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CONTROLS

UNCLAS SECTION 01 OF 03

ENVIRONMENTAL HEALTH RISK ASSESSMENT - RUSSIA, EUROPEAN (WEST OF AND INCLUDING THE URAL MOUNTAINS)
(DI-1816-RS-96-RPT 2, SEPTEMBER 1996)

/***** THIS IS A COMBINED MESSAGE *****/

BODY

1. ENVIRONMENTAL HEALTH RISK ASSESSMENTS, PREPARED BY THE

(b)(3):10 USC 424 ARE PROVIDED ON A COUNTRY-BY-COUNTRY BASIS WORLDWIDE. BECAUSE THESE ASSESSMENTS ARE UPDATED CONTINUALLY, REQUESTS THAT ANY AMPLIFICATION OF SUBJECT MATTER, CONSTRUCTIVE CRITICISM, COMMENTS, OR SUGGESTED CHANGES BE FORWARDED TO THE (b)(3):10 USC 424

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2. ENVIRONMENTAL HEALTH RISKS OF OPERATIONAL IMPORTANCE

A. ENVIRONMENTAL HEALTH RISK ASSESSMENT: SEVERE WATER AND AIR POLLUTION, COLD WINTER TEMPERATURES, RADIATION EXPOSURE, AND GENERALLY POOR FOOD SANITATION ARE MAJOR ENVIRONMENTAL HEALTH RISKS IN MANY AREAS OF EUROPEAN RUSSIA.

B. TOPOGRAPHY: RUSSIA, ALMOST TWICE THE SIZE OF THE US, HAS A TOTAL LAND AREA OF 16,995,800 SQ KM (6,628,400 SQ MI). IT HAS A DIVERSE TOPOGRAPHY, VARYING FROM TUNDRA IN THE NORTH TO SEMIDESERT IN THE SOUTH.

EUROPEAN RUSSIA, ABOUT ONE-FOURTH OF THE COUNTRY'S TOTAL AREA, ENCOMPASSES ALL RUSSIAN TERRITORY WEST OF AND INCLUDING THE

URAL MOUNTAINS, AND CAN BE DIVIDED INTO FOUR GEOGRAPHICAL REGIONS. (1) THE KOLA-KARELIAN AREA LIES IN THE NORTHWEST ALONG THE BORDER WITH FINLAND AND NORWAY. THE KOLA PENINSULA, IN THE FAR NORTH, MOSTLY CONSISTS OF LOW MOUNTAINS WITH A PEAK ELEVATION OF APPROXIMATELY 1,200 METERS (3,900 FT) AND PLATEAUS, WITH A NARROW BAND OF TUNDRA IN THE FAR NORTH. THE KARELIA AREA PRIMARILY CONSISTS OF RIDGES, MARSHES, LAKES, AND CONIFEROUS FORESTS. (2) THE RUSSIAN PLAIN EXTENDS FROM RUSSIA'S WESTERN BORDER EAST TO THE URAL MOUNTAINS AND FROM THE ARCTIC OCEAN SOUTH TO THE CAUCASUS AND THE CASPIAN SEA. KALINGRAD OBLAST, AN AREA ABOUT THE SIZE OF CONNECTICUT, IS AN ENCLAVE PHYSICALLY SEPARATED FROM THE REST OF THE COUNTRY BY LITHUANIA AND BELARUS. (3) THE CAUCASUS, AN AREA BETWEEN THE BLACK AND CASPIAN SEAS, PRIMARILY IS A HILLY AREA THAT EXTENDS SOUTH AND INCLUDES THE GREAT CAUCASUS MOUNTAINS ON THE BORDER WITH GEORGIA. THE GREAT CAUCASUS MOUNTAINS, WHICH REACH A PEAK ELEVATION OF 5,650 METERS (18,500 FT) AT MT. EL'BRUS, HAVE PERMANENT SNOW COVER AND GLACIERS. (4) THE URAL MOUNTAINS EXTEND 2,400 KM (1,500 MI) FROM THE ARCTIC COAST TO THE URAL RIVER; AVERAGE ELEVATION IS 500 METERS (1,650 FT), WITH A MAXIMUM ELEVATION OF 1,900 METERS (6,220 FT) AT MT. NARODNAYA. A LARGE GROUP OF ISLANDS KNOWN AS NOVAYA ZEMLYA EXTEND THE URALS AN ADDITIONAL 1,000 KM (600 MI) INTO THE ARCTIC OCEAN.

