ENVIRONMENTAL ASSESSMENT

COMMODITIES INTERNATIONAL (CIL)

ENHANCED CHICKEN PRODUCTION,

PROCESSING AND DISTRIBUTION

POPILNYA DISTRICT

ZHYTOMIR OBLAST, UKRAINE

Under the auspices of

Citizens Network for Foreign Affairs, Kiev, Ukraine

and the

United States Agency for International Development

Cooperative Agreement No. 121-0006-A-623-00

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(1) SUMMARY

The objective of this Environmental Assessment is to help Commodities International USA Inc. (CIL) poultry operation in Popilnia district, Zhytomyr Oblast, Ukraine, comply with current and planned environmental regulations of the Ukraine and pertinent regulations of the United States Agency for International Development, 22CFR Regulation 216. The environmental assessment also provides a menu of mitigatory measures which will improve product quality and physical infrastructure to improve profitability of the endeavor. This EA is based on the Initial Environmental Evaluation written for USAID, various CNFA/USAID reports and memorandums, on inspections by local authorities and site visits by CNFA personnel. Since March, many interviews and discussions with CIL personnel have occurred regarding this Environmental Assessment.

1.1 Mitigation Measures and Progress Towards Achieving Mitigations

After several visits to the brooder and slaughter houses and packing facilities by CNFA staff, and numerous interviews with CIL personnel, the following mitigations are considered to represent minimum standards which will comply with environmental regulations and to prevent environmental degradation and worker safety and health**.**

1.1.1. Brooder Houses

A. Water Supply

Water quality from the wells at the brooder houses must be monitored frequently for ions and contaminates regulated by Ukrainian statutes. The water is filtered to increase the cleanliness of the water and safe delivery of the medication for the poultry.

B. Concentrate Quality

Clean nutritious concentrate is mandatory for high quality profitable meat. Currently corn, soybeans, wheat and barley are used in the concentrate plus a vitamin supplement from Belgium. The Director of the project related that the concentrate to meat weight ratio in the latest harvest was 2.0 to 1, indicating that the quality of the concentrate, in terms of nutrients and calories, is excellent.

C. Maintenance of Brooder House Climate

Gas heaters in thick walled brooder houses maintain a proper climate for the broods. Gas is clean for air quality. Vents and fans keep the air moving and the temperature steady throughout the barn. In April, during a field trip to the farm, the temperature had been adjusted correctly as evidenced by a lack of clumping of the chicks in corners or on the main floor. Drafts appeared to be minimal in the house.

D. Litter Management

Litter must be managed in such a way as to avoid flies and other insects, leakage into the ground at the site, prevention of disease and elimination of odors. The present method of immediate removal to farm sites, where the litter is used for fertilizer and mulch on the fields, is a proper mitigation. CIL is following Ukrainian regulations about leaving the houses empty of chicks for a three weeks to one month after cleaning to prevent diseases. Appendix D lists a method for improving the quality of chicken house litter for fertilizers. As the project expands, a formal litter management plan is warranted.

E. Antibiotic Regimes

A broad spectrum antibiotic ?Baytril? is dribbled into the water supply for the chickens as a prophylactic measure. On the first visit to the farm, the empty bottles from the antibiotics were observed to be tossed in a pile at the back of the house. Upon the recommendation of the CNFA environmental officer, the bottles are now safely buried.

Overall, the management of the brooder houses is satisfactory with no significant impacts foreseeable if present conditions prevail.

1.1.2. Slaughter House

A. Recommended Mitigations:

Increased sanitary methods in the slaughter house and packing plant are immediately required. The majority of these mitigations require changes in management style and education, and not large financial expenditures. Included are:

1) All floors and equipment on the line need thorough cleaning after every work shift to remove fat, grease, blood, feathers and other carcass debris and dirt from the floors and equipment. It is recommended to use a significantly higher water temperature for this at least ~ 70^0C or higher at a suitable strong pressure. If grease cutting detergents need to be used for this, then strict adherence to effluent standards permissible for detergents need to be followed;

2) Adequately sized containers must be placed at correct strategic locations along the conveyer line in order to prevent blood and fat from contaminating the floors;

3) Workers must wear gloves, hair nets and clean aprons while working on the line;

4) Water used for carcass and organ washing and rinsing must be changed more frequently than at present. The wash tubs for edible viscera must be changed at the end of each shift and cleaned out correctly before refilling.

5) Depilatory machines must be thoroughly cleaned at the end of each shift with care being taken to the collection of feathers to prevent them from entering the municipal sewerage system.

