GENERAL ATOMIC COMPANY

ENVIRONMENTAL INFORMATION REPORT

JULY, 1981

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1.0 INTRODUCTION

The purpose of this environmental information report (EIR) is to support the 1981 SNM 696 license renewal application by updating the information contained in the Environmental Appraisal Report (GA-A13033) of February, 1975. The site and vicinity demography is updated to 1980, and operational experience and data are used to show that the present operation does not have a significant impact on the environment.

2.0 AFFECTED ENVIRONMENT

2.1 SITE LOCATION AND LAYOUT

The main site of the licensee at San Diego is located at 10955 John Jay Hopkins Drive approximately 13 miles north of downtown San Diego at roughly 32° 52' 39" latitude and 117° 14' longitude. The site occupies 360 acres.

Component and fuel manufacturing, as well as HTGR fuel production process development, are located in Sorrento Valley at 11220 Flintkote Avenue on 60 acres of property contiguous to the main site.

The site, vacant at the time of selection in 1956, was chosen on the basis of the availability of inexpensive land supported by city utilities and a setting in which pure and applied science could be conducted in a university-like environment.

The distance from the main site to the single, closest residence is presently about one mile, with any others being close to two miles in the southeast sector. This degree of isolation will probably continue indefinitely due to the nature of the surrounding terrain and land use zoning. The facilities do not interfere with recreational activities in the area, nor do they pose a threat to cultural or historical sites.

2.2 REGIONAL DEMOGRAPHY, LAND AND WATER USE

The present population within a one mile radius of the main site is primarily of an industrial and university campus makeup, with an estimated daytime total of up to 14,500 people (about 2200 are the licensee's employees). The immediate vicinity of the Flintkote Avenue facilities is zoned for industrial activity. Interstate Highway 5 is located about 1/2 mile to the east of the Component and Fuel Manufacturing building. The population distribution and nearby industrial and community facilities are shown in Fig. 2.2-1.

The majority of the present population to the north is in a series of small, unincorporated towns extending to Oceanside, 25 miles north with a population of 76,700. Escondido, 18 miles northeast of the site, has a population of 62,500. To the south is the metropolitan area of San Diego. The distance and population of surrounding communities is given in Table 2.2-1.

TABLE 2.2-1

DISTANCE/POPULATION OF SURROUNDING COMMUNITIES

Community	Distance (Air Miles) and Direction	Population[a]
Del Mar	5 miles north	5,017
Los Penasquitos	8 miles northeast	19,000
Rancho Bernardo	13 miles northeast	16,100
Poway	12 miles east	32,100
Mira Mesa	6 miles east	37,500
University City	4 miles south	28,900
La Jolla	5 miles southwest	27,900
Clairemont	6 miles south	82,400

[a] Population data current as of the 1980 census.

No significant fresh water recreation areas exist within the local hydrological area, nor is there significant agricultural activity. Los Penasquitos Creek flows into an area called Sorrento Slough, which is part of Torrey Pines State Park and near the licensee's site (about one mile in distance). The slough is a game refuge and an area of tidal mud flats. All plants and animals in the area are protected, and essentially no human use is made of it.

Water for the site is supplied by the City of San Diego Municipal System.

2.2 HYDROLOGY

The plant site lies within the Los Penasquitos Creek drainage basin. Surface drainage from the site runs through the Soledad Valley into Los Penasquitos Creek, which flows to the northwest and empties into the Pacific Ocean. Water flows into the Soledad Valley only during occasional heavy rains.

Floods do not represent a danger to the site as it is situated approximately 50-350 ft. above the valley floor. Also, drainage downstream from the site to the Pacific Ocean is unrestricted.

Surface water downstream from the site cannot be used domestically because of its intermittent flow and dirty condition during periods following rainstorms or heavy runoffs.

According to the California Department of Water Resources, the nearest groundwater would be in Sorrento Valley in an area defined by the drainage flow into the salt water marsh toward the ocean. The depth of the groundwater is estimated to be less than 25 feet, depending on the area precipitation and drainage from the Penasquitos Valley. The groundwater east of the site (primarily Penasquitos Valley) is considered marginal or inferior for irrigation purposes. Salt water intrusion closer to the coast further decreases the utility of the groundwater.

2.3 METEOROLOGY

2.3.1 General Influences

The weather and climatology of southern California are dominated by the semipermanent Pacific high-pressure system which is a feature of the planetary circulation and which oscillates back and forth during the year as the seasons change. In the summer when the Pacific high-pressure system is at its most northerly position, it blocks traveling storm and high- and low-pressure systems, resulting in almost no rain from frontal activity during the summer season. The withdrawal of the Pacific high-pressure system to its most southerly position in the winter season allows storm systems to travel further south, resulting in winter rains in southern California.