C. CLIMATE: THE DOMINANT FEATURE OF THE RUSSIAN CLIMATE IS THE EXTREME WINTER COLD, WHICH AFFECTS ALL BUT A FEW SMALL REGIONS OF THE COUNTRY. IN GENERAL, THE SEVERITY OF WINTER INCREASES EASTWARD AND NORTHWARD, WHILE SUMMERS BECOME WARMER EASTWARD AND SOUTHWARD. OVER MOST OF THE COUNTRY, THERE ARE TWO MAJOR SEASONS: WINTER (LATE OCTOBER THROUGH EARLY APRIL) AND SUMMER (LATE MAY THROUGH EARLY SEPTEMBER); HOWEVER, IN THE NORTH, WINTERS ARE LONGER AND SUMMERS ARE SHORTER. TYPICALLY THERE ARE SHORT TRANSITIONAL PERIODS BETWEEN SEASONS.

CLIMATIC CONDITIONS VARY THROUGHOUT EUROPEAN RUSSIA. IN THE NORTH, THE CITY OF ARCHANGEL'SK, ON THE WHITE SEA, HAS A DAILY MEAN MINIMUM TEMPERATURE OF -20XC (-5XF) DURING JANUARY AND A DAILY MEAN MAXIMUM OF 20XC (68XF) DURING JULY. IN THE SOUTH, THE CITY OF ROSTOV-NA-DONU, NEAR THE BLACK SEA, HAS A DAILY MEAN MINIMUM TEMPERATURE OF -7XC (20XF) DURING JANUARY AND A DAILY MEAN MAXIMUM OF 27XC (81XF) DURING JULY. IN EUROPEAN RUSSIA, PRECIPITATION GENERALLY IS LOW, AVERAGING ABOUT 600 MM (24 IN) ANNUALLY OVER MOST OF REGION BUT AS HIGH AS 1,450 MM (58 IN) ON THE BLACK SEA AND AS LOW AS 200 MM (8 IN) ON THE CASPIAN SEA. THROUGHOUT EUROPEAN RUSSIAN, JULY AND AUGUST TYPICALLY RECEIVE

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THE MOST PRECIPITATION, OFTEN ACCOMPANIED BY THUNDERSTORMS.

MOSCOW (55-45-XXN 037-34-XXE; ELEVATION: 156 METERS/512 FT)
TEMPERATURE: MEAN DAILY MAXIMUM/MINIMUM (XC) (XF = 1.8XC + 32)
MONTH J F M A M J J A S O N D

MAXIMUM -9 -6 0 10 19 21 23 22 16 9 2 -5
MINIMUM -16 -14 -8 1 8 11 13 12 7 3 -3 -10
PRECIPITATION: MEAN TOTAL (MM) (1 IN = 25.4 MM)

MONTH J F M A M J J A S O N D

MEAN 39 38 36 37 53 58 88 71 58 45 47 54

D. POPULATION: RUSSIA, ON THE WHOLE, IS SPARSELY POPULATED. OVERALL POPULATION DENSITY IS 9 INHABITANTS PER SQ KM (22 PER SQ MI) BUT VARIES FROM LESS THAN 1 INHABITANT PER SQ KM (3 PER SQ MI) IN SOME RURAL AREAS TO MORE THAN 500 INHABITANTS PER SQ KM (1,300 PER SQ MI) IN MANY URBAN AREAS. RUSSIA'S POPULATION GROWTH RATE CURRENTLY IS DECLINING AT AN ANNUAL RATE OF 0.2 PERCENT (US, 0.99 PERCENT).

EUROPEAN RUSSIA, WHERE APPROXIMATELY 78 PERCENT OF RUSSIA'S POPULATION LIVES, IS THE MOST DENSELY POPULATED AND MOST URBANIZED REGION OF THE COUNTRY. MOSCOW OBLAST, WHERE MOSCOW IS SITUATED, IS ONE OF THE COUNTRY'S MOST DENSELY POPULATED AREAS (APPROXIMATELY 140 PERSONS PER SQ KM; 364 PERSONS PER SQ MI).