B. Cold Storage Physical Plant

1) The ammonium refrigeration unit needs to be examined and gas leaks immediately repaired which pose a health hazard to workers and potential contamination of chicken products;

2) All ammonium lines must be properly sealed where leaking and painted bright yellow with non-lead based paint for easy identification.

3) Weeds and debris must be cleared out around the main ammonium compressors and storage tanks.

4) A sufficient barrier needs to be built around the ammonium tanks to protect them from automobiles and trucks.

5) The plant needs to purchase ammonium detectors and they need to be placed in key locations to warn workers about the presence of the ammonium gas.

6) An ammonium gas disaster preparedness plan needs to be implemented and all workers trained on proper evacuation and first aid in case of a major leak.

C. Cold Storage and Management of Chicken Products

1) Butchered chickens and chicken parts must be placed in cold storage as soon as possible after butchering. Allowing products to remain at ambient temperatures for several hours after butchering and packaging is unacceptable. Better freezer access to employees is necessary to prevent spoilage of chickens and parts when a manager who possesses the only key is not at the site.

2) Products should be quick frozen and ice should not be allowed to accumulate on the products.

3) Ice should not be allowed to accumulate in the cold rooms, especially on the refrigeration pipes and radiators. Sufficient ammonium in the system, proper ventilation, and proper temperatures will prevent this.

D. First Aid Kits

First Aid kits must be placed in accessible locations so that all employees have access to them at all times. A general emergency preparedness plan must be written and implemented through worker training.

E. Sewer Effluents

As the CIL project increases its production, significant increases in liquid effluents will occur. The current and future effluents represent a significant negative environmental impact and must be mitigated through improved management and additional equipment**.** CIL must comply with the following mitigations:

1) Monitoring of effluents should occur more frequently. The negative results methods, e.g., where government inspectors and monitoring teams notify the plant only if the effluents are not within standards, is not satisfactory. A proactive monitoring method is needed so that management can know how much effluent in terms of BOD (Biological Oxygen Demand), fats, grease, solid materials etc., is being produced, in order to change management strategies and avoid violations.

2) Decrease contaminants in effluent trains through greater use of water in cleaning operations. By changing water more frequently, i.e. after every run, in the wash tank, using more water to thoroughly wash down floors and equipment after each the sediment and solids effluents will be reduced in terms of concentrations in solute waters.

3) Plans should be made to begin to upgrade the effluent sediment tanks and correct the disposal system of removed solids.

F. Gas System Maintenance

Natural gas leaks must be immediately repaired when the odor of natural gas additives (mercaptans, etc.) is detected. Waiting until the government inspector arrives before a repair occurs is an unsatisfactory practice, and presents unnecessary human health hazards which are easily controlled by routine inspection and repair by plant employees.

G. Asbestos Roofing and Disposal of Asbestos Refuse

A management plan for the correct disposal of old junked asbestos roofing materials needs to be implemented. Numerous piles of broken asbestos corrugated roofing materials are located at various places on the property. These piles and the debris need to be cleaned up and disposed of correctly; especially in those areas were workers might track in asbestos fibers into the plant and where trucks will create asbestos dust that would contaminate workers and the poultry**.**

(2) PURPOSE OF THE PROJECT

The purpose of this project is to develop a broiler growing operation, effectively process and package poultry products and to market and distribute these products.

CIL intends to rapidly expand the broiler industry through the establishment of a vertically-integrated broiler growing program, a processing line and a consumer oriented marketing program that will rapidly expand the demand for broilers.

A main objective of this project is to establish broiler production under contract growing agreements with other farmers which will efficiently convert nutritious feed into optimum weight gains on the poultry. This project will furnish several essential services that will improve productivity and efficiency at the production end of the broiler system.

A second objective is to develop a chicken processing operation that will use all of the meat from the carcass in the form of high monetary value products. With modern processing, packaging and marketing techniques, the value that can be realized from the sum of the products will be greater than that which can be gained from unprocessed, whole, dressed broilers. Value-added processing is critical to reduce the consumer cost of poultry meat and make poultry products more globally competitive.

Last, CIL wishes to develop food service markets for these value-added chicken products that will place these products in the markets to the best advantage. By expanding market outlets, CIL expects to increase the demand for poultry and achieve the advantages of increased volume from their vertically-integrated poultry system.

