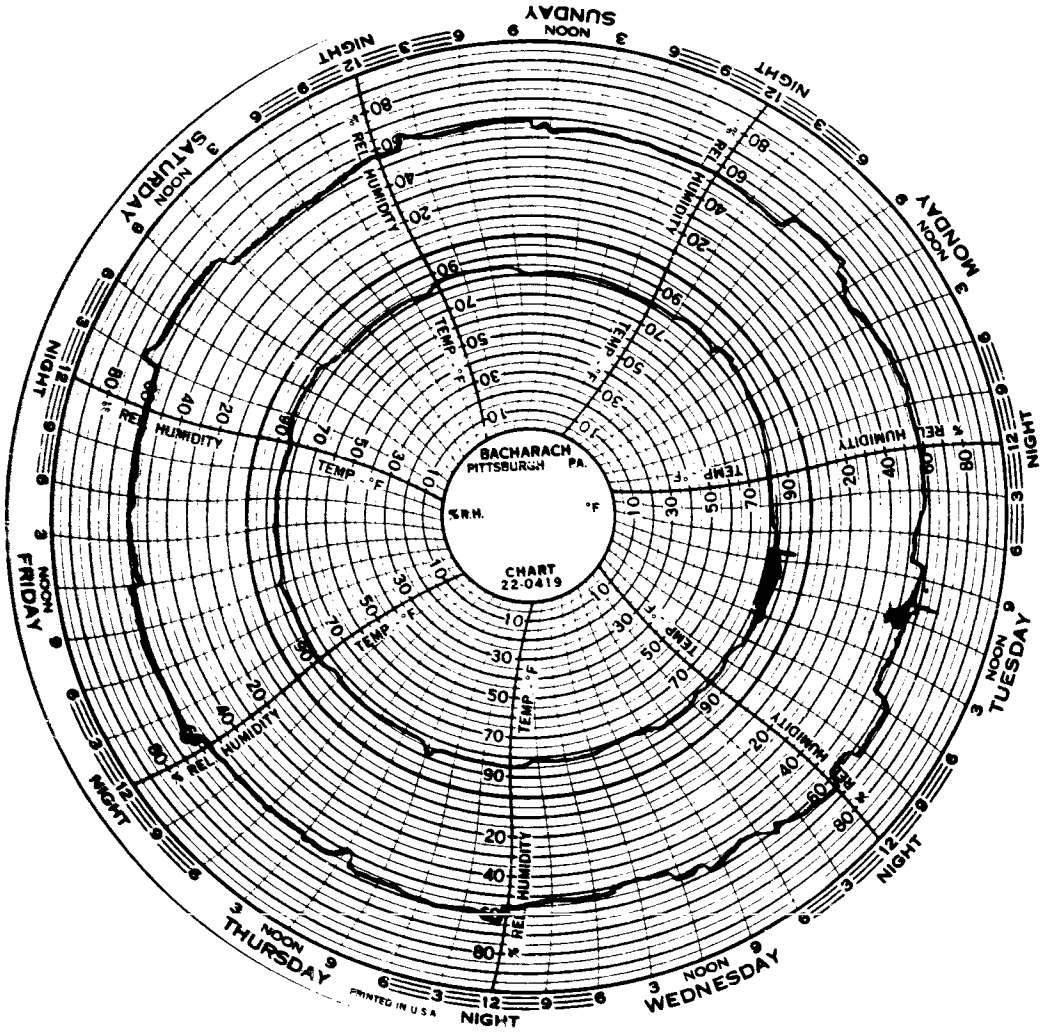
4 5 phase

000212

16.4 ± 7.1

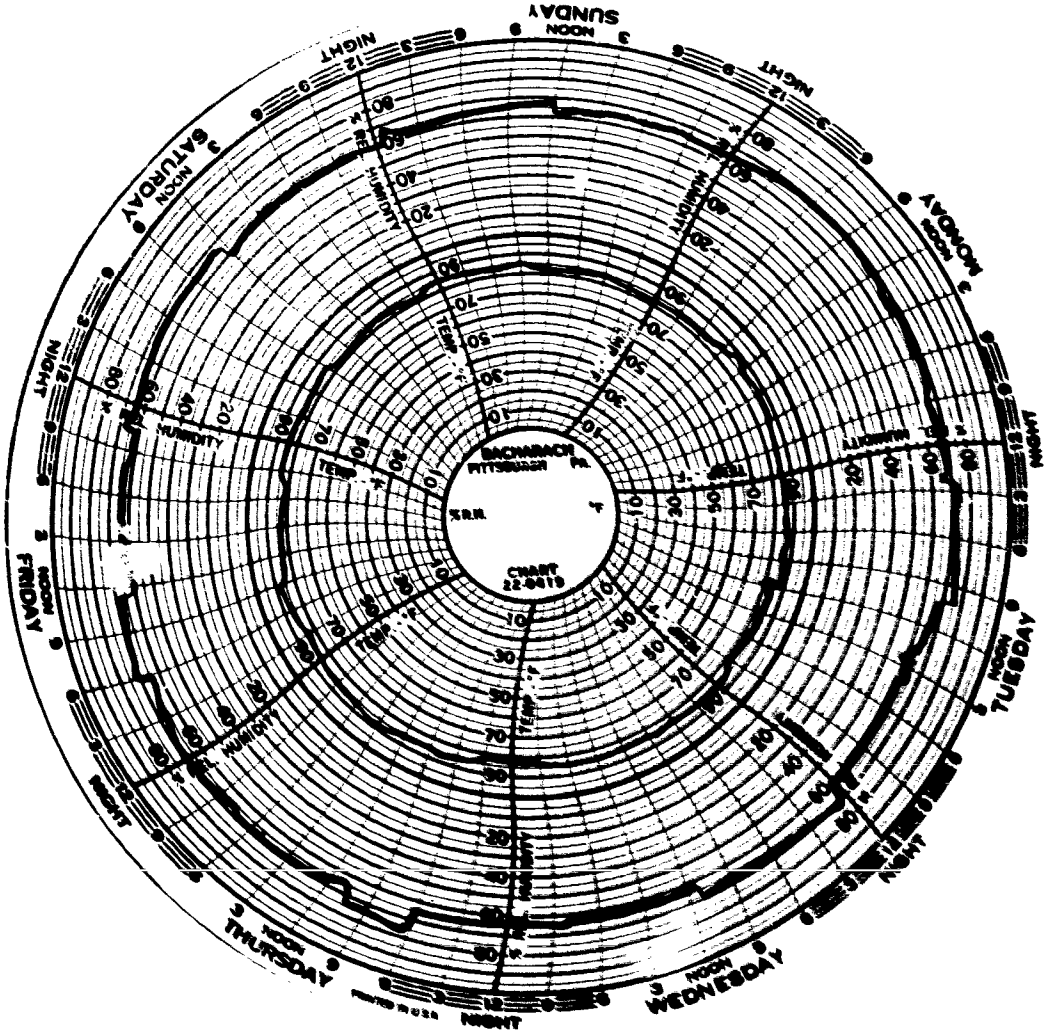
mg Skinner 5/25/83

CLIMATE CONTROL CHARTS

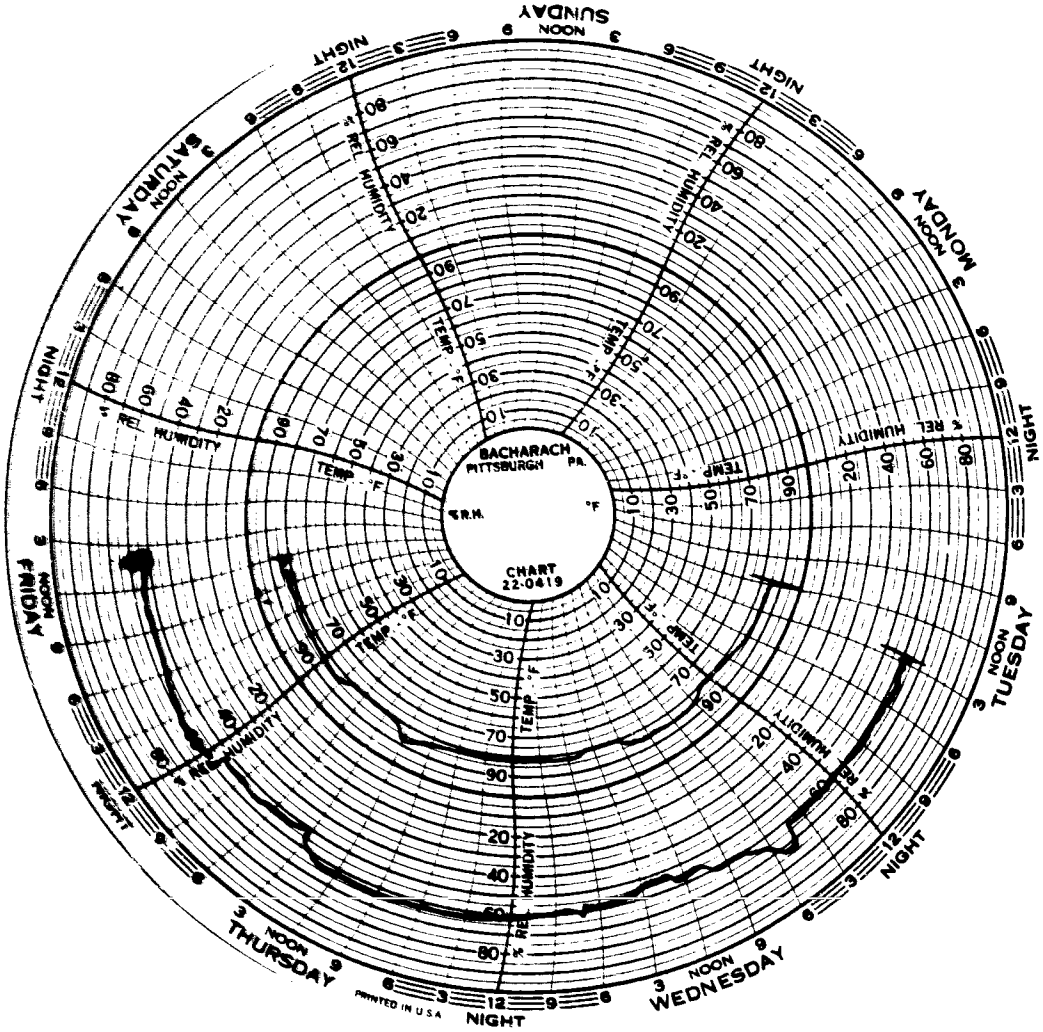


in 7/20/62 8:15
out 7/27/62 8:50

Rm 310
MAS
6/4/84