The Pacific high-pressure system further influences atmospheric circulation by forming a temperature inversion that restricts the mixing layer for pollutants and by causing low-average wind speeds in this restricted mixing layer. The lower altitude limit of the inversion, called the inversion base, is the upper limit beyond which cloud rise is retarded. Representative temperature profiles over a period of five months covering summer, fall, and winter show that inversions having bases between 250 and 5000 ft altitude occurred 76% of the time. Inversion bases occurring between 1000 and 2000 ft are most common in the summer, lowering to 250 to 1000 ft in the fall and increasing to 1500 to 2500 ft or higher in the winter.

2.3.2 Winds

The prevailing winds are usually westerly, although easterly winds are almost as common during the winter months. During the day, the westerly winds developing from the Pacific high-pressure system are reinforced by the land-sea breeze, resulting in stronger average wind velocities (6.5 to 9 mph) than from the easterly land breeze (1 to 7.2 mph). The land breeze is often present at night during the cold season, but seldom during the warmer months. This wind is shallow, usually a few hundred feet, while the sea breeze is often 1000 ft or more. Such air flow is effectively channeled by topographical features. Strong winds are infrequent; the strongest was 51 mph from the southeast in 1944.

The micrometeorology conditions at the site are determined by the terrain roughness, local topography, wind regimes (land and sea breezes), and solar heating. The dilution of airborne contamination due to normal operating releases will be determined by the small scale turbulence in the local area in combination with the wind and mode of release (ground level or elevated). A two-tower meteorological system is used to determine the micrometeorological conditions at the site. The data from the meteorological system was analyzed to provide the atmospheric stability/wind frequency results in Table 2.3-1.

2.3.3 Precipitation

The average annual rainfall in the City of San Diego is 10.4 in., but relatively wide variations in the monthly and seasonal totals take place. This is illustrated by the fact that 75% of the annual precipitation occurs from November through March. The monthly averages for the period from 1940 through 1970 are given in Table 2.3-2.

TABLE 2.3-1

GENERAL ATOMIC ATMOSPHERE STABILITY/WIND FREQUENCY

Wind Direction	A Freq.	A W.S.*	B Freq.	B W.S.	C Freq.	C W.S.	D Freq.	D W.S.	E Freq.	E W.S.	F Freq.	F W.S.	G Freq.	G W.S.
	STABILITY CLASS													
N	0	0	.0005	7.6	.002	5.6	.0050	5.9	.0075	4.8	.0067	2.8	.0041	1.8
NNE	0	0	0	0	.0013	6.1	.0063	7.1	.0088	4.2	.0067	2.3	.0052	1.1
NE	0	0	.0002	9.9	.0013	8.9	.0067	7.3	.0085	4.7	.0149	3.3	.0088	1.8
ENE	.0003	11.6	.0006	6.1	.0011	7.5	.0055	4.4	.0085	3.3	.0160	2.8	.0132	1.5
E	.0005	8.1	.0002	10.3	.0028	6.4	.0063	4.4	.0118	2.9	.0276	2.8	.0181	1.5
ESE	.0005	8.2	.0017	7.9	.0022	6.8	.0077	6.7	.0129	3.3	.0485	3.1	.0228	2.0
SE	.0002	8.4	.0017	5.6	.0049	5.5	.0102	6.1	.0121	4.4	.0234	2.9	.0163	1.8
SSE	.0008	6.2	.0017	4.6	.0067	5.3	.0074	6.1	.0078	4.8	.0111	2.6	.0105	1.9
S	.0008	6.3	.0025	5.9	.0047	5.9	.0115	5.5	.0124	4.3	.0154	2.7	.0089	1.9
SSW	.0005	9.5	.0022	6.8	.0057	6.7	.0132	7.1	.0173	5.6	.0135	2.9	.0085	1.7
SW	.0002	7.6	.0057	8.3	.0105	[illegible]	.0171	6.7	.0154	5.4	.0100	2.6	.0080	1.6
WSW	.0006	8.5	.0074	8.5	.0166	7.9	.0320	7.6	.0204	5.6	.0104	3.4	.0024	1.7
W	.0005	7.9	.0036	8.7	.0143	8.2	.0479	8.3	.0265	6.8	.0082	2.8	.0030	1.4
WNW	.0002	9.5	.0016	7.2	.0052	8.6	.0295	8.1	.0337	6.5	.0088	2.9	.0022	1.5
NW	0	0	.0008	6.6	.0028	6.3	.0171	7.1	.0193	6.1	.0119	2.8	.0047	1.5
NNW	.0002	3.9	.0008	7.3	.0027	6.2	.0086	5.9	.0102	5.0	.0094	3.0	.0061	1.6
Calm	0	0	0	0	0	0	.0003	0	.0014	0	.0035	0	.0246	0
TOTAL	.0053		.0312		.0843		.2323		.2345		.2461		.1673	