(3) DESCRIPTION OF THE PROJECT

Commodities International USA Inc. has been working in Ukraine since 1992. The company spent one and a half years analyzing the need for establishing a meat processing operation in Ukraine. Several factors were considered, including low radiation levels, availability of livestock and forage, and progressive management. A Ukrainian joint venture, under the name CIL Ltd, was established in January 1994. Due to its early entry into Ukraine and substantial investment commitment, the company received a tax exempt status for a period of five years, which expires in the year 1999.The company signed the FSRP agreement on 14th January 1997 in Washington DC.

Mr. Valeriy Masluk will be the Ukrainian joint venture partner in this project. He has been at the Popilnia farm since 1970. In 1983 he became the Managing Director. At one time the farm had 200 employees, but as a result of the CIL investment, there are now 296 employees, including the 70 at the slaughterhouse. Twenty-six employees were added solely for the activities related to the CIL investment. The farm has 50 trucks and 15 tractors. The farm is a collective joint stock venture company in which all the farmers have shares. There is no state ownership in the farm any longer. With the new equipment from CIL, Mr. Masluk is confident that the farm can improve production. Currently the farm, with its 5 barns, has a production capacity of 42 million eggs a year and 1000 tons of poultry meat. But the only barn in production is the CIL funded barn.

3.1 Some Alternatives for Site Choice

The company decided in its proposal to grow the broilers at two sites in the Lviv and Vinnytsia oblasts. Upon receiving the acceptance of its FSRP grant, the company contracted them immediately to obtain an agreement on the growing part of the program. A

fair amount of time had elapsed since the proposal was written and the grant was approved. As a result, the situation had changed at the two sites. In Lviv, the Director informed CIL that he had signed an agreement with another company and could not pursue the growing operation with CIL. At Bershad, Vinnytsia, the Director became ill which would mean long absences from his job. Given CIL?s experience of working in Ukraine where critical decisions are often delayed in the absence of the Director, and to avoid possible future problems with the broiler program, CIL decided not to pursue the growing program at this site.

Screening other sites began at once. An expert with knowledge of the Ukrainian broiler industry was called in to identify and screen new sites. Six sites were visited for consideration. Unfavorable responses were received on many of the proposed sites. Most of them were empty with little growing operation. The infrastructure was in poor condition due to lack of production and maintenance. As many of these plants were in arrears with energy suppliers, there was the possibility that energy problems would occur. Some of the plants were not integrated with a slaughtering line. Since the objective of the program was to successfully market the processed birds, the lack of a processing line meant the plant was not suitable.

CIL selected Zhovtneve Poultry Farm in Popilnia District of Zhytomir Oblast as the first choice for the first cycle. The farm was vertically integrated with brooder houses and slaughter house. The farm and processing facility was owned jointly by the workers. Its? close proximity to Kiev would enable the program Director and other staff to manage production more effectively. The main factor in choosing this site was that the Director was supportive and progressively minded towards the program. This was crucial in order to ensure the success of the program

CIL agreed to utilize an existing poultry barn at Zhovtneve. The barn buildings were in fairly good condition. However the interior was fitted with outmoded wire cages and outdated feeding systems. This is characteristic of barns in Ukraine. To achieve optimum feed conversion, the whole interior needed to be refurbished. The cages had to be removed and the troughs for catching manure needed to be filled in to even out the floor surface. CIL contracted with an equipment supplier, Thegra, to remodel and retrofit the barn with the most up to date equipment available. The contract was to run for 12 months. To further speed up the process, it was decided to buy the broiler chicks from producers who were pre-registered and in close proximity to the plant.

Eleven weeks after signing the Agribusiness Partners contract, CIL completed the following activities:

- identification and screening of an alternative site for location of the broiler growing operation,
- identification and screening of an appropriate equipment supplier who could deliver and install the necessary equipment within 4 weeks,
- remodeling and fitting the brooder barn with state-of-the-art growing equipment,
- identification of Ukrainian registered agricultural suppliers of feed concentrate, starter chicks and pharmaceuticals,
- locating raw materials such as soy bean meal, corn and wheat to complete the feed

ratio from FSRP partners, Kiev Atlantic and Freedom Farms,
- a concentrate feed product that has a balanced ratio between imported and domestic ingredients,
- establishment of a separate office to manage the program,
- the hiring of all pertinent staff.

When the remodeling of the barn was completed, the chicks were bought from Dominant, a company in Czech Republic. The feed concentrate came Belgium. These suppliers were selected mainly due to the fact that their products were registered in Ukraine.

