Fraunhofer Institut
Toxikologie und
Aerosolforschung
Pharmaforschung und
Klinische Inhalation

Effects of a higher energy flow density of pulsed high frequency EMF exposure during pregnancy on offspring of rats

12N00503

FINAL REPORT

Number 1 of 3 Originals

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Statement of Study Director:

Study No.: 12N00503

Exposure: pulsed high frequency EMF

Title: Effects of a higher energy flow density of pulsed high frequency EMF exposure during pregnancy on offspring of rats

Although the study described in this report was a non GLP-study, it was conducted following the OECD Principles of Good Laboratory Practice (GLP) (Bundesanzeiger No. 42a of March 2, 1983 [German version]) and following the Principles of Good Laboratory Practice according to Annex 1 ChemG (German Chemicals Law § 19a, Appendix 1, pp. 1724 - 1732, BGBl. I, July 25, 1994, amended on May 14, 1997), also following Guideline 67/548/EWG in connection with Guideline 88/302/EWG "Teratogenicity Study" (Amtsblatt der EG, L133, S. 24, v. 30.5.88) and OECD-Guideline 414 "Teratogenicity".

This report provides a correct and faithful record of the results obtained.

I accept the responsibility for the validity of the study.

Dr. rer. nat. J. Buschmann
Study Director

Statement of Principal Scientists:

Study No.: 12N00503

Exposure: pulsed high frequency EMF

Title: Effects of a higher energy flow density of pulsed high frequency EMF exposure during pregnancy on offspring of rats

We, the undersigned, hereby declare that the work was performed by us or under our supervision according to the procedures herein described and that this report provides a correct and faithful record of the results obtained.

Date Signature

Laboratory Animal Veterinarian:
Dr. med. vet. C. Dasenbrock _____

Exposure:
Dr.-Ing. J. Streckert _____

1. Introduction

1.1 Objective of the Study

The objective of the study was to investigate the effects of a higher energy flow density of pulsed high frequency EMF exposure during pregnancy on offspring of rats.

1.2 Guidelines for the Study

Although the study described in this report was a non GLP-study, it was conducted following the Principles of Good Laboratory Practice according to Annex 1 ChemG (German Chemicals Law § 19a, Appendix 1, pp. 1724 - 1732, BGBl. I, July 25, 1994, amended on May 14, 1997), also following Guideline 67/548/EWG in connection with Guideline 88/302/EWG "Teratogenicity Study" (Amtsblatt der EG, L133, S. 24, v. 30.5.88) and OECD-Guideline 414 "Teratogenicity".

1.3 Selection of Animal Species

Rats are often used for reproductive and other toxicity studies, because of the economy in their use, the information available on physiology, reproductive data, and the susceptibility to different chemicals.
Therefore, the rat was the species of choice and there are historical control data of the chosen strain available at Fraunhofer ITA.

1.4 Study Duration

Study initiation date:	April 7, 2000
Experimental start date:	May 15, 2000 (first day of mating)
Experimental completion date:	June 8, 2000 (last day of sacrifice)
Study completion date:	August 13, 2001 (study director signed final report)

1.5 Field Strength Selection

The particular biological design of the intended experiments implies an exposure of Wistar rats close to the onset of thermal effects, e.g. with power densities that give rise to an activation of the animal's thermoregulation system, but which remain just below the threshold for an elevation of the body temperature. Some people call this range of operation athermal in the sense of a three level classification distinguishing between non-thermal (no temperature rise, no thermoregulation), athermal (no temperature rise, thermoregulation) and thermal effects (temperature rise). As literature data show no clear agreement on the power density related to the athermal/thermal threshold, several experiments with different dosage levels were performed in a preliminary stage of the project. Taking into account that a value of 10 mW/cm^2 = 100 W/m^2 was found by Jensh [Jensh, R.P.: Behavioural teratology: application in low dose chronic microwave irradiation studies. In: Persaud, T.V.N. (ed.): Advances in the study of birth defects, vol. 4: Neural and behavioural teratology. MTP Press, 135-162 (1980)] as a borderline for non-thermal exposure of rats at 915 MHz we started from power densities of 10 W/m^2 and increased the level successively. Environmental and body temperature using rectal thermocouple tests were determined in every case . The data were taken from the exposed group as well as from the control group for different numbers of animals being housed in the respective radial waveguide. A first result was that between 50 and 60 W/m^2 the body temperature began to rise as compared to the values in the sham exposure unit. As the environmental temperature in the exposure unit also increased with time, it was concluded that this must be due to a markedly built-up of heat within the waveguide with the exposed rats. It was decided to attach an effective ventilation system to the waveguides consisting of a central low-noise van and a symmetrically arranged system of 2 x 24 air pipes of 5 cm diameter which were connected to 5 cm holes in the lower waveguide plates under each cage. Thereby it could be achieved that the inside air temperature close to the rats differed no more from the temperature in the control group, regardless of the applied power densities. Moreover, below 65 W/m^2 no increase of body temperature could be identified. At 70 W/m^2 an average body temperature increase of 0.2° C was recorded, but without producing further environmental heating. Thus we conclude that the thermoregulation process of the Wistar rats works effectively up to power densities of 65 W/m^2 for 890 MHz. We chose a value of 60 W/m^2 for our further experiments. This corresponds to a total input power of 203 W at a pulse duty cycle of the applied GSM modulation signal cocktail of 7:8 and is equivalent in our exposure system to an average whole body SAR of 2.2 W/kg, which is a mean value for different postures and positions of the rats in their cages. The overall variation of the SAR was estimated as 35%.

The selected value for the average electric power density in the cage area of approx. 60 W/m^2 represents the highest athermic value as determined in pilot studies using male animals in the same exposure system as in the study described here. This value did not cause unjustifiable increases in body and cage temperature in the pilot studies. The control of the power density was perfomed by adjusting the voltage to 120 mV on the control unit preceeding the power amplifier.

2. Exposure Conditions

The exposure of the rats was performed in special waveguides. These waveguides allowed the exposure of the cage area to a homogeneous electromagnetic field in order to keep variations of the exposure due to movements of the animals low. The modulation of the radio frequency 890 MHz carrier signal was selected in a way that the spectrum contained GSM typical frequency components occuring 1,733 kHz, 217 Hz, 8 Hz und 2 Hz (and integer multiples thereof) beside the carrier signal.

3. Test System

3.1 Animal Model

Wistar rats, Crl:(WI)BR, Charles River Deutschland, Sulzfeld, were used in this study. Virgin females (7 weeks old on delivery) and males (at least 10 weeks old on delivery) were obtained from the breeder.
The study was performed with 80 female and 30 male animals.

3.2 Acclimatization Period

Prior to the start of the mating period, the rats were acclimated for approx. 2 weeks in polycarbonate (Makrolon®) cages in animal room T2.030 of the Fraunhofer ITA. The daily observations showed that the rats were in a good healthy condition and they were therefore accepted for this study.

3.3 Identification

Each animal in the study was assigned a unique individual identification number on a numbered metal plate on the cage. The ears of the animals were also tattooed corresponding to the identification numbers.
After successful mating and randomization of the females they were assigned a study specific animal number. All data collected from an animal was filed under this individual number. Identification labels and individual data sheets were kept in the animal room and showed the following information: Study number, group number, animal number, mating date, body weight, food consumption, and days of exposure.
When an animal died or was sacrificed, the date of death was entered on the individual animal data sheet which contains sacrifice data on the reverse side. All cage information was checked against the individual animal sheet prior to sending the animal for autopsy.
Identification labels were prepared in duplicate and attached to the bottles with the different fixatives for the fetuses. Within the bottles, all fetuses were tagged individually.

3.4 Housing and Maintenance

Until mating, dams were housed in groups of two in polycarbonate (Makrolon ®) cages type III (21 x 42 x 18 cm). After mating they were kept individually in cages of the same type.
On the days of exposure, dams were housed individually in special metal free polycarbonate (Makrolon ®) cages type III with plastic lid and glass drinking tubes in the exposure systems in rooms T2.030 (Fig. 1). Before exposure, cages were changed twice every week, during exposure every second day or more often if necessary.
Absorbent softwood (altromin 3/4, Altromin International, Lage, Germany), was used as bedding in the cages.
A closed formula commercial chow in pellet form identified as "1314 N specially prepared", purchased from Altromin International, Lage, Germany, was offered ad libitum as the diet for this study. Filtered tap water was offered fresh weekly in polycarbonate (Makrolon®) bottles, ad libitum. The bottles were placed outside the waveguides. Temperature and relative humidity were recorded continuously. The temperature in the animal room was set on 20 - 24 °C and the rel. humidity 40 - 70 %.
The animal room lighting was an artificial light/dark cycle, lights on at 6.00 a.m., lights off at 6.00 p.m.

4. Conduct of the Study

4.1 Mating

Animals were mated 2 females :1 male overnight in the Makrolon® cages of the females. Next morning vaginal smears were taken from the females. A female was considered positive if sperm was found in the vaginal smear and/or if a vaginal plug was detected. This day of detection was considered day 0 p.c.

4.2 Randomization

After successful mating, the dams were randomized according to a randomization list prepared in advance and assigned a study specific number.

4.3 Groups

The following groups were formed:

Group	Power density* W/m²	Daily exposure time	No. of mated females	Animal No.
A	0 (Sham exposure)	20 h	24	A01-A24
B	60**	20 h	24	B01-B24

* target value in the cage area

** highest athermic value as determined in pilot studies

Due to the double blind study design (see 4.4), animal numbers were assigned without knowledge of exposure, so that animals from the exposure unit I was considered "Group 1" with animal numbers 101-124, those of the exposure unit II "Group 2" with animal numbers 201-224.

After completion of the study, the following assignment could be made:

Group 1: Group A:Control (Sham exposure)

Group 2: Group B: exposure to 60 W/m² (target value in the cage area)

4.4 Exposure

Dams were exposed from day 0 p.c. (11.00 a.m.) through day 20 p.c. (7.00 a.m.), 20 h per day (approx. 11.00 a.m. - 7.00 a.m.). On the days of exposure, dams were housed individually in special metal free cages with plastic lid and glass drinking tubes in the exposure units. The tubes were inserted into the cages through circular waveguides operated beyond cut-off due to the maintenance of electromagnetic shielding. The bottles with the drinking water were placed outside the waveguides in order to avoid field perturbations. Cage positions were changed daily according to a plan prepared in advance, in order to achieve similar exposure conditions for all animals.
For exposure, two exposure units were placed in animal room No. T2.030 for the control and exposed group, resp. Both exposure units were identical in terms of size, climatization, cage positions, and cable connections. Consequently, the investigations were performed as a double blind study.

4.4.1 Field Characteristics

The exposure of the rats was performed in special waveguides. These waveguides allowed the exposure of the cage area to a homogeneous electromagnetic field in order to keep variations of the exposure due to movements of the animals low. The modulation of the radio frequency 890 MHz carrier signal was selected in a way that the spectrum contained GSM typical frequency components occuring at 1,733 kHz, 217 Hz, 8 Hz and 2 Hz (and integer multiples thereof) beside the carrier signal.
For more details, see separate report by Streckert, Hansen and Bitz of Bergische Universität Wuppertal, entitled "Conception and construction of an exposure setup for the investigation of the influence of pulsed electromagnetic RF fields on defined physiological parameters of rats".

4.4.2 Shielding

The exposure units were completely electromagnetically shielded. Consequently, all external electromagnetic influences could be excluded as well as the influence from the exposed unit on the adjacent control unit. For more details, see separate report by Bergische Universität Wuppertal.

4.4.3 Control of the Exposure Data

The presence/absence of the rf field was controlled by a computer and values were recorded every 5 minutes. For more details, see separate report by Bergische Universität Wuppertal.

4.5 Clinical Observations

All animals were observed in their cages at least once daily.

4.5.1 Body Weight

Individual body weights of the dams were determined to the nearest 0.1 g on days 0, 3, 6, 9, 12, 15, 18, and 20 p.c.

4.6 Postmortal Findings at Sacrifice

At the end of the study (day 20 p.c.), all dams were sacrificed by $C0_2$ overdose and subsequent exsanguination.

4.6.1 Macropathology of the Dams

Necropsy was performed in all dams, and all macroscopic changes were recorded.

4.6.2 Reproductive Parameters

At terminal sacrifice, the following reproductive parameters were determined: uterine weight, number of Corpora lutea, implantation sites (after ammonium sulfide staining in uteri without visible implantations), number and position of early and late resorptions, number and position of live and dead fetuses, sex, position and individual weight of live fetuses as well as individual placental weight.
An animal was considered "non pregnant" only if no implantations sites could be determined even after ammonium sulfide staining.

4.7 Fetal Investigations

During preparation of the fetuses, each individual fetus was tagged with an individual number. All fetuses were carefully inspected for external anomalies (incl. hematomas and position anomalies of the limbs).
For further investigations, the fetuses of each litter were divided alternatingly.

4.7.1 Skeletal Investigations

One half of the fetuses were fixed in 70 % Ethanol and subsequently eviscerated. After that bone staining with alizarin red was performed and fetuses were examined for skeletal anomalies and ossification defects as indicators of a possible developmental retardation.
The findings were recorded on special data sheets according to a given terminology.

4.7.2 Visceral Investigations

The remaining half of the fetuses were fixated in BOUIN'S fixative and examined for visceral anomalies using WILSON's sectioning technique. At least 1 day before examination, the fetuses were placed in 99 % ethanol to remove BOUIN's fixative. Immediately before preparation of sections, fetuses were placed on dry ice in order to improve the quality of the sections.
The findings were recorded on special data sheets according to a given terminology.

4.8 Statistical Evaluation

All data were recorded using the data acquisition system „Toxicology Analysis System Customized“ or on special data sheets. Mean value and standard deviation or incidences were calculated. Differences between groups were considered casewise as statistically significant for $p < 0.05$ and marked in the tables by "*" ($p < 0.05$) or "**" ($p < 0.01$). Body weight, fetal and placental weight were analyzed using analysis of variance. If the group means differed significantly with this method, the mean of the exposed group was compared with the mean of the control group using DUNNETT's test. Incidence data were analyzed using the two-tailed FISHER's exact test. For pre- and postimplantation loss, Kruskall-wallis noparametric ANOVA test was performed. If $p < 0.05$, then a Kruskall-wallis modified DUNNETT's test was performed with the control against the exposed group.

In all instances, the dam or litter was used as the basic unit. For assessment of incidence data, additional comparisons were performed based on fetuses. All statistics were run on the SAS system 6.2 on a VAX microcomputer.

Total maternal body weight gain was determined as:

$$\text{Body weight}_{\text{day 20 p.c.}} - \text{Body weight}_{\text{day 0 p.c.}}$$

To determine the maternal body weight gain except uterus, uterine weight was subtracted from this value.

Data from non pregnant animals (see 4.6.2) were excluded from all calculations.

Preimplantation loss was determined following the formula:

$$\text{Preimplantation loss} = \frac{\text{No. Corpora lutea} - \text{No. Implantation sites}}{\text{No. Corpora lutea}} * 100$$

Postimplantation loss was determined following the formula:

$$\text{Postimplantation loss} = \frac{\text{No. Implantation sites} - \text{No. Live fetuses}}{\text{No. Implantation sites}} * 100$$

If in exceptional cases the number of Corpora lutea was lower than the number of implantation sites, then the actual value was included for calculations, but postimplantation loss was taken as 0.

All incidence data on visceral or skeletal anomalies and ossification defects are presented as: Number of fetuses with the given anomaly / Number of litters with such fetuses.

5. Results and Discussion

5.1 Mating

Four matings were necessary to yield 48 sperm positive females. Out of them, 45 were pregnant at final sacrifice. All non-pregnant animals were found in the sham-exposed control group.

5.2 Control of the Exposure Data

The exposure data in exposure units are described in detail in a separate report by Bergische Universität Wuppertal. In summary, the rf signal was stable during the whole exposure period. For more details, see the above-mentioned report.

5.3 Clinical Observations

The clinical observations are summarized in Table 1. The animals showed no abnormal clinical symptoms during the study, except animal 106 (control group) showing unformed stool on days 18-19 p.c. This finding occurs from time to time in untreated or treated animals, and it was considered incidental in this study.
No mortality occurred and there were no signs of abortion or premature delivery in exposed and sham-exposed dams.

