ORIGINAL

# RESOLUTION NO. 260

WHEREAS, By letter dated October 9, 1991, the Supply System proposed revisions to the WNP-2 Radiological Environmental Monitoring Program (REMP) contained in Attachment I - Environmental Monitoring Program - to the WNP-2 Site Certification Agreement (SCA), as modified by Resolution No. 132; and

WHEREAS, Attachment I of the SCA states that the WNP-2 "Environmental Monitoring Program will be flexible and may be modified with concurrence of the Council as detailed information is acquired from the program;" and

WHEREAS, The state Department of Health, Division of Radiation Protection, (DOH), under contract to the Council to perform environmental auditing of the WNP-2 REMP, by letter dated October 31, 1991, advised the Council that based upon their review of the 1990 WNP-2 REMP Annual Report the Supply System's program meets the requirements listed in the WNP-2 SCA and all applicable federal and state environmental radiation protection standards; and

WHEREAS, DOH, by letter dated December 6, 1991, advised the Council that they agreed with the overall changes to the WNP-2 REMP and requested that a provision be added to the sampling and collection frequency requirements to address equipment failures; and

WHEREAS, DOH and Council staff have reviewed the proposed revisions to the WNP-2 REMP and found that an update of the program is reasonable, necessary and satisfactory for the purpose of radiological environmental monitoring.

NOW, THEREFORE BE IT RESOLVED, That the Energy Facility Site Evaluation Council hereby approves the attached WNP-2 Radiological Environmental Monitoring Program, incorporating the addition recommended by DOH, as a part of the Plant 2 SCA Environmental Monitoring Program. The revised WNP-2 REMP is to be implemented by the Supply System in cooperation with the state of Washington environmental radiation program. This action closes out Resolution No. 132.

Dated this 13th day of January 1992.

WASHINGTON STATE ENERGY FACILITY
SITE EVALUATION COUNCIL

By Robert G. Waldo
Robert G. Waldo
EFSEC Chairman

Approved as to form:

By Jason Zeller
Jason Zeller
EFSEC Manager

Attachment

REMP revisions

Attach. I

C-resoluions-res.260

# PLANT 2 SITE CERTIFICATION AGREEMENT

## RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

## I. GENERAL DESCRIPTION

The Environmental Monitoring Program established by the Supply System has as its objective the determination of the significant effects of Plant 2 operation on the environment. The monitored items include land, adjacent waters and their aquatic life, air, and other eco-systems, as appropriate. The program provides an environmental measurement history for evaluation by the Supply System and the Council. The program uses reasonable and available methods and techniques; it will be maintained throughout the life of Plant 2 or until such time that the Council concurs in its termination.

The Environmental Monitoring Program may be modified with concurrence of the Council as detailed information acquired from the program indicates a need to change. Any modifications will be based upon: (a) Plant 2 effects, if any, on the terrestrial and aquatic ecology including the wildlife, fish and other aquatic life in the area of influence, (b) siting of other nuclear or other facilities in areas surrounding the site, (c) technological developments in the field of environmental monitoring, (d) changes in types and abundance of the various samples and (e) changes relative to the pathways resulting in human radiation exposure. The monitoring program is designed to assure appropriate reaction when an unexpected variance occurs in the data results.

This Radiological Environmental Monitoring Program is part of a single integrated program for monitoring the preoperational and operation phases of Plant 2 operations. Changes, supplements, or revisions to the Radiological Environmental Monitoring Program will be submitted to the Council for its review and concurrence.

## II. MONITORING PROGRAM

### A. Program Elements

1. Air sampling stations are located on site and within present or future regions of high population density within a ten-mile radius of Plant 2. The zone from five to ten miles of the site is emphasized in the regions where populations are more concentrated, especially those downwind of prevailing winds. The ten-mile radius zone includes parts of Franklin and Benton Counties.

2. In the terrestrial monitoring part of this program (milk, soil and farm products), the area within a ten-mile radius of Plant 2 is of primary concern. Agriculture is the primary activity in the Franklin County portion of this area. The major crops are wheat, alfalfa hay, sugar beets, potatoes, grapes, apples and cherries.