The broiler growing equipment was obtained from Roxell because:

- their equipment was registered for use in Ukraine,
- the equipment was made for 220 volt electrical current,
- they had an office in Kiev for rapid response if service problems arose,
- they agreed to clear customs, deliver, and install the equipment within 6 weeks from the order date.

The vaccinations, antibiotics and medicines were bought from several sources. CIL located a German and a Belgium company who had their products registered in Ukraine. The antibiotic of choice is Baytril. The antibiotic is fed into bubblers attached to the water in the brooder house as a prophylactic measure.

3.1.1. The Site

Popilnia, Ukraine is where the office and barns are located for growing the poultry.

3.1.2. The Old Barns of Popilnia

All the barns at the site are in very old condition, with traditional metal cages and conveyor belt feeding and watering methods used. The technical advisors strongly urged CIL to start from the ground up, which has been done. Traditional methods usually resulted in uneven weights among birds. Dirty and unsanitary conditions were normal for the birds as manure from the top cages dropped onto the birds in the lower level cages. This causes a loss of about 30% of the feed and wastage in water resulting in an inefficient and costly enterprise. Using the conveyor belt method and traditional mixing methods makes it difficult to deliver precise antibiotic doses to the birds. The site has 45 tons of metal cages, which at optimum output, could hold 32,000 chicks in the cages.

The barn used by CIL is four years old. All old cages and conveyor belts were removed, and the floor was covered with cement. All barn renovation work was completed within 2 months from January to March 1997. Equipment and materials were delivered and installed at the same time.

3.1.3 The New Barn at Popilnia

The new barn has no cages and no metal feeding or watering trays. Plastic tubing carries the water across the open free range space used by the chicks. PVC pipes carry the feed mixture throughout the site and plastic cups hold the water for the chicks to drink. There are 21 birds per square meter in a free range system, with adequate room for them to roam, for their legs to grow and develop as well as for strong breast development and healthier chickens.

Chicken manure is not removed from the open range ground until after the end of the 42-50 day growth cycle. Roxell and the farm manager indicate that this poses no health risk to the chicks because the sawdust and composition on the floor absorbs the manure and waste products of the chicks. The litter is of excellent composition.

3.1.4. Feed Concentrate

CIL is buying feed concentrate from Belgium since the trademark brand is registered here. US brands are not yet registered in Ukraine.

3.1.5. Feed Ingredients

CIL is buying wheat from Kiev Atlantic Ukraine and soybean meal from Freedom Farms. Between 10,000-15,000 tons of wheat and soybean meal are being sold to CIL. The concentrate is mixed on site, using the Roxell equipment. Corn is also being procured at this time. CIL found that initially the concentrate was ground too finely for the blender and was clogging up some of the feeding pipes. Manual feeding was done at the beginning until the right blend was perfected. Feed represents about 70-80% of the cost to produce chickens.

3.1.6. Energy Costs

The installation of new gas heaters saved money over traditional methods. However, due to a delay at Customs, the new heaters did not arrive in time for the beginning of business. Old heaters were used, thus raising costs.

3.1.7. Equipment

CIL chose Roxell equipment because its? designs preserve and conserve feed and water and reduce waste loss from 30% by traditional methods to 1% or less. Roxell gives a 5 year guarantee on all equipment and they offer discounted new pieces for anything that breaks in the second 5 year period. There are 4 feeder lines and 5 water lines for the 32,000 birds. Using this feeding method the chicks mature within 42-50 days.

3.1.8. The Farmers

The most important benefit to the poultry farmers is that they have a guaranteed market and a future contract price. CIL quotes minimum and maximum prices which CIL will pay for the birds. Having a secure market guarantees that the farmers will get a good price for their poultry once delivered. Retail stores in Kiev sell chicken at two times the world market price. The market gives a high demand for these products.

3.1.9. The Poultry Slaughterhouse

The CIL Ukrainian partners? slaughterhouse at Zhytomyr is a structural unit of the CAE ?Zhovten? that belongs to the collectives of the three owners: the feed plant, poultry farm and slaughter house. It has a capacity of 10,000 birds an hour. Seventy people will be employed at the slaughterhouse.

3.1.10. Site of the Slaughterhouse

The slaughter house is situated within the city of Zhytomyr surrounded by other factories. Having been constructed in the early 60's, the equipment is to be suffering substantial tear and wear. The processing of chickens had been fully stopped from 1993 until January 1997. It has never reached its full capacity of 8,000 chickens per day. One symptom of disrepair is the presence of piles of asbestos roofing broken up and pulverized in many locations throughout the complex. There is substantial roofing which needs to be replaced.