5.3.1 Body Weight of the Dams

Mean values of body weight gains are summarized in Table 2 - 4, the individual data are shown in Appendix 1 - 3.
No clear-cut influence was found on body weight gain, which is evidenced by similar body weights at all weighings. The total body weight gain as well as the maternal weight gain except uterus were also not clearly influenced by exposure (Table 4).
However, it seems that dams of the exposed group gained slightly less weight than the control animals, evidenced by decreased body weights and decreased body weight gains at all time points. All these differences are below the level of statistical significance (except weight gain between days 12 to 15). Since even the data of the control group are just at the lower limit of the historical control data, an influence of the housing conditions, which due to the position of the cages within

the exposure units in this study were different from those applied in routine studies, on this (and, consequently, all the following) parameters cannot be excluded. Then, the slight differences between the two groups may be due to an interaction of these housing conditions and an onset of first effects of exposure in the exposed animals.

5.4 Postmortal Findings at Sacrifice

5.4.1 Macropathology of the Dams

Macroscopic adspection of maternal organs did not indicate any pathological changes in control and exposed dams.

5.4.2 Reproductive Parameters

Mean values and incidences of relevant reproductive parameters are summarized in Table 5, litter data are reported in Appendix 4.
Mean number of Corpora lutea per dam was slightly and statistically non-significantly increased in the exposed group. Since this parameter is independent from the exposure, it is considered incidental. There was no statistically significant influence of exposure on pre- and postimplantation loss, number of implantation sites and live fetuses (Table 5).
Again, as in the case of maternal body weights, the performance of the exposed dams was slightly decreased compared to the sham controls. This is evidenced by slightly decreased uterine weights (Table 4), and increased pre- and postimplantation loss (Table 5), the latter due to an increased number of early resorptions. All these differences are below the level of statistical significance, but they all follow the trend towards slight effects of the exposure on embryo-fetal development. The reasons for this may be the same as described in 5.3.1.

5.5 Fetal Investigations

Due to the (statistically nonsignificant) increase in postimplantation loss, a slightly decreased number of live fetuses was observed in the exposed group.

5.5.1 Fetal and Placental Weights

Mean values of fetal and placental weights are shown in Table 6, individual litter data are reported in Appendix 5 - 6.
There was no statistically significant effect of exposure on these paramaters, except a slight but significant decrease in placental weights of only male fetuses. However, both fetal and placental weights were decreased in the exposed group. All these differences are below the level of statistical significance, but they all follow the trend towards slight effects of the exposure on embryo-fetal development. The reasons for this may be the same as described in 5.3.1.

5.5.2 External Anomalies

External anomalies are summarized Table 7, individual litter data are shown in Appendix 7.
There was only one complex malformation observed in one fetus of the control group. This malformation consisted of an ectopic omphalocele with protruding liver and oligodactylia of the forelimb (Fig. 1). Since this malformation occurred in only one fetus in the control group, it was considered incidental and of obviously genetic origin.
The other observed anomalies (subcutaneous hematomas) are not considered to be malformations, and they were observed in both the control and the exposed group in similar incidence. Subcutaneous hematomas can also occur during preparation of the fetuses.
Consequently, no influence of the exposure could be detected on the incidence of single external anomalies, the number of fetuses with external anomalies, and the number of litters with affected fetuses.

5.5.3 Visceral Anomalies

The incidence of visceral anomalies is summarized in Table 8, the individual litter data are reported in Appendix 8.
There was only one complex malformation observed in one fetus of the control group. This malformation consisted of an ectopic omphalocele with protruding liver, missing diaphragma, small spleen and oligodactylia of the forelimb (see 5.5.2)
The other observed anomalies are not considered to be malformations, but sporadically occurring variations like dilated cerebral ventricles, dilated renal pelvis, dilated ureter, enlarged kidney, blood in respiratory tract and/or stomach (obviously by swallowing blood), blood in pericardium, blood

in thoracic cavity, blood in peritoneum, blood in brain, blood in ocular region, subcutaneous hematoma (the latter six findings possibly induced artificially during preparation), and subcutaneous edema.
All these anomalies were found in both groups, including the control group, and/or in an incidence which is characteristic for the used strain of Wistar rats.
With one exception (see below), no statistically significant differences were found between the groups for any single anomaly, nor for the total number of fetuses with anomalies and total number of litters with fetuses showing visceral anomalies. There was, however, a statistically significant increase of fetuses and litters showing slightly dilated ureter in the exposed group. However, the incidence of this finding in the exposed group is still within historic control values, and there is no trend of an increase of this finding with more severe graduation. Therefore, the biological relevance of this finding is limited.
Consequently, no clear influence of exposure on visceral anomalies was found.The increased incidence of fetuses and litters showing slightly dilated ureter in the exposed group may reflect an onset of an adverse effect of the exposure. The reasons for this may be the same as described in 5.3.1.

5.5.4 Skeletal Anomalies

The incidence of skeletal anomalies is reported in Table 9, the individual litter data are given in Appendix 9.
The observed anomalies are not considered to be malformations, but sporadically occurring variations like rudimentary accessory lumbar ribs, cervical ribs, wavy ribs, dumbbell shaped vertebral centrae, bipartite vertebral centrae, and asymmetric sternebrae.
All anomalies were found in both groups, including the control group, and/or in an incidence which is characteristic for the used strain of Wistar rats.
No statistically significant differences were found between the groups for any single anomaly, nor for the total number of fetuses with skeletal anomalies and total number of litters with fetuses showing skeletal anomalies.
Consequently, no influence of exposure on skeletal anomalies was found.

5.5.5 Ossification Data

The incidence of incomplete ossification is summarized in Table 10. The mean number of ossified centres is shown in Table 11, with individual litter data listed in Appendix 10.
The observed findings are not considered to be malformations, but sporadically occurring incomplete ossification in supraoccipital, interparietal, parietal, frontal, squamosal, nasal, zygomatic, premaxillary, maxillary, hyoid, pterygoid bones, mandible, tympanic ring, scapula, clavicle, humerus, cervical vertebral arches, thoracic vertebral centres and arches, lumbar vertebral centres and arches, sacral vertebral arches, ribs, ileum, ischium, pubis, femur, tibia and fibula. All observed defects were found in both groups, including the control group, and/or in an incidence which is characteristic for 20 day old fetuses of the used strain of Wistar rats.
No relevant differences were found between the groups for any incompletely ossified bone, nor for the total number of fetuses with incomplete ossification and the total number of litters with fetuses showing incomplete ossification.
The number of calcified cervical vertebral centres, caudal vertebral arches and centres, sternebrae, metacarpals, metatarsals, proximal phalangae of the forelimbs, distal phalangae of the forelimbs and hindlimbs, and the total number of ossified centres was not different between the control and the exposed group (Table 11).
Consequently, no influence of exposure on the incidence of findings of incomplete ossification and on the number of ossified centres was found.

6. Summary and Conclusions

The objective of the study was to investigate the effects of a higher power density of pulsed high frequency EMF exposure during pregnancy on offspring of rats. The exposure of the rats was performed in special waveguides. These waveguides allowed the exposure of the cage area to a homogeneous electromagnetic field in order to keep variations of the exposure due to movements of the animals low. The modulation of the radio frequency 890 MHz carrier signal was selected in a way that the spectrum contained GSM typical frequency components occuring at 1,733 kHz, 217 Hz, 8 Hz and 2 Hz (and integer multiples thereof) beside the carrier signal. A power density of 60 W/m^2 in the cage area as the highest athermal value as determined in pilot studies was investigated.
Pregnant Wistar rats, Crl:(WI)BR, were exposed from day 0 p.c. (11.00 a.m.) through day 20 p.c. (7.00 a.m.), 20 h per day (approx. 11.00 a.m. - 7.00 a.m.). On the days of exposure, dams were

housed individually in special metal free cages with plastic lid and glass drinking tubes in wavguide systems. Cage positions were changed daily in order to achieve similar exposure conditions for all animals. A sham exposed control group was run concurrently. The investigations were performed as a double blind study.

The exposure of the rats was performed in special waveguides. These waveguides allowed the above-described exposure conditions. The exposure units were completely electromagnetically shielded. Consequently, all external electromagnetic influences could be excluded as well as the influence from the exposed unit on the adjacent control unit. The presence/absence of the rf field was controlled by a computer and values were recorded every 5 minutes.

The study was conducted following OECD-Guideline 414 "Teratogenicity". At day 20 p.c., dams were sacrificed to determine potential prenatal toxic effects of the exposure. The following reproductive parameters were determined: uterine weight, number of Corpora lutea, implantation sites (after ammonium sulfide staining in uteri without visible implantations), number position of early and late resorptions, number and position of live and dead fetuses, sex, position and individual weight of live fetuses as well as individual placental weight. Fetuses were examined for external anomalies. One half of the fetuses were examined for skeletal anomalies. The remaining half of the fetuses were examined for visceral anomalies using WILSON's sectioning technique.

The animals showed no abnormal clinical symptoms during the study. No mortality occurred and there were no signs of abortion or premature delivery in exposed and sham-exposed dams. Macroscopic adspection of maternal organs did not indicate any pathological changes.

No statistically significant influence was found on total body weight gain and maternal weight gain except uterus, although the values in the exposed group are lower than in the sham exposed group.

There was also no statistically significant influence of exposure on pre- and postimplantation loss, number of implantation sites and live fetuses and fetal and placental weights (except a significant decrease in the placental weight of male fetuses). However, all values in the exposed group were decreased compared to the sham exposed control group.

Since even the corresponding data for the above-mentioned parameters of the control group are just at the lower limit of the historical control data, an influence of the housing conditions, which due to the position of the cages within the exposure units in this study were different from those applied in routine studies, cannot be excluded. Then, the slight differences between the two groups may be due to an interaction of these housing conditions and an onset of first unspecific effects of the exposure on prenatal development of the exposed animals.

No influence of the exposure could be detected on the incidence of single external, visceral and/or skeletal anomalies, the number of fetuses with these anomalies, and the number of litters with affected fetuses, with the only exception of an increase in the number of fetuses and litters showing slightly dilated ureter in the exposed group. However, this finding is considered a sporadically occurring variation in the used strain of rats, and the observed incidence in the control group is still within historical control data.

Except one complex malformation in the control group (ectopic omphalocele, ologodactylia, missing diaphragma), the remaining observed anomalies are not considered to be malformations, but sporadically occurring variations. All anomalies were found in both groups, including the control group, and/or in an incidence which is characteristic for the used strain of Wistar rats.

There was no effect on the incidence of incomplete ossification, which sporadically occurred in both groups in an incidence which is characteristic for 20 day old fetuses of the used strain of Wistar rats. The number of calcified ossification centres was also not influenced.

In conclusion, an exposure of gravid Wistar rats [Crl:(WI)BR] from day 0 - 20 p.c. to a far field of an antenna transmitting a radio frequency 890 MHz carrier signal modulated in a way that the spectrum contained GSM typical frequency components occuring at 1,733 kHz, 217 Hz, 8 Hz and 2 Hz (and integer multiples thereof) beside the carrier signal at a field strength of 60 W/m² did not significantly affect most of the investigated maternal and fetal parameters.

Consequently, under the above-described conditions, no clear-cut teratogenic, embryolethal or retarding effects of the exposure were found in the present study. The observed (statistically non-significant) effects mainly on maternal weight gain, pre- and postimplantation loss, and fetal and placental weight may, however, represent the onset of an unspecific adverse effect of exposure on prenatal development.

7. Tables and Figures

In the tables, the following group assignment is used:

Group 1: Control (Sham exposure)

Group 2: Exposure to 60 W/m² (target value in the cage area)

Table 1: Maternal Clinical Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats

SUMMARY OF CLINICAL OBSERVATIONS DURING GESTATION (frequency/animals)

	Group 1 Control	Group 2 Exposure
DAY 0 to 20		
Normal		
WITHIN NORMAL LIMITS	502/24	504/24
Miscellaneous		
UNFORMED STOOL	2/ 1	0/ 0

Table 2: Maternal Body Weight

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats

SUMMARY OF GESTATION BODY WEIGHTS (GRAMS)

		Group 1 Control		Group 2 Exposure
DAY 0	MEAN	224	d	228
	S.D.	9.9		13.5
	N	21		24
	p-value	0.245		
DAY 3	MEAN	242	d	246
	S.D.	13.8		14.1
	N	21		24
	p-value	0.398		
DAY 6	MEAN	256	d	259
	S.D.	17.4		16.2
	N	21		24
	p-value	0.578		
DAY 9	MEAN	270	d	271
	S.D.	18.7		17.4
	N	21		24
	p-value	0.790		
DAY 12	MEAN	287	d	287
	S.D.	20.1		17.9
	N	21		24
	p-value	0.949		
DAY 15	MEAN	306	d	303
	S.D.	22.3		19.9
	N	21		24
	p-value	0.539		
DAY 18	MEAN	343	d	338
	S.D.	25.7		24.0
	N	21		24
	p-value	0.541		
DAY 20	MEAN	374	d	367
	S.D.	33.1		27.8
	N	21		24
	p-value	0.432		

Statistical key: d=Dunnett-test

Table 3: Maternal Body Weight Gain

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats

SUMMARY OF GESTATION BODY WEIGHT GAIN (GRAMS)

		Group 1 Control	Group 2 Exposure
DAYS 0 TO 3	MEAN	18 d	17
	S.D.	6.2	4.9
	N	21	24
	p-value	0.692	
DAYS 3 TO 6	MEAN	14 d	13
	S.D.	7.5	3.8
	N	21	24
	p-value	0.669	
DAYS 6 TO 9	MEAN	14 d	12
	S.D.	6.3	5.5
	N	21	24
	p-value	0.448	
DAYS 9 TO 12	MEAN	17 d	16
	S.D.	6.1	5.8
	N	21	24
	p-value	0.309	
DAYS 12 TO 15	MEAN	19 d	16*
	S.D.	4.7	6.0
	N	21	24
	p-value	0.037	0.037
DAYS 15 TO 18	MEAN	36 d	35
	S.D.	10.7	7.0
	N	21	24
	p-value	0.799	
DAYS 18 TO 20	MEAN	31 d	29
	S.D.	10.4	6.4
	N	21	24
	p-value	0.307	
DAYS 0 TO 20	MEAN	150 d	138
	S.D.	26.8	19.5
	N	21	24
	p-value	0.107	

Statistical key: d=Dunnett-test * = p<0.05

Table 4: Maternal Uterine Weight and Net Body Weight Gain

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats

SUMMARY OF GRAVID UTERINE WEIGHT AND NET BODY WEIGHT CHANGE (GRAMS)

		Group 1 Control		Group 2 Exposure
NET BODY WT. CHANGE	MEAN	150	d	138
	S.D.	26.8		19.5
	N	21		24
	p-value	0.107		
GRAVID UTERINE WT.	MEAN	82	d	75
	S.D.	14.0		15.2
	N	21		24
	p-value	0.117		
NET WEIGHT CHANGE MINUS UTERINE WT.	MEAN	67	d	63
	S.D.	18.3		10.7
	N	21		24
	p-value	0.324		

Statistical key: d=Dunnett-test

NET BODY WT. CHANGE = TERMINAL BODY WT. MINUS DAY 0 BODY WEIGHT
NET WEIGHT CHANGE = NET BODY WT. CHANGE MINUS UTERINE WEIGHT