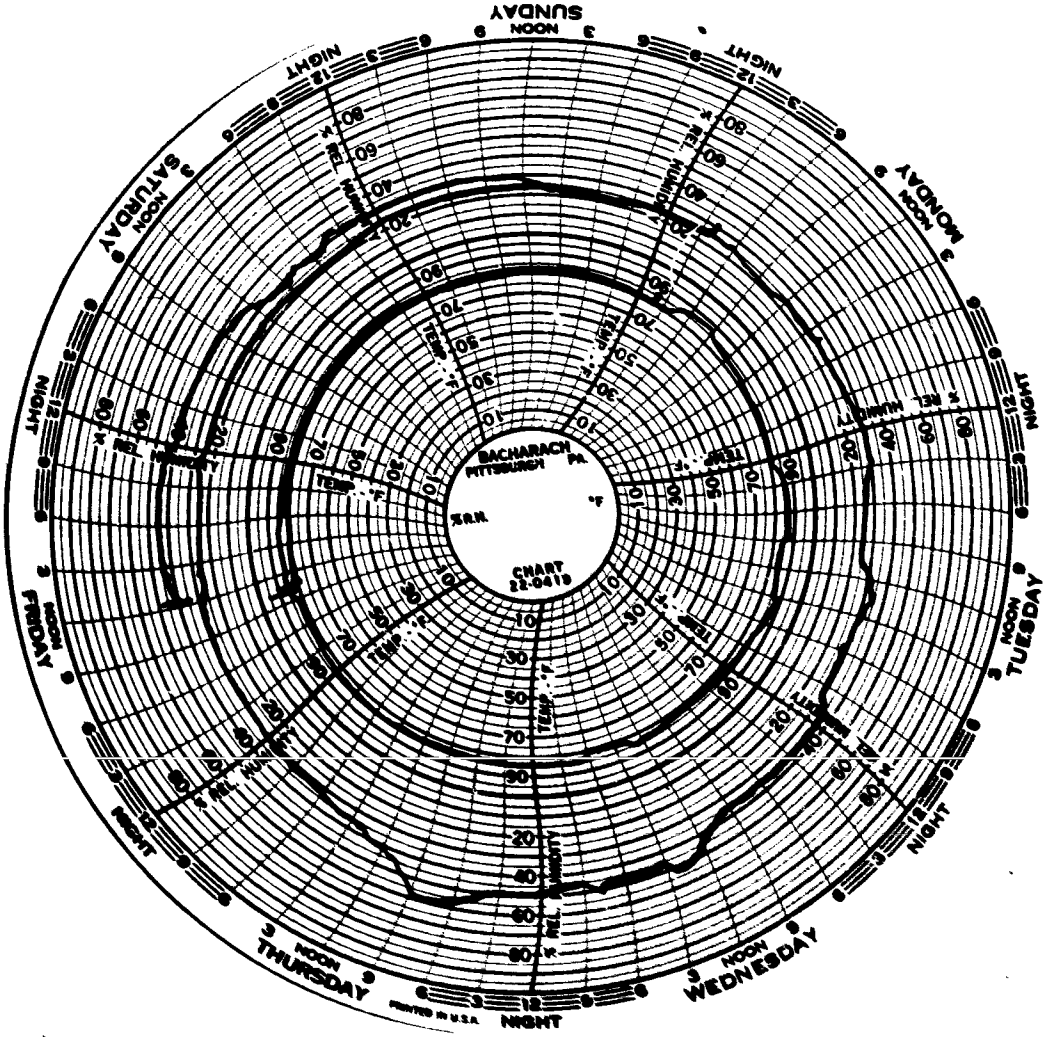


in 7/27/62 8:50
out 8/10/62 11:30



m 8/10/82 11:30
out 8/13/82 10:30

Rm 310
6/4/84 mg 5



in 10/15/82 10:10
out 10/25/82 1:00

Rm 310
6/9/84 mjs

Mobil

Animal Unit Daily Checklist*

Room No. 310
#20732

DATE	Temperature and Humidity	Sanitation of Animal Racks	Food and Bedding	Water System	Sanitation of Floors	REMARKS
3-23-83	HH 71°		HH	HH 2.8		40% humidity
3-24-83	HH 73°		HH	H_2O bottles	HH	42% humidity
3-25-83	HH 71°		HH	H_2O bottles	HH	47% humidity
3-26-83	SLC 70°			H_2O bottles		48% humidity
3-27-83	SLC 71°			H_2O bottles		53% humidity
3-28-83	HH 73°		HH	H_2O bottles		54% humidity

*Initials of person completing duty in appropriate box.

NOTE: Climate Control meter broken - VIVARIUM recorded humidity + Temperature