3.2 Inputs

3.2.1 Water

The slaughter house uses water from the town ?Water Channel,? the organization which is responsible for all water supplies and sewer systems. They also have responsibility for water quality. Daily consumption is ~ 150 m^3. In coming water is tested for the presence of microogranisms and as of 10 May, 1997, the water was negative for *Salmonella* bacteria.

3.2.2 Electric and Gas Supply

Ordinary gas and electricity lines come from the town system. The plants do not place undue burdens on the electrical system, and sufficient electricity is

available albeit, of irregular quality.

3.2.3 Produce

Poultry is brought to the entrance of the building by trucks and unloaded onto a conveyer by hand. The Zhytomyr Oblast Laboratory provides every shipment with a Veterinarian inspection of bacteriological and radiological analyses (contents of *salmonella* Cs-137,) before delivery. The results are submitted to the slaughter house. Radiological tests showed the presence of Cesium 137 at 21.6 Bk*/kg in the meat and 19.8 Bk/kg in stomach contents. The standard is 300 Bk/kg. The conveyer is at least partially washed after every shipment of chickens. The photo album in Appendix C describes the process in detail. (* One Bequeral is one nuclear transformation per second.)

3.3 Outputs

3.3.1 Pollutants

Facilities that contribute to pollution are:

1) The storage of ammonium and the refrigeration unit has antiquated equipment and leaks ammonium. The strong odour of ammonia permeated the hallway to the freezer lockers and inside several cold rooms. It was explained by the chief engineer that this was only an insignificant leak that started two days earlier. Nevertheless, the smell of ammonium was too strong to remain in the premise, causing panic among some of the visiting experts. The analysis of air quality is done by the Zhytomyr Department of State Office of Protection of the Environment once every three years, which is insufficient.

2) The boiler system has three units. Two are kept in reserve. A strong natural gas leak was noted earlier.

3) The rudimentary system of wastewater treatment consists of three units. Waste water goes to an underground storage tank where solid particles and fat are sedimented out by gravity. The partially cleaned effluent then flows into the towns? sewerage system. Regular tests of water after treatment are provided by the company ?Water Channel.? About 150 cubic meters of water are used daily during operation.

4) Solid waste disposal such as dirty feathers, offal, non usable viscera and body parts are stored in covered steel bins stored under a roof until they are taken to a central rendering works. All the interior premises and especially the floors are insufficiently cleaned of fat and grease.

5) The asbestos roofs are in poor condition. Piles of asbestos roofing in various stages of decomposition and powderization are common on the grounds of the

Zhytomyr processing facility.

In addition, there is no quality control laboratory within the plant. There is, however, one employee who is responsible for all environmental and quality control issues.The fire alarm system consists of a used gas cylinder suspended by a rope tied to a pole and a steel bar outside the buildings. In case of fire, someone pounds on the cylinder with the bar.

(4) ALTERNATIVES INCLUDING THE PROPOSED ACTION

4.1. Poultry Brooder House

The contrast between the production of the old Soviet style cages and the open house method is remarkable. The only real alternative for choice of poultry raising is that the projects? technologies be utilized. This alternative is more efficient, uses less resources, and is much less harmful to the environment for the many reasons described in this document. For example, the baseline Ukrainian broiler industry using the Soviet techniques produces broilers at about a 3 to 4.5 feed conversion ratio, and the latest CIL results approached a ratio of 2.0:1.

4.2. Slaughter House and Packing Facility

CIL researched many locations in Ukraine for suitable slaughter facilities, and this was the best in terms of management attitudes, location to markets and employee conditions. The plant is not up to United States standards, but by using the mitigations described in this EA, significant improvements can be made in product quality and worker safety. The No Action Alternative in terms of processing plant upgrading is unsatisfactory. CIL and the Agribusiness Partnerships II Project should make every effort to upgrade the plant with the mitigation measures described in this EA.