Table 5: Cesarean Section Data

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats

SUMMARY OF CESAREAN SECTION DATA

		Group 1 Control		Group 2 Exposure
Pregnant	N	21		24
Dams with no Viable Fetuses	N	0		0
Dams with Viable Fetuses	N	21		24
Corpora Lutea	TOTAL	345		433
No. per animal	MEAN	16.4	d	18.0
	S.D.	2.79		3.07
	p-value	0.073		
Implantation Sites	TOTAL	319		368
No. per animal	MEAN	15.2	d	15.3
	S.D.	1.94		2.28
	p-value	0.823		
Preimplantation Loss	TOTAL	30		67
Dams with loss	N	12	f	16
	p-value			0.552
Dams with loss > 2	N	5	f	9
	p-value			0.356
No. per animal	MEAN	1.4	d	2.8
	S.D.	1.69		3.39
	p-value	0.102		
% per animal	MEAN%	7.9	d	13.8
	S.D.	8.82		15.53
	p-value	0.133		
Live Fetuses	TOTAL	303		330
No. per animal	MEAN	14.4	d	13.8
	S.D.	2.36		2.77
	p-value	0.385		
Males	TOTAL	153		145
	MEAN%	50.9	d	43.3
	S.D.	14.00		12.03
	p-value	0.056		
Females	TOTAL	150		185
	MEAN%	49.1	d	56.7
	S.D.	14.00		12.03
	p-value	0.056		

Statistical key: d=Dunnett-test * = p<0.05

Table 5 (continued): Cesarean Section Data

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats

SUMMARY OF CESAREAN SECTION DATA

		Group 1 Control		Group 2 Exposure
Postimplantation Loss	TOTAL	16		38
Dams with loss	N	8	f	14
	p-value			0.236
Dams with loss > 2	N	1	f	4
	p-value			0.352
No. per animal	MEAN	0.8	d	1.6
	S.D.	1.41		1.98
	p-value	0.121		
% implants per animal	MEAN%	5.0	d	10.1
	S.D.	9.32		13.09
	p-value	0.142		
Dead Fetuses	TOTAL	1		0
No. per animal	MEAN	0.0	d	0.0
	S.D.	0.22		0.00
	p-value	0.290		
% of implants per animal	MEAN%	0.3	d	0.0
	S.D.	1.45		0.00
	p-value	0.290		
Resorptions: Early	TOTAL	9		31
No. per animal	MEAN	0.4	k	1.3
	S.D.	0.68		1.73
	p-value	0.046		0.069
% of implants per animal	MEAN%	2.8	k	8.3
	S.D.	4.42		11.37
	p-value	0.069		
Resorptions: Late	TOTAL	6		7
No. per animal	MEAN	0.3	d	0.3
	S.D.	0.90		0.69
	p-value	0.980		
% of implants per animal	MEAN%	1.9	d	1.9
	S.D.	5.99		4.72
	p-value	0.999		

Statistical key: d=Dunnett-test k=Kruskal-Wallis

Table 6: Fetal and Placental Weights

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats

SUMMARY OF CESAREAN SECTION DATA

		Group 1 Control	Group 2 Exposure
Fetal Body Weight (g)	MEAN	3.7 d	3.5
	S.D.	0.43	0.28
	N	21	24
	p-value	0.078	
Male Fetuses	MEAN	3.8 d	3.6
	S.D.	0.44	0.30
	p-value	0.089	
Female Fetuses	MEAN	3.6 d	3.4
	S.D.	0.40	0.29
	p-value	0.134	
PLacental Weight (g)			
of all Viable Fetuses	MEAN	0.59 d	0.56
	S.D.	0.051	0.056
	N	21	24
	p-value	0.056	
of Male Fetuses	MEAN	0.61 d	0.57*
	S.D.	0.061	0.057
	N	21	24
	p-value	0.021	0.021
of Female Fetuses	MEAN	0.57 d	0.55
	S.D.	0.057	0.059
	N	21	24
	p-value	0.228	

Statistical key: d=Dunnett-test * = p<0.05

Table 7: External Anomalies
(All data presented as: Number of fetuses with the given anomaly / Number of litters with such fetuses)

Parameter		Group 1 Control	Group 2 Exposure
Total investigated	N / N	303 / 21	330 / 24
Complex malformation [§]	N / N	1/1	0/0
Subcutaneous hemorrhage	N / N	5/3	7/6
Total external anomalies	N / N	6/4	7/6
Fetuses with external anomalies	%	2.0	2.1
Litters with fetuses with external anomalies	%	19.0	25.0

[§] ectopic omphalocele, oligodactylia (forelimb)

No significant differences ($p < 0.05$, FISHER's exact test)

Table 8: Visceral Anomalies
(All data presented as: Number of fetuses with the given anomaly / Number of litters with such fetuses)

Parameter		Group 1 Control	Group 2 Exposure
Total investigated	N / N	145/21	159/24
Complex malformation [§]	N / N	1/1	0/0
Dilated cerebral ventricle	N / N	0/0	2/2
Dilated renal pelvis			
slight	N / N	2/2	2/2
medium	N / N	1/1	1/1
high	N / N	2/2	0/0
Dilated ureter			
slight	N / N	9/7	22*/17*
medium	N / N	3/3	5/5
high	N / N	1/1	0/0
Enlarged kidney	N / N	1/1	0/0
Blood in respiratory tract	N / N	1/1	0/0
Blood in stomach	N / N	0/0	4/3
Blood in pericardium	N / N	1/1	3/3
Blood in thoracic cavity	N / N	5/5	2/2
Blood in peritoneum	N / N	4/3	3/3
Blood in ocular region	N / N	1/1	0/0
Blood in brain	N / N	0/0	1/1
Subcutaneous hematoma	N / N	5/4	5/4
Subcutaneous edema	N / N	3/1	2/2
Total visceral anomalies	N / N	29/15	43/20
Fetuses with visceral anomalies	%	20.0	27.0
Litters with fetuses with visceral anomalies	%	71.4	83.3

[§] ectopic omphalocele, oligodactylia (forelimb), missing diaphragma, small spleen

* $p < 0.05$, FISHER's exact test

Table 9: Skeletal Anomalies
(All data presented as: Number of fetuses with the given anomaly / Number of litters with such fetuses)

Parameter		Group 1 Control	Group 2 Exposure
Total investigated	N / N	158 /21	171/24
Rudimentary accessory lumbar rib/s	N / N	12/8	11/6
Cervical rib/s	N / N	0/0	1/1
Wavy rib/s	N / N	2/2	5/2
Dumbbell shaped vertebral centre/s	N / N	23/10	16/12
Bipartite vertebral centre/s	N / N	3/2	0/0
Asymmetric sternebra/e	N / N	7/5	6/5
Total skeletal anomalies	N / N	42/16	36/19
Fetuses with skeletal anomalies	%	26.6	21.1
Litters with fetuses with skeletal anomalies	%	76.2	79.2

No significant differences ($p < 0.05$, FISHER's exact test)

Table 10: Incomplete or Missing Ossification
(All data presented as: Number of fetuses with the given anomaly / Number of litters with such fetuses)

		Group	
Parameter		1	2
(Bone structure)		Control	Exposure
Total investigated	N / N	158/21	171 /24
Supraoccipital bone	N / N	89/19	108/20
Holes	N / N	26/11	35/16
Interparietal bone	N / N	123/21	133/23
Parietal bone	N / N	32/11	38/16
Frontal bone	N / N	19/8	15/7
Squamosal bone	N / N	55/15	67/20
Holes	N / N	2/1	5/2
Nasal bone	N / N	29/9	37/13
Zygomatic bone	N / N	28/10	21/10
Premaxillary bone	N / N	2/2	3/3
Maxillary bone	N / N	5/2	4/3
Mandible	N / N	13/7	15/8
Hyoid bone	N / N	42/13	40/14
Pterygoid bone	N / N	0/0	1/1
Tympanic ring	N / N	0/0	1/1
Scapula	N / N	0/0	1/1
Clavicle	N / N	0/0	1/1
Holes	N / N	0/0	1/1

No significant differences ($p < 0.05$, FISHER's exact test)

Table 10 (Continued): Incomplete or Missing Ossification
(All data presented as: Number of fetuses with the given anomaly / Number of litters with such fetuses)

		Group	
Parameter		1	2
(Bone structure)		Control	Exposure
Total investigated	N / N	158/21	171 /24
Humerus	N / N	3/2	1/1
Rib/s	N / N	2/2	0/0
Cervical vertebral arches	N / N	12/8	12/6
Thoracic vertebral centres	N / N	9/5	8/6
Thoracic vertebral arches	N / N	0/0	1/1
Lumbar vertebral arches	N / N	3/3	1/1
Lumbar vertebral centres	N / N	0/0	1/1
Sacral vertebral arches	N / N	21/8	14/8
Ileum	N / N	2/1	2/2
Ischium	N / N	4/2	6/4
Pubis	N / N	6/3	7/4
Femur	N / N	5/2	5/4
Tibia	N / N	0/0	1/1
Fibula	N / N	1/1	0/0
Total incomplete ossification	N / N	139/21	155/24
Fetuses with incomplete ossification	%	88.0	90.6
Litters with fetuses with incomplete	%	100	100

No significant differences ($p < 0.05$, FISHER's exact test)

Table 11: Number of Ossified Centres

Parameter		Group 1 Control	Group 2 Exposure
Cervical vertebral centres	Mean	0.41	0.33
	SD	0.47	0.42
Caudal vertebral arches	Mean	2.20	2.16
	SD	0.61	0.43
Caudal vertebral centres	Mean	4.83	4.85
	SD	0.65	0.50
Sternebrae	Mean	5.53	5.45
	SD	0.45	0.45
Metacarpals	Mean	3.71	3.51
	SD	0.28	0.37
Metatarsals	Mean	4.01	3.99
	SD	0.07	0.03
Proximal phalangae (forelimbs)	Mean	0.31	0.12
	SD	0.66	0.31
Distal phalangae (forelimbs)	Mean	4.85	4.97
	SD	0.68	0.12
Distal phalangae (hindlimbs)	Mean	4.67	4.72
	SD	1.09	0.71
Total number ossified centres	Mean	30.53	30.10
	SD	3.69	2.14
	N	21	24

No significant differences ($p < 0.05$, ANOVA + DUNNETT's test)

8. Appendix: Individual Litter Data

In the appendices, the following group assignment is used:

Group 1: Control (Sham exposure)

Group 2: Exposure to 60 W/m² (target value in the cage area)

Appendix 1: Individual Maternal Body Weight Data

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats

INDIVIDUAL GESTATION BODY WEIGHTS (GRAMS)

Group 1 (Control)

	DAY OF GESTATION							
ANIMAL#	0	3	6	9	12	15	18	20
101	219	241	259	277	301	319	361	403
102x NP	220	236	258	267	277	262	279	289
103	215	226	248	262	283	294	328	354
104	219	248	262	292	305	339	379	409
105	228	252	276	289	305	325	372	411
106	223	244	266	270	295	314	308	305
107	215	225	240	255	272	287	322	357
108	250	267	286	301	326	346	393	439
109	216	232	243	250	272	287	323	350
110	214	222	232	249	259	275	312	335
111	231	256	267	286	294	316	354	386
112	220	240	254	260	282	302	336	367
113	216	231	245	254	270	287	323	355
114	212	225	226	240	247	271	312	344
115	229	239	258	271	289	306	341	378
116	231	257	273	287	292	314	344	365
117	237	263	278	291	315	333	377	410
118	214	233	239	250	271	286	315	345
119	221	233	248	251	274	297	336	363
120	240	264	285	301	321	346	381	427
121	231	247	238	264	278	299	341	380
122x NP	246	264	278	291	292	285	288	290
123	225	239	253	264	278	295	336	366
124x NP	226	242	258	272	251	265	274	279
MEAN	224	242	256	270	287	306	343	374
S.D.	9.9	13.8	17.4	18.7	20.1	22.3	25.7	33.1
N	21	21	21	21	21	21	21	21

NP=NOT PREGNANT x=EXCLUDED FROM MEAN

Appendix 1 (continued): Individual Maternal Body Weight Data

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats

INDIVIDUAL GESTATION BODY WEIGHTS (GRAMS)

Group 2 (Exposure)

	DAY OF GESTATION							
ANIMAL#	0	3	6	9	12	15	18	20
201	256	267	285	301	312	334	378	411
202	222	236	249	262	275	281	300	312
203	204	216	226	245	262	275	304	330
204	212	233	244	252	270	288	314	347
205	223	247	265	282	303	318	368	399
206	242	261	275	296	312	331	369	405
207	211	230	246	257	272	284	316	350
208	246	257	273	290	306	330	375	406
209	244	260	271	291	306	321	361	390
210	219	240	251	261	277	295	327	347
211	244	270	288	301	320	336	375	402
212	218	241	245	256	278	294	336	368
213	234	245	257	270	264	300	337	358
214	227	251	263	264	285	303	334	368
215	233	248	263	276	294	305	333	352
216	245	266	279	299	313	338	369	411
217	217	235	245	253	274	286	314	343
218	228	246	255	269	282	294	329	358
219	207	219	231	244	263	277	321	344
220	227	241	253	267	276	293	331	363
221	221	241	254	266	274	284	316	341
222	235	246	253	262	278	291	323	345
223	236	260	281	278	299	310	348	381
224	229	243	259	268	283	297	334	364
MEAN	228	246	259	271	287	303	338	367
S.D.	13.5	14.1	16.2	17.4	17.9	19.9	24.0	27.8
N	24	24	24	24	24	24	24	24

Appendix 2: Individual Maternal Body Weight Gain Data

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats

INDIVIDUAL GESTATION BODY WEIGHT GAIN (GRAMS)

Group 1 (Control)

	DAY OF GESTATION							
ANIMAL#	0 - 3	3 - 6	6 - 9	9 - 12	12 - 15	15 - 18	18 - 20	0 - 20
101	22	18	18	24	18	41	42	184
102x NP	16	22	10	9	-15	17	10	70
103	11	22	14	21	11	34	26	139
104	29	14	29	13	34	41	30	190
105	25	24	13	16	21	47	39	183
106	21	22	5	24	19	-6	-3	82
107	10	15	15	17	15	35	35	142
108	18	19	15	24	20	47	46	189
109	16	11	7	22	15	36	27	134
110	8	10	17	10	16	37	23	122
111	25	11	20	8	22	38	33	156
112	20	14	6	22	20	34	30	146
113	15	14	9	17	17	36	32	139
114	13	1	14	8	23	42	32	132
115	11	19	13	18	17	36	37	150
116	26	16	14	5	22	30	22	134
117	26	15	12	25	18	44	32	173
118	19	6	11	21	15	29	30	131
119	12	15	4	22	23	39	28	143
120	24	22	15	20	25	34	47	187
121	16	-8	26	14	21	42	39	149
122x NP	19	14	13	1	-7	2	2	45
123	14	14	11	14	17	41	30	141
124x NP	16	17	14	-21	15	9	5	53
MEAN	18	14	14	17	19	36	31	150
S.D.	6.2	7.5	6.3	6.1	4.7	10.7	10.4	26.8
N	21	21	21	21	21	21	21	21

NP=NOT PREGNANT x=EXCLUDED FROM MEAN

Appendix 2 (continued): Individual Maternal Body Weight Gain Data

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats

INDIVIDUAL GESTATION BODY WEIGHT GAIN (GRAMS)

Group 2 (Exposure)

	DAY OF GESTATION							
ANIMAL#	0 - 3	3 - 6	6 - 9	9 - 12	12 - 15	15 - 18	18 - 20	0 - 20
201	12	18	16	12	21	44	33	155
202	14	13	12	13	6	19	13	91
203	12	10	20	17	13	29	27	127
204	21	12	8	18	17	27	33	135
205	24	18	17	22	15	49	31	176
206	19	15	21	17	18	38	36	163
207	19	16	11	15	11	33	34	140
208	11	17	17	16	25	45	31	160
209	15	12	20	15	14	40	29	146
210	21	11	9	16	18	32	20	128
211	26	18	13	20	16	39	27	159
212	23	4	10	22	16	43	32	151
213	11	12	13	-5	35	37	22	124
214	24	12	1	21	18	31	34	141
215	15	15	13	18	11	28	20	120
216	21	13	20	14	24	32	42	167
217	17	10	9	21	12	28	29	125
218	18	9	14	13	13	35	29	130
219	12	12	13	19	14	45	23	137
220	14	12	14	9	17	38	32	136
221	20	13	12	8	10	32	25	120
222	11	8	9	16	12	32	22	110
223	24	21	-3	21	11	38	33	145
224	14	16	9	15	14	37	30	136
MEAN	17	13	12	16	16	35	29	138
S.D.	4.9	3.8	5.5	5.8	6.0	7.0	6.4	19.5
N	24	24	24	24	24	24	24	24