NOTE: POPULATION STATISTICS ARE FOR THE ENTIRE RUSSIAN FEDERATION.

TOTAL POPULATION 149.7 MILLION LITERACY RATE
100%
DOUBLING TIME NA (US=114 YRS) PERCENT
URBANIZED 79%

E. WATER SUPPLY

(1) SOURCES. SURFACE AND GROUNDWATER SOURCES GENERALLY ARE ABUNDANT THROUGHOUT RUSSIA, ALTHOUGH INFREQUENT REGIONAL DROUGHT CONDITIONS RESULT IN WATER SHORTAGES. PRINCIPAL SOURCES OF WATER ARE RIVERS, LAKES, SPRINGS, AND WELLS. SURFACE WATER IS THE PRIMARY SOURCE OF DRINKING WATER FOR MANY AREAS.

(2) TREATMENT/DISTRIBUTION. MANY MUNICIPAL WATER TREATMENT AND DISTRIBUTION SYSTEMS ARE DECLINING IN CAPABILITY DUE TO POOR

ECONOMIC CONDITIONS THROUGHOUT THE COUNTRY. ALTHOUGH WATER TREATMENT AND DISTRIBUTION SYSTEMS ARE FOUND IN MOST URBAN AREAS, GENERALLY THEY ARE UNRELIABLE AND DO NOT HAVE ADEQUATE CAPACITY TO MEET THE DEMANDS PLACED ON THEM. SECONDARY CONTAMINATION IS /***** BEGINNING OF SECTION 002 *****/

COMMON IN MANY AREAS DUE TO POOR DESIGN, CONSTRUCTION, AND MAINTENANCE OF DISTRIBUTION SYSTEMS, AS WELL AS INTERRUPTED PUMPING OPERATIONS. LOCAL BACTERIOLOGICAL AND CHEMICAL TESTING OF WATER SUPPLIES IS LIMITED AND SPORADIC, AND MOST LIKELY DOES NOT PROVIDE AN ACCURATE ASSESSMENT OF THE WATER QUALITY. RURAL HOMES TYPICALLY OBTAIN WATER DIRECTLY FROM RAW SOURCES.

F. LIVING AND SANITARY CONDITIONS: WORSENING ECONOMIC CONDITIONS IN RUSSIA ARE CAUSING A GENERAL DECLINE IN LIVING AND SANITARY CONDITIONS. ONLY ABOUT ONE-HALF OF COLLECTED SEWAGE RECEIVES TREATMENT BEFORE THE EFFLUENT IS RELEASED INTO THE ENVIRONMENT.

ALTHOUGH REFUSE ROUTINELY IS COLLECTED IN URBAN AREAS, IT FREQUENTLY IS DUMPED ALONG WATERWAYS, OR INTO OPEN PITS AND BURNED ALONG WITH OTHER WASTES, INCLUDING INDUSTRIAL AND AGRICULTURAL WASTES. CONTINUED URBANIZATION IS FORCING MULTIPLE FAMILIES TO SHARE THE SAME APARTMENT IN MANY AREAS, EXCEEDING THE WATER SUPPLY AND SEWAGE TREATMENT INFRASTRUCTURE CAPABILITIES. HIGH-RISE APARTMENT LIVING IS COMMON IN URBAN AREAS, AND GRADUALLY IS APPEARING IN RURAL AREAS. MANY RURAL INHABITANTS LIVE IN LOG STRUCTURES THAT LACK INDOOR PLUMBING AND ELECTRICITY.

G. POLLUTION: OVERTAXED MUNICIPAL SEWAGE TREATMENT SYSTEMS, AND UNREGULATED, UNCONTROLLED INDUSTRIES AND ENERGY PRODUCTION INFRASTRUCTURE HEAVILY CONTAMINATE WATER, AIR, AND SOIL, ESPECIALLY IN URBAN AREAS. IN EUROPEAN RUSSIA, CRITICALLY DEGRADED AREAS INCLUDE MOSCOW, THE KOLA PENINSULA REGION, THE MIDDLE VOLGA AND KAMA REGION, THE NORTHERN CASPIAN SEA REGION, THE BLACK SEA COAST, AND THE URAL INDUSTRIAL ZONE.