Particular emphasis is placed on the collection of the primary components of the food chain to man. Soil samples, vegetables, fruits, and milk are sampled. Samples of domestic animals normally consumed by man, such as chickens, beef cattle, and hogs will be collected when indicated by soil and vegetation samples.

3. In the aquatic program, sampling includes groundwater at Plant 2 and the WNP-1 Site, surface water samples from the Columbia River, and drinking water from the DOE 300 area potable water intake and the City of Richland municipal water supply.

   In addition, sediment samples are taken from the Columbia River above and below the Plant 2 discharge point. Fish samples are also taken from the Columbia River near the plant discharge and from the Snake River.

B. Surveillance levels

The radiological environmental monitoring program outlined in Table 1 represents the current level of surveillance around Plant 2. The sampling locations may change from time to time when samples are no longer available. Replacement sampling sites are then added to the program to compensate.

Analytical procedures shall be compatible with but not limited to the following documents, or later documents representing state-of-the-art improvements:

1. "Handbook of Radiochemical Analytical Methods" U.S. Environmental Protection Agency, EPA-680/4-75-001, February, 1975.

2. "Health and Safety Laboratory Procedures Manual" U.S. Energy Research and Development Administration, HASL-300, 27th Edition.

3. "Standard Methods for the Examination of Water" American Public Health Association, 16th Edition.

The Supply System will use laboratories which participate in the Environmental Protection Agency's (EPA's) Environmental Radioactivity Laboratory Intercomparisons Studies (Crosscheck) Program or equivalent program. Upon request, the Supply System will provide the Council or its designated representatives access to written procedures, quality assurance audits, and the results of the Crosscheck Program as performed in the implementation of the Radiological Environmental Monitoring Program. In addition, the Council designate(s) will be provided the opportunity to view and participate in the collection and analytical process.

Sample stations are described in the following discussion of sample types and in Table 1. The approximate sampling locations are presented in Figures 1, 2 and 3. The sampling locations in some media, such as TLDs and air, are more numerous on the map than in the following discussion and in Table 1, because the map includes the required locations plus locations that are not required by the Site Certification Agreement.

1. Atmosphere

   a. Gamma Detectors

      Three gamma detectors are maintained around the plant, when needed. These detectors are not a part of the routine REMP program. They shall be used as supplemental or backup systems to provide immediate evaluation of radiation levels in the environment on a short-term basis.

   b. TLDs

      The background levels of external radiation are established by exposing thermoluminescent dosimeters (TLDs) for various periods of time at twenty-five or more locations within a ten-mile radius of the site. Two TLDs are placed at each location. One TLD is exchanged and read annually. The other TLD is exchanged and read quarterly. TLDs are located at each air sampling station and at other locations as required by plant design.

2. Airborne Particulates

   Airborne particulates are collected on a weekly basis at nine or more sampling stations. The particulate filters and charcoal cartridges, are changed weekly. The filter housings are located 6-8 feet above ground level to reduce dust loadings of the filters and to minimize the influence of radon and its daughters emanating from the soil on sample activity.

3. Drinking Water

   Sampling of drinking water is performed on a monthly basis from two locations downstream from the discharge. These samples are collected using water samplers which produce composite samples that are flow proportional.

4. River and Discharge Water

   Sampling of the Columbia River is performed on a monthly basis from locations at the plant intake and below the discharge. Samples are also taken from the plant discharge line. These water samples are collected using composite samplers that sample proportionally to flow.

5. Ground Water

   Sampling of groundwater is performed quarterly from on-site wells which are being used for fire protection and as backup drinking water sources. One well is located near Plant 2. Two additional wells are located on the WNP-1 Site.

6. Soil

   Soil samples are collected annually at five air sampling locations.

7. Sediment Samples

Samples of the Columbia River bottom sediment are collected semiannually upstream and downstream from the Plant 2 discharge.

8. Milk

Milk is sampled semimonthly during the grazing season and monthly at other times from at least three milk producers within ten miles of the plant and from a control location in a least prevalent wind direction greater than 20 miles from the site. Information regarding the sources of food is documented for each sampling location.