Appendix 3:
Individual Maternal Uterine Weight and Net Body Weight Gain Data

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats

INDIVIDUAL GRAVID UTERINE WEIGHT AND NET BODY WEIGHT CHANGE (GRAMS)

Group 1 (Control)

ANIMAL#	UTERUS WEIGHT	ADJUSTED WEIGHT	NET WEIGHT CHANGE FROM DAY 0	WEIGHT CHANGE FROM DAY 0
101	94	309	90	184
102x NP	0	289	70	70
103	70	284	69	139
104	99	310	91	190
105	89	322	94	183
106	61	244	21	82
107	81	277	62	142
108	104	334	85	189
109	71	279	63	134
110	69	266	53	122
111	68	318	87	156
112	80	287	66	146
113	83	273	57	139
114	85	259	47	132
115	89	289	61	150
116	53	313	82	134
117	104	306	69	173
118	71	274	60	131
119	93	270	49	143
120	96	331	91	187
121	87	293	62	149
122x NP				45
123	83	283	58	141
124x NP				53
MEAN	82.	291.	67.	150.
S.D.	14.0	24.4	18.3	26.8
N	21	21	21	21

ADJUSTED WEIGHT = TERMINAL BODY WEIGHT MINUS GRAVID UTERINE WEIGHT
NET WEIGHT CHANGE FROM DAY 0 = TERMINAL CORRECTED BODY WEIGHT MINUS DAY 0 BODY WEIGHT

NP=NOT PREGNANT x=EXCLUDED FROM MEAN

Appendix 3 (continued):
Individual Maternal Uterine Weight and Net Body Weight Gain Data

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats

INDIVIDUAL GRAVID UTERINE WEIGHT AND NET BODY WEIGHT CHANGE (GRAMS)
Group 2 (Exposure)

ANIMAL#	UTERUS WEIGHT	ADJUSTED WEIGHT	NET WEIGHT CHANGE FROM DAY 0	WEIGHT CHANGE FROM DAY 0
201	99	312	56	155
202	47	265	43	91
203	65	266	62	127
204	76	271	59	135
205	106	293	71	176
206	92	313	71	163
207	85	265	54	140
208	92	314	69	160
209	80	310	66	146
210	59	288	69	128
211	66	336	93	159
212	84	284	67	151
213	72	286	52	124
214	75	293	66	141
215	54	299	66	120
216	92	319	75	167
217	64	279	62	125
218	89	269	42	130
219	74	270	63	137
220	78	285	58	136
221	53	288	67	120
222	59	286	51	110
223	74	307	71	145
224	72	292	64	136
MEAN	75.	291.	63.	138.
S.D.	15.2	19.3	10.7	19.5
N	24	24	24	24

ADJUSTED WEIGHT = TERMINAL BODY WEIGHT MINUS GRAVID UTERINE WEIGHT
NET WEIGHT CHANGE FROM DAY 0 = TERMINAL CORRECTED BODY WEIGHT MINUS DAY 0 BODY WEIGHT

Appendix 4: Individual Cesarean Section Data

Effects of pulsed high frequency EMF exposure during pregnancy on offspring of Wistar rats

INDIVIDUAL FEMALE REPRODUCTION DATA AND MEAN FETAL WEIGHT DATA

Group 1 (Control)

ANIMAL#	CORPORA LUTEA	%PREIMPL. LOSS	IMPLANT SITES	FETUSES LIVE	DEAD (n)	DEAD %	RESORPTIONS EARLY	RESORPTIONS LATE	TOTAL (n)	TOTAL %	SEX MALE	SEX FEMALE	AVERAGE FETAL BODY WEIGHT MALES	AVERAGE FETAL BODY WEIGHT FEMALES	AVERAGE FETAL BODY WEIGHT LITTER
101	17	0.0	17	17	0	0.0	0	0	0	0.0	9	8	3.6	3.5	3.5
102	NP														
103	15	13.3	13	13	0	0.0	0	0	0	0.0	11	2	3.4	3.1	3.3
104	15	0.0	15	13	1	6.7	0	1	1	6.7	8	5	5.5	4.8	5.2
105	18	5.6	17	15	0	0.0	1	1	2	11.8	10	5	3.8	3.4	3.7
106	14	21.4	11	11	0	0.0	0	0	0	0.0	6	5	3.7	3.5	3.6
107	13	0.0	14	14	0	0.0	0	0	0	0.0	6	8	4.0	3.6	3.8
108	17	0.0	18	18	0	0.0	0	0	0	0.0	7	11	3.9	3.8	3.8
109	16	0.0	16	15	0	0.0	1	0	1	6.3	8	7	2.9	2.7	2.8
110	11	0.0	12	12	0	0.0	0	0	0	0.0	8	4	3.8	3.6	3.7
111	15	13.3	13	12	0	0.0	1	0	1	7.7	3	9	3.8	3.7	3.7
112	17	5.9	16	15	0	0.0	1	0	1	6.3	8	7	3.4	3.2	3.3
113	16	0.0	16	14	0	0.0	2	0	2	12.5	5	9	3.9	3.8	3.8
114	15	0.0	15	15	0	0.0	0	0	0	0.0	8	7	3.7	3.5	3.6
115	16	6.3	15	15	0	0.0	0	0	0	0.0	6	9	4.0	3.8	3.8
116	20	25.0	15	9	0	0.0	2	4	6	40.0	4	5	3.9	3.7	3.8
117	23	17.4	19	19	0	0.0	0	0	0	0.0	7	12	3.6	3.4	3.5
118	13	0.0	14	13	0	0.0	1	0	1	7.1	7	6	3.7	3.4	3.6
119	20	15.0	17	17	0	0.0	0	0	0	0.0	9	8	3.9	3.6	3.8
120	18	11.1	16	16	0	0.0	0	0	0	0.0	10	6	4.0	3.7	3.9
121	16	6.3	15	15	0	0.0	0	0	0	0.0	8	7	3.9	3.6	3.7
122	NP														
123	20	25.0	15	15	0	0.0	0	0	0	0.0	6	9	3.6	3.3	3.4
124	NP														
MEAN	16.4	7.9	15.2	14.4	0.0	0.3	0.4	0.3	0.7	4.7	7.3	7.1	3.8	3.6	3.7
S.D.	2.79	8.82	1.94	2.36	0.22	1.45	0.68	0.90	1.38	9.13	1.98	2.36	0.46	0.39	0.43
N	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21

NP=NOT PREGNANT

Appendix 4 (Continued): Individual Cesarean Section Data

Effects of pulsed high frequency EMF exposure during pregnancy on offspring of Wistar rats

INDIVIDUAL FEMALE REPRODUCTION DATA AND MEAN FETAL WEIGHT DATA Group 2 (Exposure)

	CORPORA	%PREIMPL.	IMPLANT	FETUSES			RESORPTIONS				SEX		AVERAGE FETAL BODY WEIGHT		
ANIMAL#	LUTEA	LOSS	SITES	LIVE	DEAD (n)	DEAD %	EARLY	LATE	TOTAL (n)	TOTAL %	MALE	FEMALE	MALES	FEMALES	LITTER
201	18	0.0	18	18	0	0.0	0	0	0	0.0	11	7	3.5	3.4	3.5
202	15	0.0	15	8	0	0.0	7	0	7	46.7	3	5	4.1	3.7	3.9
203	15	6.7	14	12	0	0.0	2	0	2	14.3	6	6	3.7	3.3	3.5
204	14	0.0	14	13	0	0.0	1	0	1	7.1	5	8	4.1	3.7	3.8
205	19	5.3	18	18	0	0.0	0	0	0	0.0	6	12	4.0	3.8	3.9
206	19	0.0	19	17	0	0.0	1	1	2	10.5	9	8	3.9	3.6	3.7
207	18	5.6	17	15	0	0.0	2	0	2	11.8	8	7	4.1	3.9	4.0
208	18	0.0	19	17	0	0.0	2	0	2	10.5	4	13	3.6	3.5	3.5
209	22	36.4	14	14	0	0.0	0	0	0	0.0	3	11	3.9	3.6	3.7
210	19	42.1	11	11	0	0.0	0	0	0	0.0	4	7	3.5	3.4	3.5
211	18	22.2	14	14	0	0.0	0	0	0	0.0	7	7	3.1	2.6	2.8
212	17	0.0	17	16	0	0.0	1	0	1	5.9	6	10	3.2	3.3	3.3
213	23	34.8	15	13	0	0.0	2	0	2	13.3	5	8	3.7	3.6	3.6
214	15	6.7	14	14	0	0.0	0	0	0	0.0	8	6	3.5	3.2	3.4
215	15	6.7	14	9	0	0.0	2	3	5	35.7	2	7	3.5	3.6	3.6
216	17	5.9	16	16	0	0.0	0	0	0	0.0	10	6	3.7	3.6	3.7
217	14	0.0	15	12	0	0.0	3	0	3	20.0	6	6	3.5	3.4	3.4
218	18	0.0	18	16	0	0.0	1	1	2	11.1	9	7	3.6	3.4	3.5
219	14	7.1	13	13	0	0.0	0	0	0	0.0	4	9	3.7	3.6	3.6
220	21	23.8	16	15	0	0.0	1	0	1	6.3	8	7	3.2	3.0	3.1
221	17	41.2	10	10	0	0.0	0	0	0	0.0	4	6	3.4	3.1	3.2
222	21	23.8	16	10	0	0.0	5	1	6	37.5	5	5	3.6	3.4	3.5
223	20	20.0	16	14	0	0.0	1	1	2	12.5	5	9	3.2	3.1	3.2
224	26	42.3	15	15	0	0.0	0	0	0	0.0	7	8	3.1	2.9	3.0
MEAN	18.0	13.8	15.3	13.8	0.0	0.0	1.3	0.3	1.6	10.1	6.0	7.7	3.6	3.4	3.5
S.D.	3.07	15.53	2.28	2.77	0.00	0.00	1.73	0.69	1.98	13.09	2.35	2.07	0.30	0.29	0.28
N	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

Appendix 5: Individual Fetal Weight Data

Effects of pulsed high frequency EMF exposure during pregnancy on offspring of Wistar rats

INDIVIDUAL FETAL BODY WEIGHTS (GRAMS)

Group 1 (Control)

ANIMAL#	MEAN	FETUS# 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
101	3.5	2.0	3.3	3.9	2.8	3.7	4.0	3.6	3.5	3.7	3.5	3.5	4.0/	4.1	3.8	3.8	3.3	3.9		
102	NP																			
103	3.3	3.4	2.9	3.2	3.5	3.4	3.3	3.0/	3.6	3.4	3.8	3.2	3.3	3.2						
104	5.2	L	5.4	5.5	5.4	5.0	D	5.3	4.4	5.0/	5.8	5.7	4.4	5.7	5.3	4.9				
105	3.7	3.5	E	3.9	3.8	3.4	3.6	3.7/	3.6	3.8	3.8	3.8	L	3.2	4.0	3.6	3.9	3.3		
106	3.6	3.3	3.5	3.5	3.6	3.9/	3.4	3.4	3.5	3.7	3.7	3.9								
107	3.8	3.8	3.9	4.0	4.0	4.0	3.5	3.7/	3.8	3.5	3.9	4.4	3.8	3.4	3.4					
108	3.8	3.7	4.0	3.9	4.0	3.5	4.0/	4.0	3.3	3.8	4.1	3.9	3.9	4.2	3.7	3.6	3.9	3.8	3.7	
109	2.8	E	2.8	3.0	2.7	3.0/	2.8	2.7	2.8	2.6	2.7	2.9	3.0	2.8	2.8	2.7	3.3			
110	3.7	3.4	3.6	3.9	3.5	4.1/	3.9	3.8	3.7	4.1	3.6	3.3	3.7							
111	3.7	E	3.7	3.6	3.6	3.9	3.7	3.8	3.7	3.7	3.9	3.6/	3.7	3.8						
112	3.3	3.2	3.2	3.4	3.2	3.4	3.2/	3.3	3.4	3.3	3.2	3.2	2.9	E	3.1	3.3	3.7			
113	3.8	3.2	E	4.0	3.8	3.7	3.8	4.0	4.1/	3.9	E	3.6	4.1	3.7	3.8	3.8	4.2			
114	3.6	3.8	3.2	3.7	3.6	3.6	3.7	3.6	3.8/	3.3	3.9	3.6	3.4	3.9	3.6	3.7				
115	3.8	3.6	3.7	3.8	4.0	3.9	3.9	3.7	3.9	3.5	3.5	3.9/	4.2	4.0	4.0	4.2				
116	3.8	E	3.4	L	3.5	3.7	L	E	3.9	3.9	L /	4.0	4.0	3.7	3.8	L				
117	3.5	3.5	3.4	3.3	3.6	3.6	3.5	3.5	3.5/	3.6	3.2	2.8	3.5	3.4	3.5	3.0	3.7	3.7	3.4	4.1
118	3.6	3.4	3.8	3.5	3.4	E	3.9	3.5	3.4	3.2	3.4	3.7/	3.6	3.8	3.8					
119	3.8	3.5	3.0	3.9	3.4	3.3	3.7	3.7	3.8	3.7	3.8	4.1/	4.0	4.0	3.9	4.1	4.1	4.2		
120	3.9	3.5	3.5	3.7	4.0	4.3	3.9	4.5/	3.7	3.8	4.0	3.7	4.2	3.9	3.9	3.8	4.2			
121	3.7	3.7	3.9	3.9	4.0	3.5	3.5	4.0/	3.7	3.6	3.8	3.8	3.8	3.2	3.8	3.5				
122	NP																			
123	3.4	3.6	3.5	3.1	3.3	3.5	3.1	3.5/	3.0	3.6	3.7	3.2	3.1	3.6	3.7	3.8				
124	NP																			
MEAN	3.7																			
S.D.	0.43																			
N	21																			

E-Early resorption L-Late resorption B-Abortion site I-Implantation site D-Dead fetus P-Delivered fetus
/-Denotes position of cervix

NP=NOT PREGNANT

Appendix 5 (Continued): Individual Fetal Weight Data

Effects of pulsed high frequency EMF exposure during pregnancy on offspring of Wistar rats

INDIVIDUAL FETAL BODY WEIGHTS (GRAMS)

Group 2 (Exposure)