*miles per hour

TABLE 2.3-2

AVERAGE PRECIPITATION FROM 1940 THROUGH 1970

Period	Average Precipitation (in.)
January	2.01
February	2.15
March	1.57
April	0.79
May	0.15
June	0.05
July	0.01
August	0.08
September	0.15
October	0.49
November	0.90
December	2.05

The maximum precipitation in 24 hours for each month of the year during a period extending from 1941 to 1970 is given in Table 2.3-3.

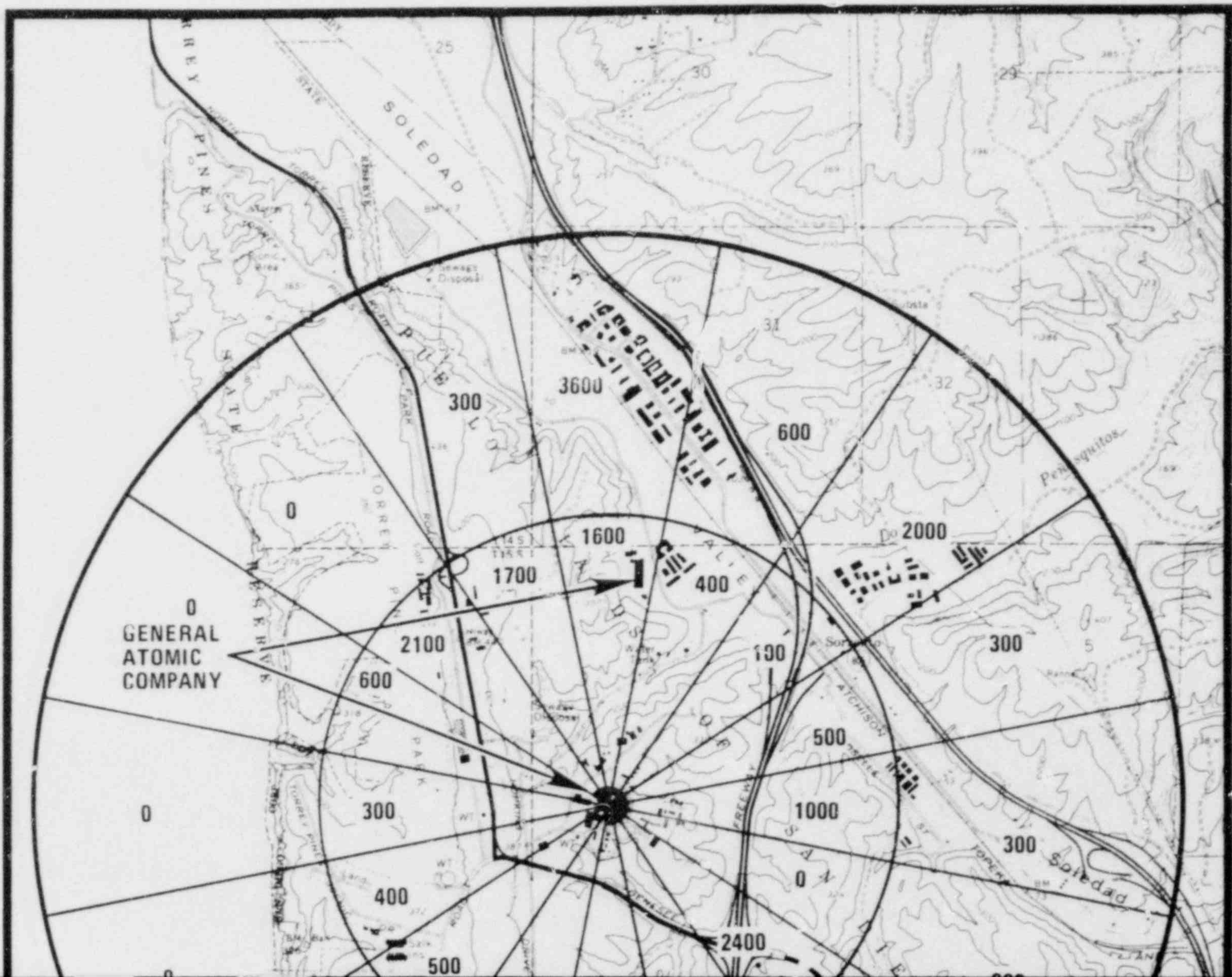
TABLE 2.3-3

MAXIMUM PRECIPITATION IN 24 HOURS FROM 1941 to 1970

Month	Maximum Precipitation (in.)
January (1943)	2.65
February (194[illegible])	1.71
March (1952)	2.40
April (1965)	1.40
May (1957)	0.42
June (1963)	0.27
July (1968)	0.10
August (1951)	0.83
September (1963)	0.90
October (1941)	1.20
November (1944)	2.44
December (1945)	3.07