ALMOST ALL SURFACE WATER SOURCES RECEIVE UNTREATED INDUSTRIAL EFFLUENT. SURFACE WATER POLLUTANTS REPORTEDLY INCLUDE PETROLEUM PRODUCTS, PHENOLS, AND HEAVY METALS FROM INDUSTRIES (INCLUDING METALLURGICAL, CHEMICAL, PETROLEUM, COAL, AND PAPER), UNTREATED MUNICIPAL WASTES, AND NITRATES AND PESTICIDES FROM AGRICULTURAL RUNOFF. SEVERELY POLLUTED BODIES OF WATER INCLUDE THE VOLGA, URAL, DON, KAMA, AND PECHORA RIVERS, LAKE LADOGA, AND THE BALTIC, BLACK, AND CASPIAN SEA COASTS. MANY GROUNDWATER SOURCES ALSO ARE CONTAMINATED WITH AGRICULTURAL AND INDUSTRIAL CHEMICALS, WITH THE HEAVIEST CONTAMINATION BEING REPORTED IN TULA, PERM, TATARSTAN, BASHKORTOSTAN, AND MOSCOW OBLASTS.

AIR CONTAMINANTS IN URBAN AND INDUSTRIAL AREAS REPORTEDLY IN EXCESS OF RUSSIA'S "MAXIMUM PERMISSIBLE" CONCENTRATIONS INCLUDE CARBON DISULFIDE, DUST, FORMALDEHYDE, HEAVY METALS, HYDROCARBONS, HYDROGEN SULFIDE, METHYLMERCAPTAN, OXIDES OF NITROGEN, SULFUR, AND CARBON, AND PHENOLS. MAJOR POLLUTERS LACKING ENVIRONMENTAL CONTROLS INCLUDE METALLURGICAL, CHEMICAL, PETROCHEMICAL, FERTILIZER, AND WOOD PROCESSING INDUSTRIES AND MOTOR VEHICLES. CITIES IDENTIFIED WITH THE HIGHEST LEVELS OF AIR POLLUTANTS INCLUDE CHEREPOVEC, ELEKTROSTAL, KLIN, KOLOMNA, LIPECK, NOVODVINSK, PERM', PODOL'SK, MAGNITOGORSK, MOSCOW, MYTISHCHI, SAMARA, SARATOV, SCHELKOVO, SERPUKHOV, UFA, VOSKRESSENSK, AND YEKATERINBURG.

IN SOILS AROUND LARGE CITIES AND INDUSTRIAL CENTERS WHERE METALLURGICAL, CHEMICAL, PETROCHEMICAL, AND HEAVY EQUIPMENT INDUSTRIES ARE LOCATED, CONTAMINANTS REPORTEDLY INCLUDE HEAVY METALS, PETROLEUM PRODUCTS, AND FLUORIDE COMPOUNDS. LEVELS OF HEAVY METALS IN SOILS REPORTEDLY EXCEED RUSSIAN STANDARDS IN MANY AREAS, INCLUDING ST. PETERSBURG, R'AZAN', MONCEGORSK, AND THROUGHOUT MOSCOW OBLAST. PESTICIDE RESIDUES CONTAMINATE THE SOIL IN MANY REGIONS, INCLUDING MOSCOW, VOLOGRAD, AND ROSTOV OBLASTS, AND KRASNODAR KRAY.

RADIOLOGICAL CONTAMINATION OF THE ENVIRONMENT

RADIOLOGICAL CONTAMINATION OF EUROPEAN RUSSIA APPEARS TO BE LOCALIZED TO URBAN AREAS AND IN THE VICINITY OF ACTIVE AND FORMER DEFENSE SITES. APPROXIMATELY 1,000 SITES HAVE BEEN IDENTIFIED AND MITIGATED IN THE IMMEDIATE VICINITY OF MOSCOW. MOST OF THE MATERIALS RECOVERED HAVE INVOLVED LOW-LEVEL RADIOACTIVE WASTE GENERATED BY HOSPITALS, UNIVERSITIES, AND INDUSTRY.