ANIMAL#	MEAN	FETUS# 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
201	3.5	3.9	3.5	3.4	3.3	3.5	3.8	3.3	3.4/	3.2	3.5	3.6	3.5	3.7	3.4	3.3	3.6	3.5	3.5	
202	3.9	4.0	E	E	E	4.0	4.4	E /	3.7	E	E	E	3.3	3.9	4.1	3.5				
203	3.5	3.3	3.3	E	3.8	3.3	3.1/	3.2	3.6	3.3	3.6	E	3.4	3.9	4.1					
204	3.8	4.0	3.5	3.7	3.9	4.1	3.5/	3.7	3.4	E	4.7	3.9	3.9	3.8	3.8					
205	3.9	4.1	4.0	3.9	3.9	3.9	3.7	3.7	4.3/	3.8	3.6	3.8	3.9	3.8	3.7	3.9	4.0	4.2	4.1	
206	3.7	L	3.8	3.7	3.5	3.8	3.3	4.0	3.5	3.6	3.8	4.0/	3.3	3.7	4.3	3.6	E	4.0	3.6	3.8
207	4.0	3.5	3.6	3.8	3.7	3.9	4.0	3.9	3.8	4.5/	4.1	4.0	4.2	E	4.1	4.7	4.1	E		
208	3.5	3.4	E	3.5	3.6	3.5	3.6	3.5	3.3	E	3.7	3.7/	3.4	3.4	3.6	3.2	3.1	3.7	3.5	3.8
209	3.7	3.2	3.3	3.9	3.8	3.3	3.9	3.5	3.9/	3.9	3.6	3.7	4.0	3.7	3.9					
210	3.5	3.2	3.5	3.6	3.9	3.6	3.5	3.5	3.6	3.5	3.1	3.2/								
211	2.8	3.0	3.0	2.5	2.5	3.1	2.5	3.0	1.8/	2.9	2.7	3.1	3.3	3.5	2.8					
212	3.3	2.2	3.4	3.4	E	3.3	3.5	3.7/	3.0	3.7	3.2	3.4	3.3	3.3	3.5	3.1	3.3	3.2		
213	3.6	3.6	3.9	3.5	4.0/	3.7	3.6	3.5	3.4	E	E	3.6	3.6	3.6	3.5	3.7				
214	3.4	3.4	3.3	3.2	3.6	3.7	3.5	3.4	3.7	3.4	3.3/	3.5	3.2	3.5	2.6					
215	3.6	E	3.7	L	3.3	3.0	3.7	3.7	E /	L	3.4	4.0	3.3	3.7	L					
216	3.7	3.4	3.4	3.9	3.8	3.7	3.4	3.6	3.7	3.5	3.5	4.0/	3.2	3.7	4.0	3.9	4.0			
217	3.4	3.2	3.4	E	3.4	3.8	3.2	3.3	3.6	3.7/	E	3.4	3.6	3.2	3.3	E				
218	3.5	3.7	3.6	3.7	3.4	3.6	3.2	3.8	3.3/	3.4	3.5	3.3	3.7	3.5	3.4	3.4	E	3.6	L	
219	3.6	3.5	3.6	3.9	3.5/	3.3	3.7	3.8	3.4	3.6	3.8	3.3	3.9	3.6						
220	3.1	2.4	3.1	3.0	3.5	2.9	E	3.7	3.3	3.1/	2.5	3.2	3.3	3.5	3.2	3.2	3.1			
221	3.2	3.2	3.6	3.3	3.4	3.2	3.4	3.3/	2.7	3.5	2.9									
222	3.5	L	E	3.3	E	3.5	3.4	3.8	E	3.2	3.3	3.7/	3.7	3.7	3.7	E	E			
223	3.2	2.8	2.8	L	3.1	2.8	3.2	3.2	2.6	3.1/	3.7	3.3	3.3	3.3	E	3.5	3.6			
224	3.0	2.8	2.9	2.2	3.1	3.0	3.2	3.1	2.4	3.5	3.3/	3.2	2.7	3.7	3.2	2.6				
MEAN	3.5																			
S.D.	0.28																			
N	24																			

E-Early resorption L-Late resorption B-Abortion site I-Implantation site D-Dead fetus P-Delivered fetus
/-Denotes position of cervix

Appendix 6: Individual Placental Weight Data

Effects of pulsed high frequency EMF exposure during pregnancy on offspring of Wistar rats

INDIVIDUAL FETAL DATA -- PLACENTAL WEIGHT IN G

Group 1 (Control)

FEMALE#	MEAN	FETUS# 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
101	0.58	0.40	0.47	0.57	0.45	0.60	0.51	0.48	0.55	0.59	0.57	0.60	0.76/0.92	0.85	0.52	0.44	0.53							
102	NP																							
103	0.61	0.54	0.60	0.61	0.58	0.57	0.58	0.54/0.78	0.63	0.73	0.61	0.60	0.57											
104	0.56	L	0.62	0.59	0.52	0.56	D	0.63	0.54	0.47/0.59	0.64	0.54	0.53	0.51	0.57									
105	0.70	0.74	E	0.63	0.81	0.72	0.63	0.67/0.52	0.66	0.73	0.68	L	0.69	0.70	0.68	0.72	0.91							
106	0.63	0.62	0.74	0.78	0.51	0.66/0.60	0.64	0.57	0.61	0.60	0.63													
107	0.66	0.81	0.66	0.85	0.83	0.65	0.56	0.58/0.72	0.54	0.74	0.62	0.63	0.55	0.49										
108	0.57	0.54	0.64	0.62	0.52	0.58	0.57/0.49	0.55	0.55	0.53	0.59	0.55	0.67	0.58	0.60	0.65	0.50	0.60						
109	0.52	E	0.57	0.58	0.58	0.52/0.52	0.40	0.47	0.55	0.47	0.52	0.54	0.53	0.47	0.53	0.50								
110	0.56	0.63	0.59	0.59	0.39	0.66/0.54	0.58	0.54	0.61	0.50	0.55	0.54												
111	0.57	E	0.48	0.49	0.57	0.61	0.57	0.62	0.58	0.69	0.62	0.60/0.49	0.54											
112	0.61	0.58	0.54	0.89	0.67	0.63	0.60/0.66	0.62	0.67	0.47	0.46	0.53	E	0.52	0.59	0.65								
113	0.62	0.57	E	0.66	0.69	0.54	0.68	0.64	0.69/0.61	E	0.58	0.65	0.58	0.65	0.53	0.58								
114	0.60	0.68	0.64	0.74	0.53	0.54	0.61	0.54	0.54/0.49	0.66	0.64	0.64	0.69	0.51	0.54									
115	0.66	0.59	0.62	0.74	0.57	0.63	0.74	0.67	0.61	0.54	0.64	0.88/0.75	0.68	0.57	0.74									
116	0.51	E	0.43	L	0.49	0.48	L	E	0.42	0.54	L /0.52	0.64	0.53	0.58	L									
117	0.61	0.74	0.63	0.67	0.63	0.55	0.75	0.52	0.63/0.71	0.60	0.55	0.54	0.62	0.58	0.48	0.66	0.54	0.60	0.62					
118	0.54	0.60	0.54	0.53	0.56	E	0.52	0.55	0.51	0.57	0.53	0.64/0.51	0.56	0.46										
119	0.51	0.44	0.40	0.58	0.47	0.47	0.44	0.47	0.52	0.54	0.57	0.55/0.50	0.54	0.47	0.60	0.56	0.54							
120	0.64	0.65	0.53	0.63	0.58	0.57	0.55	0.67/0.66	0.73	0.73	0.68	0.62	0.57	0.52	0.69	0.81								
121	0.57	0.50	0.66	0.60	0.54	0.51	0.57	0.57/0.56	0.49	0.65	0.63	0.68	0.57	0.56	0.47									
122	NP																							
123	0.55	0.57	0.52	0.61	0.57	0.58	0.53	0.57/0.45	0.52	0.59	0.55	0.54	0.55	0.54	0.54									
124	NP																							

MEAN	0.59
S.D.	0.051
N	21

E-EARLY RESORPTION L-LATE RESORPTION D-DEAD FETUS /-DENOTES POSITION OF CERVIX
NP=NOT PREGNANT

Appendix 6 (Continued): Individual Placental Weight Data

Effects of pulsed high frequency EMF exposure during pregnancy on offspring of Wistar rats

INDIVIDUAL FETAL DATA -- PLACENTAL WEIGHT IN G

Group 2 (Exposure)

FEMALE#	MEAN	FETUS# 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
201	0.56	0.58	0.52	0.60	0.50	0.51	0.54	0.60	0.55/	0.51	0.54	0.62	0.51	0.58	0.64	0.63	0.54	0.54	0.57					
202	0.57	0.70	E	E	E	0.65	0.64	E /	0.48	E	E	E	0.53	0.48	0.57	0.52								
203	0.56	0.49	0.58	E	0.64	0.57	0.53/	0.44	0.49	0.54	0.49	E	0.47	0.71	0.76									
204	0.53	0.52	0.52	0.48	0.59	0.56	0.57/	0.53	0.56	E	0.51	0.53	0.48	0.53	0.53									
205	0.63	0.60	0.62	0.63	0.88	0.57	0.73	0.62	0.55/	0.58	0.71	0.57	0.56	0.71	0.54	0.53	0.59	0.73	0.69					
206	0.46	L	0.49	0.40	0.42	0.52	0.40	0.49	0.40	0.38	0.48	0.47/	0.42	0.41	0.51	0.41	E	0.52	0.58	0.50				
207	0.49	0.44	0.45	0.42	0.47	0.54	0.47	0.48	0.52	0.55/	0.50	0.51	0.55	E	0.45	0.52	0.48	E						
208	0.51	0.46	E	0.59	0.50	0.53	0.48	0.53	0.38	E	0.56	0.55/	0.51	0.54	0.50	0.47	0.46	0.51	0.51	0.52				
209	0.57	0.46	0.59	0.56	0.60	0.58	0.52	0.53	0.68/	0.74	0.47	0.57	0.59	0.50	0.57									
210	0.57	0.52	0.58	0.55	0.63	0.60	0.57	0.51	0.59	0.60	0.55	0.56/												
211	0.51	0.39	0.46	0.39	0.42	0.51	0.58	0.59	0.41/	0.52	0.61	0.57	0.59	0.63	0.53									
212	0.59	0.66	0.62	0.54	E	0.67	0.59	0.75/	0.51	0.56	0.55	0.59	0.52	0.68	0.60	0.49	0.60	0.56						
213	0.61	0.63	0.61	0.62	0.61/	0.65	0.49	0.69	0.54	E	E	0.60	0.68	0.66	0.59	0.55								
214	0.58	0.77	0.53	0.62	0.63	0.57	0.52	0.53	0.52	0.51	0.74/	0.52	0.49	0.53	0.61									
215	0.66	E	0.73	L	0.63	0.55	0.56	0.73	E /	L	0.66	0.64	0.86	0.60	L									
216	0.66	0.65	0.63	0.70	0.65	0.66	0.66	0.78	0.67	0.64	0.46	0.62/	0.59	0.65	0.71	0.74	0.78							
217	0.48	0.52	0.45	E	0.49	0.52	0.49	0.44	0.38	0.41/	E	0.41	0.47	0.61	0.51	E								
218	0.52	0.71	0.60	0.48	0.43	0.47	0.53	0.44	0.62/	0.47	0.50	0.53	0.58	0.43	0.59	0.41	E	0.61	L					
219	0.61	0.55	0.63	0.58	0.52/	0.59	0.60	0.60	0.70	0.67	0.67	0.54	0.73	0.51										
220	0.56	0.43	0.58	0.55	0.75	0.55	E	0.58	0.58	0.56/	0.38	0.63	0.48	0.57	0.60	0.56	0.56							
221	0.58	0.61	0.68	0.66	0.62	0.68	0.49	0.51/	0.43	0.61	0.54													
222	0.56	L	E	0.54	E	0.42	0.60	0.56	E	0.48	0.49	0.69/	0.54	0.59	0.73	E	E							
223	0.56	0.56	0.45	L	0.58	0.57	0.57	0.53	0.45	0.57/	0.64	0.54	0.48	0.61	E	0.73	0.54							
224	0.46	0.36	0.51	0.36	0.43	0.45	0.48	0.45	0.37	0.60	0.55/	0.47	0.33	0.64	0.45	0.44								

MEAN	0.56
S.D.	0.056
N	24

E-EARLY RESORPTION L-LATE RESORPTION D-DEAD FETUS /-DENOTES POSITION OF CERVIX

Appendix 7: Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS	OBSERVATION
101	1 M			WITHIN NORMAL LIMITS
	2 F			WITHIN NORMAL LIMITS
	3 M			WITHIN NORMAL LIMITS
	4 M	TORSO	M	UMBILICAL HERNIA; EXTREME ECTOPIC LIVER
			M	OLIGODACTYLIA
	5 M			WITHIN NORMAL LIMITS
	6 M			WITHIN NORMAL LIMITS
	7 F			WITHIN NORMAL LIMITS
	8 F			WITHIN NORMAL LIMITS
	9 F			WITHIN NORMAL LIMITS
	10 F			WITHIN NORMAL LIMITS
	11 F			WITHIN NORMAL LIMITS
	12 M			WITHIN NORMAL LIMITS
	13 M			WITHIN NORMAL LIMITS
	14 M			WITHIN NORMAL LIMITS
	15 M			WITHIN NORMAL LIMITS
	16 F			WITHIN NORMAL LIMITS
	17 F			WITHIN NORMAL LIMITS
103	1 M			WITHIN NORMAL LIMITS
	2 F			WITHIN NORMAL LIMITS
	3 M			WITHIN NORMAL LIMITS
	4 M			WITHIN NORMAL LIMITS
	5 M			WITHIN NORMAL LIMITS
	6 M			WITHIN NORMAL LIMITS
	7 M			WITHIN NORMAL LIMITS
	8 M			WITHIN NORMAL LIMITS
	9 M			WITHIN NORMAL LIMITS
	10 M			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
	12 F			WITHIN NORMAL LIMITS
	13 M			WITHIN NORMAL LIMITS
104	1 L			WITHIN NORMAL LIMITS
	2 M			WITHIN NORMAL LIMITS
	3 M			WITHIN NORMAL LIMITS
	4 F			WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation
FETAL STATUS CODES: L-late resorption

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS	OBSERVATION
104	(CONTINUED)			
	5 M			WITHIN NORMAL LIMITS
	6 D			WITHIN NORMAL LIMITS
	7 M			WITHIN NORMAL LIMITS
	8 M			WITHIN NORMAL LIMITS
	9 F			WITHIN NORMAL LIMITS
	10 M			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
	12 F			WITHIN NORMAL LIMITS
	13 M			WITHIN NORMAL LIMITS
	14 M			WITHIN NORMAL LIMITS
	15 F			WITHIN NORMAL LIMITS
105	1 M			WITHIN NORMAL LIMITS
	3 M			WITHIN NORMAL LIMITS
	4 M			WITHIN NORMAL LIMITS
	5 F			WITHIN NORMAL LIMITS
	6 M			WITHIN NORMAL LIMITS
	7 M			WITHIN NORMAL LIMITS
	8 F			WITHIN NORMAL LIMITS
	9 M			WITHIN NORMAL LIMITS
	10 M			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
	12 L			WITHIN NORMAL LIMITS
	13 F			WITHIN NORMAL LIMITS
	14 M			WITHIN NORMAL LIMITS
	15 F			WITHIN NORMAL LIMITS
	16 M			WITHIN NORMAL LIMITS
	17 F			WITHIN NORMAL LIMITS
106	1 F			WITHIN NORMAL LIMITS
	2 F			WITHIN NORMAL LIMITS
	3 F			WITHIN NORMAL LIMITS
	4 F			WITHIN NORMAL LIMITS
	5 M			WITHIN NORMAL LIMITS
	6 F			WITHIN NORMAL LIMITS
	7 M			WITHIN NORMAL LIMITS
	8 M			WITHIN NORMAL LIMITS
	9 M			WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation
FETAL STATUS CODES: D-dead fetus L-late resorption