2.3.4 Storms

Tornadoes on the Pacific Coast are of low frequency and are not severe. Small tornadoes and water spouts have been reported. In the one degree square (117° - 118° longitude, 32° - 33° latitude) containing San Diego and its vicinity, only five tornadoes were reported between 1916 and 1971. There were no reported deaths due to tornadoes in California up to 1971.


GENERAL
ATOMIC
COMPANY
SOLEDAD
TORREY PINES
STATE RESERVE
PUEBLO
ATCHISON
TOPEKA
FREEWAY
Soledad
Peñasquitos
3600
300
600
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1700
400
2000
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2100
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2400
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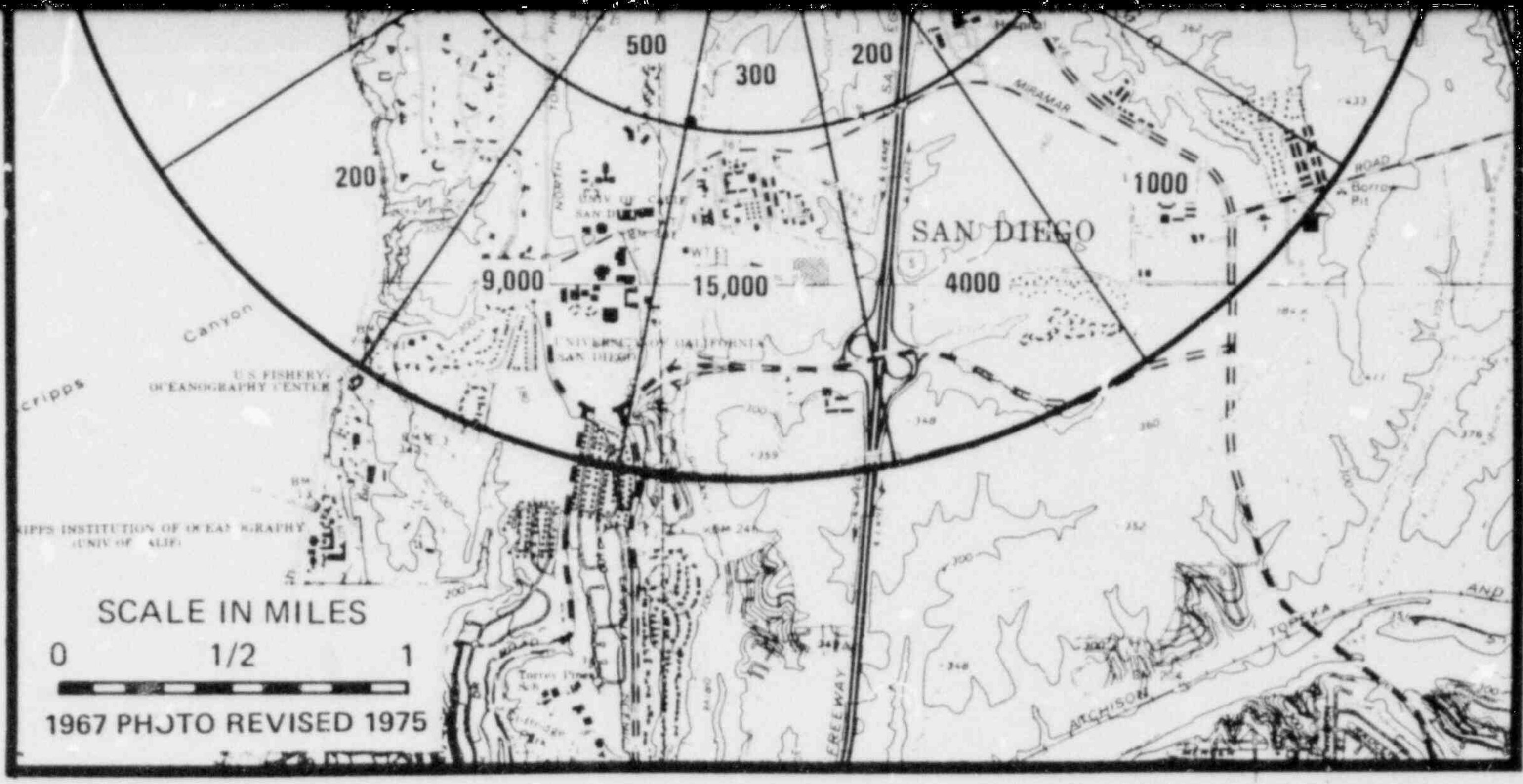