(5) AFFECTED ENVIRONMENT

5.1. Description of the Physical Environment

The Zhytomyr Oblast is located just west of Kiev and borders Belarus on the north, Vinnitskaya Oblast to the south, Khmel?nitskiy and Rovnoskaya Oblasts to the west. Zhytomyr is served by several rails and paved highways. The Tenepia river flows through the city of Zhytomyr north east to the Dnipro River. The Oblast has two major cities; Zhytomir and Korosten and numerous small towns and villages. The highest elevations in the Oblast are 316 meters above sea level in the north and 252 meters in the center. Air quality is considered to be good in the Oblast (See Bibliography Reference 1). The geological substrate is primarily consolidated Miocene and Pliocene calcareous reefs. The climate is northern temperate. Winds are predominantly from the west. July absolute maximum temperature is 38 C and the January maximum low is -35 C. Mean January temperature is 6 C and the July mean temperature is 18 C. Soil types are complex, probably because of glacial mixing, plus wind and water sedimentation. There are about

12 different soil types in the Oblast. Most prominent soil types are coastal derivatives, marsh and peat soils with complex tuffs. Major crops are potatoes, wheat, dairy and livestock, hops, and flax. Manufactured products in Zhytomyr are televisions and electrical instruments, fabrics, packaged foods, leather goods, shoes, glassware, and to the north, forest products. Granite and marble mines are found in the Oblast. Vegetative type is pine-alder-birch forests in the north, forested steppes in the central, and steppes to the south.

5.1.1. Poultry Farm

The farm at Popilnia is located in an area of low rolling hills intersected by numerous intermittent streams. The area has predominantly chernozem soils, but is near the transition area to the poorer forest soils of northern Ukraine. Almost all of the area is totally devoted to agriculture, and the steppes are vast. As far as the eye can see in all directions there are wheat fields, mostly deep ploughed, dissected frequently by rows of deciduous hardwood trees planted along field borders and roads. Almost all of the streams have been dammed for water conservation, and around these numerous, small lakes are abundant marshes and aquatic habitats.

5.1.2. Zhytomyr Processing Plant

Zhytomyr is the capital city of the Oblast of Zhytomyr. The city lies in the second wave of forests south of the Belarus border. Most of these forests are plantations, but reflect poorer soil complexes than the rich chernozem soils to the south.

5.1.3. Radiation Situation in Zhytomyr

The city of Zhytomir lies on the southern boundary of the major radio active fallout zone from Chernobyl in Ukraine. Almost all of the Oblast was severely irradiated in 1986. About one-half of the Oblast in the north was contaminated to ?catastrophic? levels (Appendix B). Major areas are classified as ?extremely contaminated.? Depending on the reference source, some areas of Zhytomyr Oblast ?may? (Atlas Ukraine, 1996) of ?may not? (Ukraine Ministry 1996) be generally contaminated. Cesium-137 is considered to be from 2-4 Kilobequeral/square meter* over about 1/3 of the southern Zhytomyr Oblast. A band of about 1/4 of the area of the Oblast has about 20-40 KBk/KB.M. About ? of the Oblast has been contaminated with about 185-1480 KBk/KB.M and some small areas of above 1480 KBk/KB./M. This represents a serious environmental loading, and must be taken into consideration when purchasing feedstock and general supplies, such as grain for concentrate or wood products. *** One Bequeral is one nuclear transformation per second. One Kilobequeral is one thousand Bequeral.**

5.2 Description of the Biological Environment

With considerable forests in the Oblast, the biodiversity of the area is high. However, the northern sections pose interesting biological challenges due to high radioactivity. An observation to date is, that in the controlled areas, vegetation and wildlife has rebounded. This is due to the lack of human pressure from hunting and harvesting. However, it has been observed in rodents and other animals, including elk, that the size of the litters have been significantly reduced and life expectancies of vertebrates are falling. Immune deficiency diseases are on the rise. Many hunting harvests of wild game have been seized due to the radiation.

A partial list of species in the general vicinity of Zhytomyr is listed in Table 1.

Table 1

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1. Forest Vegetation

Middle European pine and broadleaf deciduous forests.

Agricultural lands on the borders of birch and hornbeam forests.

Oak-pine or hornbeam-oak-pine woodlands.

Dniprovsko-Dnestrovskiy oak and oak-hornbeam forests.

Oak woodland forests.

2. Landscapes

Sward-podzolic soils

Devegetated soils

3. Flood Plain Vegetation

Meadow-marshes, pools, forest plains.