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS	OBSERVATION
106	(CONTINUED)			
	10 M			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
107	1 F			WITHIN NORMAL LIMITS
	2 F			WITHIN NORMAL LIMITS
	3 M			WITHIN NORMAL LIMITS
	4 M			WITHIN NORMAL LIMITS
	5 M			WITHIN NORMAL LIMITS
	6 F			WITHIN NORMAL LIMITS
	7 F			WITHIN NORMAL LIMITS
	8 M			WITHIN NORMAL LIMITS
	9 F			WITHIN NORMAL LIMITS
	10 M			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
	12 F			WITHIN NORMAL LIMITS
	13 F			WITHIN NORMAL LIMITS
	14 F			WITHIN NORMAL LIMITS
108	1 F			WITHIN NORMAL LIMITS
	2 F			WITHIN NORMAL LIMITS
	3 F			WITHIN NORMAL LIMITS
	4 M			WITHIN NORMAL LIMITS
	5 F			WITHIN NORMAL LIMITS
	6 M			WITHIN NORMAL LIMITS
	7 M			WITHIN NORMAL LIMITS
	8 F			WITHIN NORMAL LIMITS
	9 F			WITHIN NORMAL LIMITS
	10 M			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
	12 F			WITHIN NORMAL LIMITS
	13 M			WITHIN NORMAL LIMITS
	14 F			WITHIN NORMAL LIMITS
	15 F			WITHIN NORMAL LIMITS
	16 F			WITHIN NORMAL LIMITS
	17 F			WITHIN NORMAL LIMITS
	18 F			WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
109	2 F		WITHIN NORMAL LIMITS
	3 M		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	12 M		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
	14 M		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS
	16 M		WITHIN NORMAL LIMITS
110	1 M		WITHIN NORMAL LIMITS
	2 M		WITHIN NORMAL LIMITS
	3 M		WITHIN NORMAL LIMITS
	4 F	TORSO	SUBCUTANEOUS HAEMORRHAGE
	5 M	TORSO	SUBCUTANEOUS HAEMORRHAGE
	6 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	8 M		WITHIN NORMAL LIMITS
	9 M		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
111	2 F		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	8 M		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
111 (CONTINUED)			
	10 M		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	12 M		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
112	1 M		WITHIN NORMAL LIMITS
	2 F		WITHIN NORMAL LIMITS
	3 M		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	7 M		WITHIN NORMAL LIMITS
	8 M		WITHIN NORMAL LIMITS
	9 M		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
	14 F		WITHIN NORMAL LIMITS
	15 M		WITHIN NORMAL LIMITS
	16 M		WITHIN NORMAL LIMITS
113	1 F		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	12 M		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
	14 M		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS
	16 M		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS	OBSERVATION
114	1 F			WITHIN NORMAL LIMITS
	2 F			WITHIN NORMAL LIMITS
	3 M			WITHIN NORMAL LIMITS
	4 F			WITHIN NORMAL LIMITS
	5 M			WITHIN NORMAL LIMITS
	6 M			WITHIN NORMAL LIMITS
	7 M			WITHIN NORMAL LIMITS
	8 M			WITHIN NORMAL LIMITS
	9 F			WITHIN NORMAL LIMITS
	10 M			WITHIN NORMAL LIMITS
	11 F			WITHIN NORMAL LIMITS
	12 F			WITHIN NORMAL LIMITS
	13 M			WITHIN NORMAL LIMITS
	14 F			WITHIN NORMAL LIMITS
	15 M			WITHIN NORMAL LIMITS
115	1 F			WITHIN NORMAL LIMITS
	2 F			WITHIN NORMAL LIMITS
	3 M			WITHIN NORMAL LIMITS
	4 F			WITHIN NORMAL LIMITS
	5 F			WITHIN NORMAL LIMITS
	6 M			WITHIN NORMAL LIMITS
	7 F			WITHIN NORMAL LIMITS
	8 M			WITHIN NORMAL LIMITS
	9 F			WITHIN NORMAL LIMITS
	10 F			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
	12 M			WITHIN NORMAL LIMITS
	13 F			WITHIN NORMAL LIMITS
	14 F			WITHIN NORMAL LIMITS
	15 M			WITHIN NORMAL LIMITS
116	2 F			WITHIN NORMAL LIMITS
	3 L			WITHIN NORMAL LIMITS
	4 F			WITHIN NORMAL LIMITS
	5 F			WITHIN NORMAL LIMITS
	6 L			WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation
FETAL STATUS CODES: L-late resorption

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
116 (CONTINUED)			
	8 F		WITHIN NORMAL LIMITS
	9 M		WITHIN NORMAL LIMITS
	10 L		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	12 M		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
	14 M		WITHIN NORMAL LIMITS
	15 L		WITHIN NORMAL LIMITS
117	1 F		WITHIN NORMAL LIMITS
	2 F		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	7 F	TORSO	SUBCUTANEOUS HAEMORRHAGE
	8 F		WITHIN NORMAL LIMITS
	9 M		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
	14 M		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS
	16 M		WITHIN NORMAL LIMITS
	17 M		WITHIN NORMAL LIMITS
	18 M		WITHIN NORMAL LIMITS
	19 M		WITHIN NORMAL LIMITS
118	1 F		WITHIN NORMAL LIMITS
	2 M		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	8 F	TORSO	SUBCUTANEOUS HAEMORRHAGE
	9 F	TORSO	SUBCUTANEOUS HAEMORRHAGE
	10 F		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation
FETAL STATUS CODES: L-late resorption

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS	OBSERVATION
118	(CONTINUED)			
	11 M			WITHIN NORMAL LIMITS
	12 M			WITHIN NORMAL LIMITS
	13 M			WITHIN NORMAL LIMITS
	14 M			WITHIN NORMAL LIMITS
119	1 M			WITHIN NORMAL LIMITS
	2 F			WITHIN NORMAL LIMITS
	3 M			WITHIN NORMAL LIMITS
	4 F			WITHIN NORMAL LIMITS
	5 F			WITHIN NORMAL LIMITS
	6 F			WITHIN NORMAL LIMITS
	7 F			WITHIN NORMAL LIMITS
	8 M			WITHIN NORMAL LIMITS
	9 F			WITHIN NORMAL LIMITS
	10 M			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
	12 M			WITHIN NORMAL LIMITS
	13 F			WITHIN NORMAL LIMITS
	14 M			WITHIN NORMAL LIMITS
	15 F			WITHIN NORMAL LIMITS
	16 M			WITHIN NORMAL LIMITS
	17 M			WITHIN NORMAL LIMITS
120	1 F			WITHIN NORMAL LIMITS
	2 F			WITHIN NORMAL LIMITS
	3 F			WITHIN NORMAL LIMITS
	4 F			WITHIN NORMAL LIMITS
	5 M			WITHIN NORMAL LIMITS
	6 M			WITHIN NORMAL LIMITS
	7 M			WITHIN NORMAL LIMITS
	8 M			WITHIN NORMAL LIMITS
	9 M			WITHIN NORMAL LIMITS
	10 F			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
	12 M			WITHIN NORMAL LIMITS
	13 M			WITHIN NORMAL LIMITS
	14 M			WITHIN NORMAL LIMITS
	15 F			WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats

INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS	OBSERVATION
120 (CONTINUED)	16 M			WITHIN NORMAL LIMITS
121	1 M			WITHIN NORMAL LIMITS
	2 M			WITHIN NORMAL LIMITS
	3 M			WITHIN NORMAL LIMITS
	4 M			WITHIN NORMAL LIMITS
	5 F			WITHIN NORMAL LIMITS
	6 F			WITHIN NORMAL LIMITS
	7 M			WITHIN NORMAL LIMITS
	8 F			WITHIN NORMAL LIMITS
	9 F			WITHIN NORMAL LIMITS
	10 M			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
	12 F			WITHIN NORMAL LIMITS
	13 F			WITHIN NORMAL LIMITS
	14 M			WITHIN NORMAL LIMITS
	15 F			WITHIN NORMAL LIMITS
123	1 F			WITHIN NORMAL LIMITS
	2 F			WITHIN NORMAL LIMITS
	3 F			WITHIN NORMAL LIMITS
	4 F			WITHIN NORMAL LIMITS
	5 M			WITHIN NORMAL LIMITS
	6 M			WITHIN NORMAL LIMITS
	7 F			WITHIN NORMAL LIMITS
	8 F			WITHIN NORMAL LIMITS
	9 M			WITHIN NORMAL LIMITS
	10 M			WITHIN NORMAL LIMITS
	11 F			WITHIN NORMAL LIMITS
	12 F			WITHIN NORMAL LIMITS
	13 F			WITHIN NORMAL LIMITS
	14 M			WITHIN NORMAL LIMITS
	15 M			WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS	OBSERVATION
201	1 M			WITHIN NORMAL LIMITS
	2 M			WITHIN NORMAL LIMITS
	3 F			WITHIN NORMAL LIMITS
	4 F			WITHIN NORMAL LIMITS
	5 F			WITHIN NORMAL LIMITS
	6 M			WITHIN NORMAL LIMITS
	7 F			WITHIN NORMAL LIMITS
	8 F			WITHIN NORMAL LIMITS
	9 M			WITHIN NORMAL LIMITS
	10 F			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
	12 M			WITHIN NORMAL LIMITS
	13 M			WITHIN NORMAL LIMITS
	14 F			WITHIN NORMAL LIMITS
	15 M			WITHIN NORMAL LIMITS
	16 M			WITHIN NORMAL LIMITS
	17 M			WITHIN NORMAL LIMITS
	18 M			WITHIN NORMAL LIMITS
202	1 M			WITHIN NORMAL LIMITS
	5 F			WITHIN NORMAL LIMITS
	6 M			WITHIN NORMAL LIMITS
	8 F			WITHIN NORMAL LIMITS
	12 F			WITHIN NORMAL LIMITS
	13 F			WITHIN NORMAL LIMITS
	14 M			WITHIN NORMAL LIMITS
	15 F			WITHIN NORMAL LIMITS
203	1 F			WITHIN NORMAL LIMITS
	2 F			WITHIN NORMAL LIMITS
	4 M			WITHIN NORMAL LIMITS
	5 F			WITHIN NORMAL LIMITS
	6 F			WITHIN NORMAL LIMITS
	7 M			WITHIN NORMAL LIMITS
	8 M			WITHIN NORMAL LIMITS
	9 F			WITHIN NORMAL LIMITS
	10 M			WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS	OBSERVATION
203 (CONTINUED)				
	12 F			WITHIN NORMAL LIMITS
	13 M			WITHIN NORMAL LIMITS
	14 M			WITHIN NORMAL LIMITS
204	1 M			WITHIN NORMAL LIMITS
	2 F			WITHIN NORMAL LIMITS
	3 F			WITHIN NORMAL LIMITS
	4 M			WITHIN NORMAL LIMITS
	5 M			WITHIN NORMAL LIMITS
	6 F			WITHIN NORMAL LIMITS
	7 F			WITHIN NORMAL LIMITS
	8 F			WITHIN NORMAL LIMITS
	10 M			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
	12 F			WITHIN NORMAL LIMITS
	13 F			WITHIN NORMAL LIMITS
	14 F			WITHIN NORMAL LIMITS
205	1 M			WITHIN NORMAL LIMITS
	2 F			WITHIN NORMAL LIMITS
	3 F			WITHIN NORMAL LIMITS
	4 F			WITHIN NORMAL LIMITS
	5 M			WITHIN NORMAL LIMITS
	6 F			WITHIN NORMAL LIMITS
	7 F			WITHIN NORMAL LIMITS
	8 M			WITHIN NORMAL LIMITS
	9 F			WITHIN NORMAL LIMITS
	10 F			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
	12 F			WITHIN NORMAL LIMITS
	13 F			WITHIN NORMAL LIMITS
	14 F			WITHIN NORMAL LIMITS
	15 M			WITHIN NORMAL LIMITS
	16 F			WITHIN NORMAL LIMITS
	17 M			WITHIN NORMAL LIMITS
	18 F			WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#	SEX	ORGAN	CLASS	OBSERVATION
206	1	L			WITHIN NORMAL LIMITS
	2	M			WITHIN NORMAL LIMITS
	3	F			WITHIN NORMAL LIMITS
	4	F			WITHIN NORMAL LIMITS
	5	M			WITHIN NORMAL LIMITS
	6	F			WITHIN NORMAL LIMITS
	7	M	TORSO		SUBCUTANEOUS HAEMORRHAGE
	8	F			WITHIN NORMAL LIMITS
	9	M			WITHIN NORMAL LIMITS
	10	M			WITHIN NORMAL LIMITS
	11	M			WITHIN NORMAL LIMITS
	12	F			WITHIN NORMAL LIMITS
	13	M			WITHIN NORMAL LIMITS
	14	M			WITHIN NORMAL LIMITS
	15	F			WITHIN NORMAL LIMITS
	17	F			WITHIN NORMAL LIMITS
	18	F			WITHIN NORMAL LIMITS
	19	M			WITHIN NORMAL LIMITS
207	1	F			WITHIN NORMAL LIMITS
	2	M			WITHIN NORMAL LIMITS
	3	M			WITHIN NORMAL LIMITS
	4	F			WITHIN NORMAL LIMITS
	5	F			WITHIN NORMAL LIMITS
	6	F			WITHIN NORMAL LIMITS
	7	M			WITHIN NORMAL LIMITS
	8	F			WITHIN NORMAL LIMITS
	9	M			WITHIN NORMAL LIMITS
	10	M			WITHIN NORMAL LIMITS
	11	M			WITHIN NORMAL LIMITS
	12	F			WITHIN NORMAL LIMITS
	14	M			WITHIN NORMAL LIMITS
	15	M			WITHIN NORMAL LIMITS
	16	F			WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation
FETAL STATUS CODES: L-late resorption

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS	OBSERVATION
208	1 F			WITHIN NORMAL LIMITS
	3 F			WITHIN NORMAL LIMITS
	4 F			WITHIN NORMAL LIMITS
	5 F			WITHIN NORMAL LIMITS
	6 F			WITHIN NORMAL LIMITS
	7 F			WITHIN NORMAL LIMITS
	8 F			WITHIN NORMAL LIMITS
	10 M			WITHIN NORMAL LIMITS
	11 F			WITHIN NORMAL LIMITS
	12 M			WITHIN NORMAL LIMITS
	13 F			WITHIN NORMAL LIMITS
	14 F			WITHIN NORMAL LIMITS
	15 F			WITHIN NORMAL LIMITS
	16 F			WITHIN NORMAL LIMITS
	17 F			WITHIN NORMAL LIMITS
	18 M			WITHIN NORMAL LIMITS
	19 M			WITHIN NORMAL LIMITS
209	1 F			WITHIN NORMAL LIMITS
	2 F			WITHIN NORMAL LIMITS
	3 M			WITHIN NORMAL LIMITS
	4 M			WITHIN NORMAL LIMITS
	5 F			WITHIN NORMAL LIMITS
	6 F			WITHIN NORMAL LIMITS
	7 F			WITHIN NORMAL LIMITS
	8 F			WITHIN NORMAL LIMITS
	9 F			WITHIN NORMAL LIMITS
	10 F			WITHIN NORMAL LIMITS
	11 F			WITHIN NORMAL LIMITS
	12 F			WITHIN NORMAL LIMITS
	13 F			WITHIN NORMAL LIMITS
	14 M			WITHIN NORMAL LIMITS
210	1 M			WITHIN NORMAL LIMITS
	2 M			WITHIN NORMAL LIMITS
	3 F			WITHIN NORMAL LIMITS
	4 M			WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
210 (CONTINUED)			
	5 F		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	8 M		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
211	1 F		WITHIN NORMAL LIMITS
	2 M		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	12 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	14 M		WITHIN NORMAL LIMITS
212	1 M	TORSO	SUBCUTANEOUS HAEMORRHAGE
	2 F		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	7 M		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	9 M		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	14 F		WITHIN NORMAL LIMITS
	15 M		WITHIN NORMAL LIMITS
	16 F		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
212	(CONTINUED)		
	17 F		WITHIN NORMAL LIMITS
213	1 F		WITHIN NORMAL LIMITS
	2 M		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	7 M		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
	14 M		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS
214	1 F		WITHIN NORMAL LIMITS
	2 F		WITHIN NORMAL LIMITS
	3 M		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	8 M		WITHIN NORMAL LIMITS
	9 M		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
	14 F		WITHIN NORMAL LIMITS
215	2 F		WITHIN NORMAL LIMITS
	3 L		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	9 L		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation
FETAL STATUS CODES: L-late resorption

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS	OBSERVATION
215	(CONTINUED)			
	10 F			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
	12 F			WITHIN NORMAL LIMITS
	13 F			WITHIN NORMAL LIMITS
	14 L			WITHIN NORMAL LIMITS
216	1 M			WITHIN NORMAL LIMITS
	2 M			WITHIN NORMAL LIMITS
	3 M			WITHIN NORMAL LIMITS
	4 M			WITHIN NORMAL LIMITS
	5 F			WITHIN NORMAL LIMITS
	6 F			WITHIN NORMAL LIMITS
	7 M			WITHIN NORMAL LIMITS
	8 M			WITHIN NORMAL LIMITS
	9 F			WITHIN NORMAL LIMITS
	10 F			WITHIN NORMAL LIMITS
	11 M			WITHIN NORMAL LIMITS
	12 F			WITHIN NORMAL LIMITS
	13 M			WITHIN NORMAL LIMITS
	14 M			WITHIN NORMAL LIMITS
	15 M			WITHIN NORMAL LIMITS
	16 F			WITHIN NORMAL LIMITS
217	1 F			WITHIN NORMAL LIMITS
	2 M			WITHIN NORMAL LIMITS
	4 M			WITHIN NORMAL LIMITS
	5 M			WITHIN NORMAL LIMITS
	6 F			WITHIN NORMAL LIMITS
	7 M			WITHIN NORMAL LIMITS
	8 M			WITHIN NORMAL LIMITS
	9 F			WITHIN NORMAL LIMITS
	11 F			WITHIN NORMAL LIMITS
	12 M			WITHIN NORMAL LIMITS
	13 F			WITHIN NORMAL LIMITS
	14 F			WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation
FETAL STATUS CODES: L-late resorption