INDISCRIMINATE DUMPING OF WASTE IS DECLINING AS NEW LAWS HAVE BEEN ENACTED TO PROTECT THE POPULATION FROM UNREGULATED EXPOSURE.

THE **KOLA PENINSULA** IS THE HOME OF THE **RUSSIAN NAVY** NORTHERN FLEET AND THE MURMANSK SHIPPING COMPANY, WHICH OWNS NUCLEAR-POWERED COMMERCIAL VESSELS SUCH AS ICEBREAKERS. THE NORTHERN FLEET OPERATES FROM THE FOLLOWING OPERATIONAL NUCLEAR CAPABLE SITES ON THE KOLA PENINSULA: ZAPADNAYA LITSA (MALAYA LOPATKA, BOLSHAYA LOPATKA, NERPICHA, AND ANDREJEVA BAY), VIDYAYEVO, SAYDA BAY, GADZHIEVO, SEVEROMORSK, AND GREMIKHA. NUCLEAR WASTE ALSO IS STORED AT SEVERAL SHIPYARDS ON KOLA AND AT SEVERODVINSK. THE PRIMARY RADIONUCLIDE ENCOUNTERED IN NUCLEAR PROPULSION RADIOACTIVE WASTE IS COBALT-60 (CO-60).

AN ESTIMATED 8,000 CUBIC METERS OF SOLID NUCLEAR WASTE AND 7,000 CUBIC METERS OF LIQUID NUCLEAR WASTE IS STORED ON THE KOLA

PENINSULA. SOLID WASTE IS STORED IN ANTIQUATED CONCRETE POOL TYPE RESERVOIRS. LIQUID WASTE IS STORED IN TANKER-TYPE VESSELS. OVER THE PAST SEVERAL DECADES, LARGE QUANTITIES OF RADIOACTIVE WASTE HAVE BEEN STORED ONBOARD THE MS LEPSE; THIS WASTE HAS NOW BEGUN TO LEAK INTO THE ENVIRONMENT, CAUSING LOCALIZED CONTAMINATION.

RADIOACTIVE WASTE FROM THE ARCHANGEL'SK OBLAST HAS BEEN TRANSPORTED TO TWO UNDERGROUND DISPOSAL SITES 12 KM SOUTHWEST OF SEVERODVINSK ON MOUNT MIRONOVAYA. REPORTS INDICATE THAT GROUND WATER HAS ENTERED THE SITES, AND CONTAMINATION HAS BEEN DETECTED IN THE ENVIRONMENT.

NUCLEAR POWER. RUSSIA HAS A VERY MATURE NUCLEAR POWER INDUSTRY INVOLVING NEARLY 100 COMMERCIAL NUCLEAR POWER PLANTS, URANIUM FUEL PROCESSING FACILITIES, AND SPENT FUEL STORAGE LOCATIONS.

/***** BEGINNING OF SECTION 003 *****/

MOST OPERATING COMMERCIAL NUCLEAR POWER PLANTS WERE CONSTRUCTED DURING THE LATE 1960S TO EARLY 1980S AND ARE CONSIDERED TO BE NEARING THE END OF THEIR USEFUL LIFETIME.

ENVIRONMENTAL CONTAMINATION FROM NUCLEAR POWER APPEARS TO BE RELATED TO A COMBINATION OF FACILITY AGE, DESIGN, AND OPERATOR ERROR. ALTHOUGH SEVERAL ACCIDENTS HAVE RESULTED IN SURFACE WATER AND SOIL CONTAMINATION, IMMEDIATE ACTIONS HAVE BEEN TAKEN TO HALT THE SPREAD OF CONTAMINATION, AND APPROPRIATE DECONTAMINATION HAS BEEN REPORTED. FOR SPECIFIC DETAILS REGARDING REACTOR LOCATION, AGE, INCIDENTS OF CONTAMINATION OR ACCIDENTS, AND GENERAL INFORMATION ON COMMERCIAL NUCLEAR POWER IN RUSSIA, CONTACT AFMIC. CHERNOBYL CONTAMINATION. IN 1986, CHERNOBYL NUCLEAR POWER PLANT (CNPP) EXPERIENCED A CATASTROPHIC EXPLOSION, DURING WHICH AN UNDETERMINED QUANTITY OF RADIOACTIVE MATERIAL WAS RELEASED INTO THE ENVIRONMENT. ALTHOUGH THE CNPP COMPLEX IS LOCATED IN UKRAINE, AN ESTIMATED 36 PERCENT OF THE CONTAMINATION WAS DEPOSITED IN THE FOLLOWING RUSSIAN OBLASTS: BELGOROD, BRYANSK, VORONEZH, KAULUGA, KURSK, OREL, LENINGRAD, LIPETSK, RYAZAN, TAMBOV, TULA, PENZA, AND ULYANOVSK. CONTAMINATION, SUFFICIENT TO CAUSE PARTIAL EVACUATION OF POPULATED SETTLEMENTS, WAS OBSERVED IN BRYANSK, KAULUGA, OREL, AND TULA.