4. Fauna

A. In zones of pine forests and deciduous forests and woodlands:

Big dormouse
Forest dormouse
Nut-brown dormouse
Squirrel
Forest Marten
Roe Deer
Elk
Bison
Capercailzie
Blackcock
Hazel-hen
Black stork
Bearded owl
Woodpecker
Jay

Thrush
Tit (tufted titmouse, black titmouse)

Reptiles and Amphibians

Viviparous lizard
Ordinary adder
Ordinary triton
Tufted triton

B. Widespread mostly in the Oak and Beech-hornbeam-oak forests of forest-steppe are:

Big dormouse
Forest dormouse
Squirrel
Big hawk
White-tail eagle
Pigeons
Woodpecker
Wood lark
Black and singing thrush
Podol'skiy mole-rat
Black kite
Ordinary buzzard
Slow-worm
Reed toad

Reptiles and Amphibians

Viviparous and green lizard
Ordinary adder
Grass toad

C. Agricultural Lands are full of:

Field-mouse
Gray hamster
Steppe crane
Lark
Partridge
Field-vole
Black kite

(6) AMMONIA REFRIGERATION

The Occupational Safety and Health Administration standard for ammonia inhalation is 50 ppm as an 8-hour time-weighted average, but the National Institute for Occupational Safety and Health has recommended that 50 ppm be a 5-minute ceiling for exposure. The characteristic ammonia odor is readily perceptible below toxic levels. Most people can detect an odor at 30 ppm, and eye and nose irritations become more severe as the levels increase to 50 ppm. Some people can detect ammonia at 5 ppm.

A correctly designed, small refrigeration plant with ammonia as refrigerant can replace the former plants using CFC, HCFC and other artificial refrigerants and can, at the same time, lead to considerable reductions in the energy consumption. The energy savings are measured to be in the range of 15%. (Refer to section 3.3.1-1 for specific details.)

(7) AIR EMISSIONS AND NOISE LEVELS

7.1 Air emissions

No significant air pollution is produced by either brooder houses or slaughter house and packing facility except ammonia as mentioned above in Section 6. Natural gas is used at both sites. Odors are under control through proper litter management. Garbage is covered in steel bins in an area separate from the rest of the plant.

7.2 Noise

The small size of the operation precludes much truck traffic. The farm is isolated and the amount of noise generated is normal for farms. The slaughter house is located in an industrial zone and doesn?t generate much noise. During slaughtering and packing, noise is generated from the machinery, with the noisiest part of the plant being the blowers in the feather room, where only a few people work. Ear plugs are not needed.

(8) POTENTIAL IMPACTS OF TRANSPORTATION

The all- weather hard surfaced road leading to the farm from the freeway is not heavily traveled. The cement patio surrounding the farm is in good condition. No negative impacts to transportation are foreseen with this project, especially because of its rural setting on the outskirts of the village. The slaughter house is located within the city of Zhytomyr, and is serviced with adequate roads and a moderate volume of traffic.

(9) EFFECTS OF FACILITY DEVELOPMENT ON AESTHETICS AND VISUAL QUALITY

The farm is not visible from the village and is of satisfactory aesthetic standards**.** There is a grove of deciduous hard woods such as oaks, basswood and black locust planted along the road. The slaughter house is surrounded by a tall wall and trees, and is located in a light industrial zone where aesthetics were never considered in the original development process **except, for some flower gardens and yards in the complex for the workers.**

(10) ENVIRONMENTAL CONSEQUENCES

The farm activities are not considered to place an undue burden on the environment and represent a revitalization of a facility that is essentially vacant which put people out of work and created hardships when it is not in operation. The production of copious amounts of high quality litter impregnated with urea and fecal material will significantly benefit local agriculture, which is in short supply of fertilizers.

The slaughter house and packing facilities place a significant burden on the waste water systems in terms of effluents, since it is doubtful if the system can continue to expand without exceeding the standards for waste waters. Additionally, the generally unsanitary conditions of the slaughter and packing process places a public health burden on customers who consume the products. Improved management of sanitation practices will immediately reduce this negative impact while providing high quality protein to the market place.

10.1 Emergency Response Services and Availability of Medical Facilities

The city of Zhytomyr has adequate emergency facilities including major hospitals and clinics with ambulance service. The farm in Popilnia is more distant from such facilities. First Aid Kits are present in the slaughter house, but under lock and key.

10.2 Human Health and Worker Safety

As mentioned above, improved sanitation practices listed in the mitigations section of this report will improve human health. A cleaner workplace at the slaughter house will help reduce accidents.

(11) LIST OF PREPARERS

The CNFA Former Environmental Advisor, Mark Mitchell, and Marcus L. Winter, ENI/ED/AG, prepared the Initial Environmental Evaluation (Appendix). The IEE was approved on 1-2-97 by the Office Director of Enterprise Development Bureau for Europe and New Independent States. The Scope of Work for the Environmental Assessment, was not available. Therefore, CNFA proceeded with the Environmental Assessment according to the memorandum of understanding for this matter between CNFA and USAID-Kiev.