FIG. 2.2-1
POPULATION DISTRIBUTION AROUND THE SAN DIEGO SITE

3.0 ENVIRONMENTAL IMPACT

3.1 INTRODUCTION

The potential impact of the site operations are considered as a result of releases to the environment. Radiological releases over the last five years were averaged to get representative numbers.

3.2 AIR RELEASES

3.2.1 Radiological Releases

Table 3.2-1 lists the average yearly release of airborne radioactivity from the site for the years 1966 through 1980. The largest sources of activity were tritium (0.5 Ci/yr), Argon-41 (0.8 Ci/yr), and Krypton-85 (0.8 Ci/yr). Much of the tritium and Krypton releases were the result of calibration or instrumental analysis activities. The Argon-41 was released as the result of Triga Research Reactor operation.

If an individual were continuously present at the site boundary for one year, the maximum 50-year dose commitment for the inhalation route would be 7×10^{-3} rem to the bone, 4×10^{-3} rem to the lung, and 1.3×10^{-5} rem to the thyroid. The maximum whole-body gamma dose would be 5.2×10^{-6} rem. By comparison, the EPA standard (40 CFR 190) for the uranium fuel cycle is 25×10^{-3} rem/yr. Also by comparison, the average yearly dose rate in the United States for the various organs is 120×10^{-3} rem/yr for the bone and 180×10^{-3} rem/yr for the lung. The whole-body dose rate is approximately 100×10^{-3} rem/yr for the San Diego area. Since there are no individuals living at the site boundary, the actual doses from the site operations could be considerably lower than the

TABLE 3.1-1

SAN DIEGO SITE AVERAGE YEARLY RADIONUCLIDE RELEASE, 1976 THROUGH 1980

AIR

Radionuclide	Ci/Yr*
H-3	0.5
Ar-41	0.8
Co-60	.0017
Kr-85	0.8
Nb-95	.008
Ru-103	.0000015
Xe-127	.003
I-131	.001
Xe-133	.07
Cs-137	.07
Eu-154	.0006
Th-232	.00027
U-235	.0016
U-238	.0002

LIQUID

U-235	2.7×10^{-4} Ci/yr

*Releases of less than 10^{-6} Ci/yr are not listed.

maximum doses calculated. A single residence is approximately 0.75 mile north of the Fuel Fabrication Facility in Sorrento Valley.

3.2.2 Nonradiological Releases

The nonradiological effluents have not changed significantly from 1975 and, in many cases, have decreased due to reduced operations. In 1975 the boundary concentrations of the various chemicals from the site were several orders of magnitude lower than the applicable standards. They still do not have any significant impact on the environment.

3.3 LIQUID RELEASES

The operation of the various facilities of the licensee's San Diego site will not result in the discharge of a liquid waste into any local surface or subsurface waters.

3.3.1 Radiological Releases

Table 3.1-1 lists the average amount per year of Uranium-235 that was released to the regional sewer system. Only 5000 gallons per month are allowed to be released to the regional sewer system at concentrations no greater than the unrestricted MPC. The 2.7×10^{-4} Ci/yr listed in Table 3.1-1 has resulted in liquid concentrations of much less than the applicable MPC. The release goes into a sewer system treating 100 million gallons of waste per day. For all practical purposes, the liquid radioactive effluents are inconsequential.

3.3.2 Nonradiological Releases

The licensee discharges the normal amount of sanitary sewage waste for 2200 people into the regional sewerage system. Under three industrial waste discharge permits granted by the San Diego City Water Utilities Department, the licensee has been permitted to discharge 30,000 gallons per day of research laboratory waste water, 30,000 gallons per day of fume scrubber waste water, and 9,000 gallons per day of neutralized acid waste water into the sewerage system.

3.4 SOLID WASTES

No radioactive materials are disposed of in the ground without special permission. Waste material is concentrated, then consigned to a licensed waste disposal contractor for burial at a government-approved site. As a result, there is no environmental impact from solid waste disposal.

3.5 SUMMARY AND CONCLUSIONS

The environmental impact of the licensee's operations are well within the applicable standards. The results of the licensee's environmental monitoring program confirm this. For a description and results of the environmental monitoring program, see the demonstration volume of the licensee's renewal application.