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
218	1 M		WITHIN NORMAL LIMITS
	2 M		WITHIN NORMAL LIMITS
	3 M	TORSO	SUBCUTANEOUS HAEMORRHAGE
	4 M		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	7 M		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	12 M		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
	14 F		WITHIN NORMAL LIMITS
	15 M		WITHIN NORMAL LIMITS
	17 F		WITHIN NORMAL LIMITS
	18 L		WITHIN NORMAL LIMITS
219	1 F		WITHIN NORMAL LIMITS
	2 M		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	7 M		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	12 F	TORSO	SUBCUTANEOUS HAEMORRHAGE
	13 M		WITHIN NORMAL LIMITS
220	1 F		WITHIN NORMAL LIMITS
	2 M		WITHIN NORMAL LIMITS
	3 M		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation
FETAL STATUS CODES: L-late resorption

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
220 (CONTINUED)			
	7 M	TORSO	SUBCUTANEOUS HAEMORRHAGE
	8 F	TORSO	SUBCUTANEOUS HAEMORRHAGE
	9 F		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	12 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	14 F		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS
	16 F		WITHIN NORMAL LIMITS
221	1 M		WITHIN NORMAL LIMITS
	2 M		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	9 M		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
222	1 L		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	12 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	14 M		WITHIN NORMAL LIMITS
223	1 F		WITHIN NORMAL LIMITS
	2 M		WITHIN NORMAL LIMITS
	3 L		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation
FETAL STATUS CODES: L-late resorption

Appendix 7 (continued): Individual Fetal External Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL EXTERNAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
223	(CONTINUED)		
	5 F		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS
	16 F		WITHIN NORMAL LIMITS
224	1 M		WITHIN NORMAL LIMITS
	2 M		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	7 M		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	9 M		WITHIN NORMAL LIMITS
	10 F	TORSO	SUBCUTANEOUS HAEMORRHAGE
	11 M		WITHIN NORMAL LIMITS
	12 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	14 F		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 8: Individual Fetal Visceral Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL VISCERAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#	SEX	ORGAN	CLASS	OBSERVATION
101	2	F	URETER		DILATED; MEDIUM
	4	M	TORSO	M	UMBILICAL HERNIA; EXTREME
			LIVER		ECTOPIC
			FORELIMB LEFT		OLIGODACTYLIA
			SPLEEN		SMALL
			DIAPHRAGMA		MISSING
	6	M			WITHIN NORMAL LIMITS
	8	F	TORSO		SUBCUTANEOUS HEMATOMA
	10	F			WITHIN NORMAL LIMITS
	12	M			WITHIN NORMAL LIMITS
	14	M			WITHIN NORMAL LIMITS
	16	F			WITHIN NORMAL LIMITS
103	2	F			WITHIN NORMAL LIMITS
	4	M			WITHIN NORMAL LIMITS
	6	M			WITHIN NORMAL LIMITS
	8	M			WITHIN NORMAL LIMITS
	10	M			WITHIN NORMAL LIMITS
	12	F			WITHIN NORMAL LIMITS
104	3	M			BLOOD IN PERITONEUM
	5	M			WITHIN NORMAL LIMITS
	6	D			
	8	M	TORSO		SUBCUTANEOUS OEDEMA
					BLOOD IN THORACIC CAVITY
					BLOOD IN PERICARDIUM
					BLOOD IN PERITONEUM
	10	M			SUBCUTANEOUS OEDEMA
	12	F			WITHIN NORMAL LIMITS
	14	M			SUBCUTANEOUS OEDEMA
105	3	M			WITHIN NORMAL LIMITS
	5	F			WITHIN NORMAL LIMITS
	7	M			WITHIN NORMAL LIMITS
	9	M			WITHIN NORMAL LIMITS
	11	M			WITHIN NORMAL LIMITS
	14	M			WITHIN NORMAL LIMITS
	16	M			WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation
FETAL STATUS CODES: D-dead fetus L-late resorption

Appendix 8 (continued): Individual Fetal Visceral Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL VISCERAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
106	2 F		WITHIN NORMAL LIMITS
	4 F	KIDNEY	DILATED PELVIS; HIGH
		URETER	DILATED; MEDIUM
	6 F		WITHIN NORMAL LIMITS
	8 M	URETER	DILATED; SLIGHT
	10 M		WITHIN NORMAL LIMITS
107	2 F		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 M		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	12 F		BLOOD IN THORACIC CAVITY
	14 F		WITHIN NORMAL LIMITS
108	2 F		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	8 F		BLOOD IN PERITONEUM
	10 M		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
	14 F		WITHIN NORMAL LIMITS
	16 F		WITHIN NORMAL LIMITS
	18 F		WITHIN NORMAL LIMITS
109	3 M		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	11 M		BLOOD IN PERITONEUM
	13 F		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS
110	2 M		WITHIN NORMAL LIMITS
	4 F	TORSO	SUBCUTANEOUS HAEMORRHAGE
	6 M		WITHIN NORMAL LIMITS
	8 M		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 8 (continued): Individual Fetal Visceral Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL VISCERAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#	SEX	ORGAN	CLASS OBSERVATION
111	3	F		WITHIN NORMAL LIMITS
	5	F		WITHIN NORMAL LIMITS
	7	F		WITHIN NORMAL LIMITS
	9	F		WITHIN NORMAL LIMITS
	11	F		WITHIN NORMAL LIMITS
	13	F		WITHIN NORMAL LIMITS
112	2	F		WITHIN NORMAL LIMITS
	4	F		WITHIN NORMAL LIMITS
	6	F		BLOOD IN THORACIC CAVITY
	8	M	URETER	DILATED; SLIGHT
	10	M		WITHIN NORMAL LIMITS
	12	F		WITHIN NORMAL LIMITS
	15	M		WITHIN NORMAL LIMITS
113	3	F		WITHIN NORMAL LIMITS
	5	F		WITHIN NORMAL LIMITS
	7	F		WITHIN NORMAL LIMITS
	9	F		WITHIN NORMAL LIMITS
	12	M		WITHIN NORMAL LIMITS
	14	M		WITHIN NORMAL LIMITS
	16	M		WITHIN NORMAL LIMITS
114	2	F		WITHIN NORMAL LIMITS
	4	F	URETER	DILATED; SLIGHT
	6	M		WITHIN NORMAL LIMITS
	8	M		WITHIN NORMAL LIMITS
	10	M	TORSO	SUBCUTANEOUS HAEMATOMA
	12	F		SUBCUTANEOUS HAEMATOMA
	14	F		WITHIN NORMAL LIMITS
115	2	F		WITHIN NORMAL LIMITS
	4	F		WITHIN NORMAL LIMITS
	6	M		WITHIN NORMAL LIMITS
	8	M		WITHIN NORMAL LIMITS
	10	F		WITHIN NORMAL LIMITS
	12	M		WITHIN NORMAL LIMITS
	14	F		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 8 (continued): Individual Fetal Visceral Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL VISCERAL OBSERVATIONS Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
116	4 F		BLOOD IN THORACIC CAVITY
	8 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
	14 M		WITHIN NORMAL LIMITS
117	2 F		WITHIN NORMAL LIMITS
	4 F	URETER	DILATED; SLIGHT
	6 M		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
	14 M		WITHIN NORMAL LIMITS
	16 M		WITHIN NORMAL LIMITS
	18 M		WITHIN NORMAL LIMITS
118	2 M		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	9 F	TORSO	SUBCUTANEOUS HAEMORRHAGE
	11 M		WITHIN NORMAL LIMITS
	13 M	URETER	DILATED; SLIGHT
119	2 F		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 M		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	12 M	URETER	DILATED; SLIGHT
	14 M		WITHIN NORMAL LIMITS
	16 M		WITHIN NORMAL LIMITS
120	2 F		BLOOD IN OCULAR REGION
	4 F		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	8 M		WITHIN NORMAL LIMITS
	10 F		BLOOD IN NASAL CAVITY
			BLODD IN TRACHEA
			BLOOD IN THORACIC CAVITY
		KIDNEY	DILATED PELVIS; MEDIUM
		URETER	DILATED; MEDIUM
	12 M		WITHIN NORMAL LIMITS
	14 M		WITHIN NORMAL LIMITS
	16 M		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 8 (continued): Individual Fetal Visceral Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL VISCERAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
121	2 M	URETER	DILATED; SLIGHT
	4 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 F	KIDNEY	ENLARGED
			DILATED RENAL PELVIS; HIGH
		URETER	DILATED; HIGH
	10 M		WITHIN NORMAL LIMITS
	12 F	URETER	DILATED; SLIGHT
	14 M	URETER	DILATED; SLIGHT
		KIDNEY	DILATED RENAL PELVIS; SLIGHT
123	2 F		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
	14 M		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 8 (continued): Individual Fetal Visceral Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL VISCERAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
201	2 M		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	12 M		WITHIN NORMAL LIMITS
	14 F		WITHIN NORMAL LIMITS
	16 M		WITHIN NORMAL LIMITS
	18 M		WITHIN NORMAL LIMITS
202	5 F		WITHIN NORMAL LIMITS
	8 F	URETER	DILATED; SLIGHT
	13 F		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS
203	2 F		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	7 M	URETER	DILATED; SLIGHT
	9 F		WITHIN NORMAL LIMITS
	12 F		BLOOD IN STOMACH
	14 M	URETER	DILATED; SLIGHT
204	2 F		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
205	2 F		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	6 F	KIDNEY	DILATED RENAL PELVIS; SLIGHT
		URETER	DILATED; MEDIUM
	8 M		WITHIN NORMAL LIMITS
	10 F	URETER	DILATED; SLIGHT
	12 F		WITHIN NORMAL LIMITS
	14 F		WITHIN NORMAL LIMITS
	16 F		WITHIN NORMAL LIMITS
	18 F		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 8 (continued): Individual Fetal Visceral Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL VISCERAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
206	3 F		BLOOD IN PERITONEUM
	5 M		WITHIN NORMAL LIMITS
	7 M	TORSO	SUBCUTANEOUS HAEMORRHAGE
		BRAIN	DILATED VENTRICLES
			BLOOD IN STOMACH
	9 M	URETER	DILATED; SLIGHT
	11 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	15 F	URETER	DILATED; SLIGHT
			BLOOD IN STOMACH
	18 F		WITHIN NORMAL LIMITS
207	2 M	URETER	DILATED; SLIGHT
	4 F		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	12 F	TORSO	SUBCUTANEOUS HAEMORRHAGE
	15 M		BLOOD IN PERICARDIUM
208	3 F		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	12 M		WITHIN NORMAL LIMITS
	14 F	KIDNEY	DILATED RENAL PELVIS; SLIGHT
		URETER	DILATED; SLIGHT
	16 F		WITHIN NORMAL LIMITS
	18 M		WITHIN NORMAL LIMITS
209	2 F	URETER	DILATED; SLIGHT
	4 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
	14 M		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 8 (continued): Individual Fetal Visceral Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL VISCERAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
210	2 M		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 M		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
211	2 M	URETER	DILATED; SLIGHT
	4 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 F		SMALL FETUS
	10 F		WITHIN NORMAL LIMITS
	12 M	URETER	DILATED; SLIGHT
	14 M		WITHIN NORMAL LIMITS
212	2 F		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	7 M		WITHIN NORMAL LIMITS
	9 M		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	15 M		WITHIN NORMAL LIMITS
	17 F		WITHIN NORMAL LIMITS
213	2 M		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	12 F	URETER	DILATED; MEDIUM
	14 M	URETER	DILATED; SLIGHT
214	2 F		WITHIN NORMAL LIMITS
	4 M		BLOOD IN THORACIC CAVITY
	6 M	URETER	DILATED; SLIGHT
	8 M		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
	14 F	URETER	DILATED; SLIGHT

CLASS CODES: M=Malformation V=Variation

Appendix 8 (continued): Individual Fetal Visceral Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL VISCERAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
215	4 F		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	12 F	URETER	DILATED; SLIGHT
216	2 M		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 M	URETER	DILATED; SLIGHT
	10 F		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
	14 M		WITHIN NORMAL LIMITS
	16 F		WITHIN NORMAL LIMITS
217	2 M		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	7 M	URETER	DILATED; SLIGHT
	9 F	URETER	DILATED; SLIGHT
	12 M		WITHIN NORMAL LIMITS
	14 F		WITHIN NORMAL LIMITS
218	2 M		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	10 M	URETER	DILATED; SLIGHT
	12 M		BLOOD IN PERICARDIUM
	14 F		WITHIN NORMAL LIMITS
	17 F		BLOOD IN CEREBELLUM
219	2 M		WITHIN NORMAL LIMITS
	4 F	URETER	DILATED; SLIGHT
	6 M		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	12 F	TORSO	SUBCUTANEOUS HAEMORRHAGE
			BLOOD IN THORACIC CAVITY

CLASS CODES: M=Malformation V=Variation

Appendix 8 (continued): Individual Fetal Visceral Observations

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL VISCERAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
220	2 M		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	7 M	TORSO	SUBCUTANEOUS HAEMORRHAGE
			BLOOD IN PERITONEUM
	9 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS
221	2 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	10 F	BRAIN	ENLARGED VENTRICLES
222	5 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	12 M		WITHIN NORMAL LIMITS
	14 M	URETER	DILATED; SLIGHT
223	2 M		WITHIN NORMAL LIMITS
	5 F	TORSO	SUBCUTANEOUS HAEMORRHAGE
	7 F		WITHIN NORMAL LIMITS
	9 F	URETER	DILATED; MEDIUM
	11 F		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	16 F	URETER	DILATED; SLIGHT
224	2 M		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	6 F	TORSO	SUBCUTANEOUS HAEMORRHAGE
		KIDNEY	DILATED RENAL PELVIS; MEDIUM
		URETER	DILATED; MEDIUM
	8 F		WITHIN NORMAL LIMITS
	10 F	TORSO	SUBCUTANEOUS HAEMORRHAGE
	12 M		WITHIN NORMAL LIMITS
	14 F	URETER	DILATED; SLIGHT
	15 F		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 9: Individual Fetal Skeletal Observations (Anomalies)

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL SKELETAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
101	1 M		WITHIN NORMAL LIMITS
	3 M	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	5 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	9 F	STERNUM	ASSYMMETRIC STERNEBRA
	11 F		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	15 M	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	17 F		WITHIN NORMAL LIMITS
103	1 M		WITHIN NORMAL LIMITS
	3 M		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	7 M		WITHIN NORMAL LIMITS
	9 M		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
104	2 M		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	7 M		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS
105	1 M		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	13 F	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
		STERNUM	ASYMMETRIC STRENEBRA
		VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	15 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	17 F		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 9 (continued): Individual Fetal Skeletal Observations (Anomalies)

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL SKELETAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
106	1 F		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	5 M	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	7 M	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
		VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	9 M	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	11 M		WITHIN NORMAL LIMITS
107	1 F		WITHIN NORMAL LIMITS
	3 M		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
108	1 F		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	7 M		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS
	17 F		WITHIN NORMAL LIMITS
109	2 F		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	12 M	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	14 M		WITHIN NORMAL LIMITS
	16 M		WITHIN NORMAL LIMITS
110	1 M		WITHIN NORMAL LIMITS
	3 M	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	5 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	9 M		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 9 (continued): Individual Fetal Skeletal Observations (Anomalies)