This Environmental Assessment was written by Dr. Wayne Williams and Lena Lopantseva and edited by Jo Anne Williams. Dr. Williams is currently the Environmental Officer for Citizens Network for Foreign Affairs projects in Kiev, Ukraine. He has extensive experience in the Environmental Assessment field, successfully completing several dozen Environmental Assessments for USAID in Central America from 1991 through 1995 in his capacity as Regional Environmental Advisor for USAID/ROCAP in Guatemala and for CNFA, Kiev for Agribusiness projects.. These and other Environmental Assessments completed by Dr. Williams covered the widest possible range of topics including medical clinics construction, solid and liquid waste disposal, public health and other projects including large and medium sized industrial operations, including electrical power generating plants. Dr. Williams has designed, built and supervised several technical laboratories. Lena Lopantseva, Environmental Assistant for Citizens Network for Foreign Affairs projects in Kiev, Ukraine. She has a Masters Degree in Physics with a Minor in Science Education. Jo Anne Williams has a Bachelors Degree in Environmental Studies and Planning from Sonoma State University, California. She has had extensive experience editing scientific and technical publications.

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(13) APPENDIX

A. INITIAL ENVIRONMENTAL EXAMINATION
B. MAPS OF REGION
C. PHOTO ALBUM (BROODER AND SLAUGHTER HOUSES)
D. PROCUREMENT AND MANAGEMENT OF BROILER LITTER
E. LIST OF RARE AND ENDANGERED SPECIES IN ZHYTOMYR OBLAST AND SURROUNDINGS
F. BROILER MEAT PRODUCTION COST COMPARISON
G. RADIOLOGICAL AND BACTERIOLOGICAL TESTS
H. MICROCLIMATE REGIME FOR BROILERS GROWING
I. REPORT ABOUT POULTRY FARM ?ZHOVTEN?

Appendix D

PROCUREMENT AND MANAGEMENT OF BROILER LITTER.**

Peat, chopped straw, corn-cobs, saw dust, wood shavings, etc. are used as floor litter in poultry farming. Clean broiler manure can be made by keeping chickens without any litter. In connection with this, several different kinds of litter can be distinguished such as: natural manure (65-70% humidity) which was obtained without using any litter, semi-liquid (70-90% humidity), liquid (91-95% humidity) and sewerage (more then 95% humidity).

Broiler litter is a quick-acting, effective fertilizer due to nutritious substances which are easy for plants to absorb. During the year, each hen will produce 6-7 kg of manure.

Conservation of the raw litter decreases the loss of nitrogen, which, in a 1.5 -2 month period can reach 30-60% of the total amount of nitrogen in the raw litter. To minimize this loss it is necessary to mix it with crumbling peat (25-50% of total litter mass) or with powdered super phosphate (6-10% of total litter mass). Super phosphate must be added to the litter after it is removed from the poultry yard.

The most effective method of nitrogen preservation in the manure is done by using deep litter (30-40 cm layer) which consists of dry crumbled sphagnum peat with a chopped straw, fen peat, or straw from the poultry-yard. The litter and manure are cleared out by a bulldozer or a skip loader. On the average, each chicken needs 100-150 grams of litter per day. The litter must be changed every 16-18 weeks for every new generation of broilers.

Pure manure is preserved by placing it in tightly-sealed containers (4-5 m in width, 1.5-2 m in height; length is arbitrary). The manure is covered by a 10-15 cm soil layer, which is no more than 25% of the total humus mass. If the humidity of humus is less then 60%, it needs to be moistened. If the manure is overheated (greater than $55\text{-}60^0$ C) it must be moistened again to prevent aerobic conditions during storage.

While the manure is being spread out, one of the following components must be mixed into the containers: 5-7% super phosphate, 10-15% phosphorous flour or 5% phosphorus-gypsum. During long-term storage of pure manure, the mineral fertilizers are increased up to 10-15%. Adding 0.5-2% chlorine potassium salts is recommended when storing nitrates for long-term storage, and for preventing freezing of the manure in the containers.

Adding manganese sulfate (0.25 gram per kg of organic fertilizers) will almost fully prevent urea decomposition. As a result, nitrogen losses will decrease (the first five days by 1.5%, the second five days by 2.1%). Almost the same effect will take place when using wastes from the manganese ore industry (10-30 times more than norms for pure preparation). **Source: Reference Book of the Farmer.

Translated by Lena Lopantseva, Environmental Assistant, CNFA