SINCE 1986, MOST SHORT HALF-LIVED RADIONUCLIDES HAVE DECAYED, LEAVING PRIMARILY CS-137, PU-239, SR-90, AND THEIR DECAY DAUGHTER PRODUCTS WITHIN THE ENVIRONMENT. ALTHOUGH THE TRANSPORT OF RADIONUCLIDES OUT OF THE ENVIRONMENT HAS BEEN SOMEWHAT EFFECTIVE IN AQUATIC AND PASTORAL AREAS, TREES AND AGRICULTURAL PRODUCTS GROWN AND HARVESTED IN FORESTS (WILD BERRIES AND

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MUSHROOMS) STILL RETAIN A SUBSTANTIAL RADIONUCLIDE BURDEN.

RADIOACTIVE I-131 (HALF-LIFE OF ONLY 8 DAYS) HAS DECAYED TO BACKGROUND LEVELS AND THEREFORE NO LONGER POSES A THREAT TO THE THYROID GLAND. AN ESTIMATED 60 PERCENT OF THE TOTAL LIFETIME DOSE HAS ALREADY BEEN DELIVERED TO THE POPULATION (PRIMARILY FROM SHORT HALF-LIVED NUCLIDES), WITH THE REMAINING 40 PERCENT TO BE DELIVERED FROM CS-137 AND SR-90 DURING THE NEXT 40 YEARS.

H. HAZARDOUS ANIMALS AND PLANTS

(1) SNAKES. VENOMOUS LAND SNAKES INCLUDE

FAMILY: CROTALIDAE

AGKISTRODON HALYS

FAMILY: VIPERIDAE

VIPERA AMMODYTES

VIPERA BERUS

VIPERA KAZNAKOVI

VIPERA LEBETINA

VIPERA URSINII

VIPERA XANTHINA

(2) PLANTS.

DERMATITIS RISK

ACONITUM SPP.

ACTAEA SPP.

CROTON SPP.

EUPHORBIA SPP.

HERACLEUM SPP.

RHUS SPP.(TOXICODENDRON SPP.)

URTICA SPP.

SYSTEMIC POISONING RISK

ACONITUM SPP.

ACTAEA SPP.

AESCULUS SPP.

AETHUSA CYNAPIUM

ATROPA BELLADONNA

CHAEROPHYLLUM TEMULENTUM

CITRULLUS COLOCYNTHIS

CONIUM MACULATUM

CONVALLARIA MAJALIS

CROTON SPP.

EUONYMUS SPP.

EUPHORBIA SPP.

FRITILLARIA SPP.

HELIOTROPIUM SPP.

UNCLASSIFIED

HELLEBORUS SPP.
HYOSCYAMUS SPP.
LABURNUM ANAGYROIDES
MERCURIALIS SPP.
PARIS QUADRIFOLIA
POLYGONATUM SPP.
RHAMNUS SPP.
RHUS SPP. (TOXICODENDRON SPP.)
SOLANUM SPP.
SOPHORA SPP.
TAXUS SPP.

(3) OTHER. INVERTEBRATES INCLUDE LATRODECTUS SPP. (WIDOW SPIDERS)
AND
BUTHUS SPP. AND ANDROCTONUS SPP. (SCORPIONS) IN SOUTHERN AREAS OF
THE REGION.

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