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL SKELETAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#	SEX	ORGAN	CLASS OBSERVATION
111	2	F		WITHIN NORMAL LIMITS
	4	F		WITHIN NORMAL LIMITS
	6	F		WITHIN NORMAL LIMITS
	8	M	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	10	M	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	12	M		WITHIN NORMAL LIMITS
112	1	M		WITHIN NORMAL LIMITS
	3	M		WITHIN NORMAL LIMITS
	5	F		WITHIN NORMAL LIMITS
	6	F		WITHIN NORMAL LIMITS
	7	M	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	9	M	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
			VERTEBRA	BIPARTITE THORACIC CENTRE
	11	F		WITHIN NORMAL LIMITS
	14	F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	16	M	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
113	1	F		WITHIN NORMAL LIMITS
	4	F	RIBS	WAVY RIBS
	6	M		WITHIN NORMAL LIMITS
	8	F		WITHIN NORMAL LIMITS
	11	M		WITHIN NORMAL LIMITS
	13	F		WITHIN NORMAL LIMITS
	15	F		WITHIN NORMAL LIMITS
114	1	F		WITHIN NORMAL LIMITS
	3	M		WITHIN NORMAL LIMITS
	5	M		WITHIN NORMAL LIMITS
	7	M		WITHIN NORMAL LIMITS
	9	F		WITHIN NORMAL LIMITS
	11	F		WITHIN NORMAL LIMITS
	13	M		WITHIN NORMAL LIMITS
	15	M		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 9 (continued): Individual Fetal Skeletal Observations (Anomalies)

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL SKELETAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
115	1 F		WITHIN NORMAL LIMITS
	3 M	VERTEBRA	BIPARTITE THORACIC CENTRE
		VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	5 F		WITHIN NORMAL LIMITS
	7 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	9 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 F	VERTEBRA	BIPARTITE THORACIC CENTRE
	15 M	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
116	2 F		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	9 M	RIBS	WAVY RIBS
	12 M		WITHIN NORMAL LIMITS
	14 M		WITHIN NORMAL LIMITS
117	1 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
		STERNUM	ASYMMETRIC STERNEBRA
	3 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	5 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	7 F		WITHIN NORMAL LIMITS
	9 M	STERNUM	ASYMMETRIC STERNEBRA
	11 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	13 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	15 F		WITHIN NORMAL LIMITS
	17 M	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	19 M		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 9 (continued): Individual Fetal Skeletal Observations (Anomalies)

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL SKELETAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
118	1 F		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	10 F		WITHIN NORMAL LIMITS
	12 M		WITHIN NORMAL LIMITS
	14 M	STERNUM	ASYMMETRIC STERNEBRA
119	1 M		WITHIN NORMAL LIMITS
	3 M		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	7 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	9 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	11 M		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS
	17 M		WITHIN NORMAL LIMITS
120	1 F		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	7 M	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	9 M	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	11 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS
121	1 M	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	3 M		WITHIN NORMAL LIMITS
	5 F	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	7 M	STERNUM	ASYMMETRIC STERNEBRA
	9 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	11 M		WITHIN NORMAL LIMITS
	13 F	STERNUM	ASYMMETRIC STERNEBRA
	15 F		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 9 (continued): Individual Fetal Skeletal Observations (Anomalies)

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL SKELETAL OBSERVATIONS

Group 1 (Control)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
123	1 F		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	7 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	9 M		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
	15 M	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE

CLASS CODES: M=Malformation V=Variation

Appendix 9 (continued): Individual Fetal Skeletal Observations (Anomalies)

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL SKELETAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
201	1 M	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	3 F		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	9 M		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 M	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	15 M		WITHIN NORMAL LIMITS
	17 M		WITHIN NORMAL LIMITS
202	1 M		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	12 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	14 M		WITHIN NORMAL LIMITS
203	1 F		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 M		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
204	1 M		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
	14 F		WITHIN NORMAL LIMITS
205	1 M		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
	15 M		WITHIN NORMAL LIMITS
	17 M		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 9 (continued): Individual Fetal Skeletal Observations (Anomalies)

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL SKELETAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
206	2 M		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	6 F	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	8 F	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	10 M	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	12 F		WITHIN NORMAL LIMITS
	14 M	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	17 F	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	19 M		WITHIN NORMAL LIMITS
207	1 F		WITHIN NORMAL LIMITS
	3 M		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	7 M		WITHIN NORMAL LIMITS
	9 M		WITHIN NORMAL LIMITS
	11 M	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	14 M		WITHIN NORMAL LIMITS
	16 F		WITHIN NORMAL LIMITS
208	1 F		WITHIN NORMAL LIMITS
	4 F		WITHIN NORMAL LIMITS
	6 F		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
	14 F		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS
	17 F		WITHIN NORMAL LIMITS
	19 M		WITHIN NORMAL LIMITS
209	1 F		WITHIN NORMAL LIMITS
	3 M		WITHIN NORMAL LIMITS
	5 F	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	7 F		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 9 (continued): Individual Fetal Skeletal Observations (Anomalies)

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL SKELETAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
210	1 M		WITHIN NORMAL LIMITS
	3 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	5 F		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	11 F	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
211	1 F		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
212	1 M		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	8 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	10 F		WITHIN NORMAL LIMITS
	12 F		WITHIN NORMAL LIMITS
	14 F		WITHIN NORMAL LIMITS
	16 F		WITHIN NORMAL LIMITS
213	1 F		WITHIN NORMAL LIMITS
	3 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	5 M		WITHIN NORMAL LIMITS
	7 M		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	13 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	15 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
214	1 F		WITHIN NORMAL LIMITS
	3 M		WITHIN NORMAL LIMITS
	5 M		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	9 M		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE

CLASS CODES: M=Malformation V=Variation

Appendix 9 (continued): Individual Fetal Skeletal Observations (Anomalies)

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL SKELETAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
215	2 F	RIBS	CERVICAL RIB
		RIBS	WAVY RIBS
	5 M	RIBS	WAVY RIBS
	7 F		WITHIN NORMAL LIMITS
	11 M	RIBS	WAVY RIBS
	13 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
		RIBS	WAVY RIBS
216	1 M		WITHIN NORMAL LIMITS
	3 M		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	7 M	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	9 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	15 M		WITHIN NORMAL LIMITS
217	1 F		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	6 F	STERNUM	ASYMMETRIC STERNEBRA
	8 M	STERNUM	ASYMMETRIC STERNEBRA
	11 F		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
218	1 M		WITHIN NORMAL LIMITS
	3 M		WITHIN NORMAL LIMITS
	5 M	STERNUM	ASYMMETRIC STERNEBRA
	7 M		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	11 F		WITHIN NORMAL LIMITS
	13 F		WITHIN NORMAL LIMITS
	15 M		WITHIN NORMAL LIMITS
219	1 F	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	3 F		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	7 M		WITHIN NORMAL LIMITS
	9 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	11 F		WITHIN NORMAL LIMITS
	13 M	STERNUM	ASYMMETRIC STERNEBRA
		RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB

CLASS CODES: M=Malformation V=Variation

Appendix 9 (continued): Individual Fetal Skeletal Observations (Anomalies)

Effects of pulsed high frequency EMF exposure
during pregnancy on offspring of Wistar rats
INDIVIDUAL FETAL SKELETAL OBSERVATIONS

Group 2 (Exposure)

FEMALE#	FETUS#/SEX	ORGAN	CLASS OBSERVATION
220	1 F		WITHIN NORMAL LIMITS
	3 M		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	8 F	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	10 M		WITHIN NORMAL LIMITS
	12 M		WITHIN NORMAL LIMITS
	14 F		WITHIN NORMAL LIMITS
	16 F		WITHIN NORMAL LIMITS
221	1 M	RIBS	WAVY RIBS
	3 F		WITHIN NORMAL LIMITS
	4 M		WITHIN NORMAL LIMITS
	5 F		WITHIN NORMAL LIMITS
	7 F		WITHIN NORMAL LIMITS
	9 M	STERNUM	ASYMMETRIC STERNEBRA
222	3 F	RIBS	RUDIMENTARY ACCESSORY LUMBAR RIB
	6 F		WITHIN NORMAL LIMITS
	9 F		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
223	1 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	4 M		WITHIN NORMAL LIMITS
	6 M		WITHIN NORMAL LIMITS
	8 F		WITHIN NORMAL LIMITS
	10 M		WITHIN NORMAL LIMITS
	12 F	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	15 F		WITHIN NORMAL LIMITS
224	1 M		WITHIN NORMAL LIMITS
	3 F		WITHIN NORMAL LIMITS
	5 F	STERNUM	ASYMMETRIC STERNEBRA
	7 M	VERTEBRA	DUMBBELL SHAPED THORACIC CENTRE
	9 M		WITHIN NORMAL LIMITS
	11 M		WITHIN NORMAL LIMITS
	13 M		WITHIN NORMAL LIMITS
	15 F		WITHIN NORMAL LIMITS

CLASS CODES: M=Malformation V=Variation

Appendix 10: Individual Ossification Data (Number of ossified centres)

Group 1: Control

Dam	Number of ossified centres ...									
No.	Cerv. verteb. centres	Caudal vertebral arches	Caudal vertebral centres	Sterne-brae	Meta-carpals	Meta-tarsals	Phalangae Forelimb proxi.	Phalangae Forelimb distal	Phalangae Hindl. distal	Total
101	0.0	2.1	4.2	5.7	3.9	3.9	0.4	5.0	4.4	29.6
103	0.1	2.0	4.1	5.9	3.3	4.0	0.0	5.0	5.0	29.4
104	1.0	2.9	6.6	5.7	4.0	4.3	2.6	5.0	5.0	37.1
105	0.0	1.6	4.6	5.6	3.8	4.0	0.6	5.0	5.0	30.2
106	0.7	2.8	5.0	6.0	3.8	4.0	0.7	5.0	5.0	33.0
107	1.7	2.3	5.1	5.4	3.9	4.0	0.0	5.0	5.0	32.4
108	0.7	2.0	4.3	5.3	3.6	4.0	0.0	5.0	5.0	29.9
109	0.0	1.0	3.6	3.9	3.0	4.0	0.0	1.9	0.0	17.4
110	0.8	2.3	4.8	5.5	4.0	4.0	0.0	5.0	5.0	31.4
111	0.0	2.0	4.3	5.8	4.0	4.0	0.0	5.0	5.0	30.1
112	0.1	2.3	4.5	5.3	3.4	4.0	0.0	5.0	5.0	29.6
113	0.1	1.3	4.9	5.7	3.4	4.0	0.0	5.0	4.3	28.7
114	0.1	2.2	4.8	5.6	3.9	4.0	0.0	5.0	4.4	30.0
115	0.1	2.8	5.3	5.8	4.0	4.0	0.0	5.0	5.0	32.0
116	0.8	1.6	5.0	5.8	3.6	4.0	0.0	5.0	5.0	30.8
117	0.2	2.2	4.2	5.2	3.8	4.0	0.0	5.0	5.0	29.6
118	1.0	2.9	5.6	5.7	3.9	4.0	0.1	5.0	5.0	33.2
119	0.8	3.7	5.7	6.0	4.0	4.0	1.7	5.0	5.0	35.9
120	0.3	1.7	4.9	5.6	3.4	4.0	0.0	5.0	5.0	29.9
121	0.0	2.5	5.0	5.6	3.6	4.0	0.0	5.0	5.0	30.7
123	0.1	2.1	5.0	5.1	3.6	4.0	0.4	5.0	5.0	30.3
Mean	0.41	2.20	4.83	5.53	3.71	4.01	0.31	4.85	4.67	30.53
SD	0.47	0.61	0.65	0.45	0.28	0.07	0.66	0.68	1.09	3.69
N	21	21	21	21	21	21	21	21	21	21
Min	0.00	1.00	3.60	3.90	3.00	3.90	0.00	1.90	0.00	17.40
Max	1.70	3.70	6.60	6.00	4.00	4.30	2.60	5.00	5.00	37.10

Appendix 10 (continued): Individual Ossification Data (Number of ossified centres)

Group 2: Exposure

Dam	Number of ossified centres ...									
No.	Cerv. verteb. centres	Caudal vertebral arches	Caudal vertebral centres	Sterne-brae	Meta-carpals	Meta-tarsals	Phalangae Forelimb proxi.	Phalangae Forelimb distal	Hindl. distal	Total
201	0.0	1.8	4.6	4.9	3.2	4.0	0.0	5.0	5.0	28.5
202	0.0	1.3	4.5	6.0	3.8	4.0	0.0	5.0	5.0	29.6
203	0.2	2.0	4.5	5.3	3.7	4.0	0.0	5.0	5.0	29.7
204	0.1	1.8	5.3	6.0	4.0	4.0	0.3	5.0	5.0	31.5
205	0.0	2.4	5.2	5.7	4.0	4.0	1.4	5.0	5.0	32.7
206	1.0	2.3	5.4	5.9	4.0	4.0	0.0	5.0	5.0	32.6
207	0.6	2.5	5.6	5.8	3.9	4.0	0.3	5.0	5.0	32.7
208	1.0	2.5	5.3	5.4	3.8	4.0	0.0	5.0	5.0	32.0
209	0.1	2.1	5.1	5.9	3.5	4.0	0.0	5.0	5.0	30.7
210	1.0	1.9	5.0	5.2	3.2	4.0	0.0	5.0	5.0	30.3
211	0.0	2.0	4.3	4.4	3.0	4.0	0.0	5.0	5.0	27.7
212	0.3	2.0	4.4	4.6	3.5	3.9	0.0	4.4	4.4	27.5
213	0.0	2.3	5.0	5.6	3.4	4.0	0.0	5.0	5.0	30.3
214	0.0	1.8	4.6	5.1	3.3	4.0	0.0	5.0	5.0	28.8
215	0.0	2.0	5.4	5.4	3.8	4.0	0.0	4.9	3.2	28.7
216	0.1	2.5	4.9	5.5	4.0	4.0	0.0	5.0	5.0	31.0
217	0.3	2.5	5.0	6.0	3.1	4.0	0.0	5.0	5.0	30.9
218	1.5	3.0	5.3	5.8	3.9	4.0	0.1	5.0	5.0	33.6
219	0.6	3.0	5.1	5.7	3.1	4.0	0.0	5.0	5.0	31.5
220	0.3	2.4	3.9	5.3	3.1	4.0	0.0	5.0	2.5	26.5
221	0.3	1.8	5.0	5.5	3.1	4.0	0.5	5.0	5.0	30.2
222	0.4	2.6	5.2	5.8	3.7	4.0	0.3	5.0	5.0	32.0
223	0.0	2.0	4.0	5.1	3.2	4.0	0.0	5.0	5.0	28.3
224	0.0	1.4	3.9	4.8	3.0	3.9	0.0	5.0	3.1	25.1
Mean	0.33	2.16	4.85	5.45	3.51	3.99	0.12	4.97	4.72	30.10
SD	0.42	0.43	0.50	0.45	0.37	0.03	0.31	0.12	0.71	2.14
N	24	24	24	24	24	24	24	24	24	24
Min	0.00	1.30	3.90	4.40	3.00	3.90	0.00	4.40	2.50	25.10
Max	1.50	3.00	5.60	6.00	4.00	4.00	1.40	5.00	5.00	33.60

Appendix 11: Summary Table

Parameter	Exposure 60 W/m^2
Maternal weight gain	**{<}**
Clinical symptoms	**-**
Macroscopic pathology	**-**
Number of live fetuses	**{<}**
Pre-/postimplantation loss	**{>}**
Fetal/placental weight	**{<}**
External anomalies	**-**
Visceral anomalies	**-**
Dilated ureter	**[>]**
Skeletal anomalies	**-**
State of ossification	**-**

Abbreviations:
- no effect on the given parameter compared to control group
< decrease compared to control group
> increase compared to control group
{ } not statistically significant
[ ] of limited biological relevance

An exposure of gravid Wistar rats [Crl:(WI)BR] from day 0 - 20 p.c. to a far field of an antenna transmitting a radio frequency 890 MHz carrier signal modulated in a way that the spectrum contained GSM typical frequency components occuring at 1,733 kHz, 217 Hz, 8 Hz und 2 Hz (and integer multiples thereof) beside the carrier signal at a field strength of 60 W/m² did not significantly affect most of the investigated maternal and fetal parameters. **Consequently, under the above-described conditions, no clear-cut teratogenic, embryo-lethal or retarding effects of the exposure were found in the present study. The observed (statistically non-significant) effects mainly on maternal weight gain, pre- and postimplantation loss, and fetal and placental weight may, however, represent the onset of an unspecific adverse effect of exposure on prenatal development.**