9. Fish

Fish are collected annually from the Columbia River near the plant discharge and from the Snake River. The exact time of sampling depends upon such factors as the water depth, weather conditions, and fish availability. If any of the analytical results of the Columbia River fish samples are significantly higher than the results of the Snake River samples or the results of previous fish samples, sampling will be conducted semiannually.

TABLE 1

| SAMPLE TYPE | LOCATION[1] | SAMPLING AND[1] COLLECTION FREQUENCY | TYPE AND FREQUENCY OF ANALYSIS |
|---|---|---|---|
| Airborne Particulate and Radioiodine[3] | 1.3 miles S<br>3.0 miles ESE<br>4.5 miles NE<br>9.3 miles SSE<br>6.4 miles SE<br>7.7 miles S<br>2.7 miles WNW<br>4.5 miles ESE<br>30 miles WSW | Continuous sampling<br>Weekly collection | Particulate:<br>Gross beta[2]<br>Gamma isotopic[4]<br>on quarterly composite<br>(by location)<br><br>Radioiodine:<br>Gamma for I-131 |
| Direct Radiation[5] | 3.0 miles S<br>3.0 miles NNW<br>4.5 miles SE<br>9.3 miles SSE<br>6.4 miles SE<br>7.7 miles S<br>2.7 miles WNW<br>4.5 miles ESE<br>30 miles WSW<br>3.1 miles E<br>3.1 miles ENE<br>6.1 miles NNW<br>At least 13 stations at approximately 0.5 and 1.5 miles, within the 22½° sectors | Quarterly, annually | Gamma dose |
| Soil | 1.3 miles S<br>1.5 miles ENE<br>2.7 miles WNW<br>3.0 miles ESE<br>30 miles WSW | Annually | Gamma isotopic[4]<br>Strontium - 90[6] |

TABLE 1 (Continued)

| SAMPLE TYPE | LOCATION[1] | SAMPLING AND[1] COLLECTION FREQUENCY | TYPE AND FREQUENCY OF ANALYSIS |
|---|---|---|---|
| River and Discharge Water | Intake<br>Discharge | Composite aliquots[8]<br>Monthly collection | Gamma isotopic[4]<br>Tritium[9]<br>Gross beta |
| Drinking Water | 7.4 miles SSE (300 Area)<br>11.0 miles SSE (Richland Water) | Composite aliquots[8]<br>Monthly collection | Gamma isotopic[4]<br>Tritium[9]<br>Gross beta[10]<br>Strontium - 90[10] |
| Ground Water[11] | Well Plant 2<br>Well WNP-1<br>Well WNP-1 | Quarterly | Gamma isotopic[4]<br>Tritium |
| Sediment | ~1 mile upstream<br>~2 miles downstream | Semiannually | Gamma isotopic[4] |
| Milk[12] | Closest milk animal<br>Farm ESE or SSE<br>Farm SE<br>Control, 30 miles WSW or SW | Semimonthly during grazing season; Monthly at other times | Gamma isotopic[4]<br><br>Iodine - 131 |
| Fish[13] | 3 species from the Columbia River in the vicinity of discharge and 3 species from the Snake River | Annually, unless an impact is indicated, then semiannually | Gamma isotopic[4] |
| Fruit & Vegetables[14] | Within 10 mile radius, when available<br>16 miles SSE in Riverview area of Pasco | Monthly during growing season | Gamma isotopic[4] |
| Meat and Poultry[15] | Within 10 mile radius | As required | Gamma isotopic[4] |

TABLE 1 (Continued)

These sampling locations are described relative to their distance from Plant 2 containment.

1) Deviation may be required if samples are unobtainable due to hazardous conditions, seasonal availability, malfunction of automatic sampling equipment, or other legitimate reasons. All deviations will be documented in the annual report. If samples are unobtainable due to sampling equipment malfunction, efforts shall be made to complete corrective action prior to the end of the next sampling period. If extended sampling failure occurs (two sampling periods), arrangements shall be made to obtain adequate alternate samples.

2) Particulate sample filters will be analyzed for gross beta after at least 24 hours decay. If gross beta activity is greater than 10 times the mean of the control sample, gamma isotopic analysis should be performed on the individual sample.

3) A total of twelve air sampling stations are used by the REMP.

4) Gamma isotopic means identification and quantification of gamma emitting radionuclides that may be attributable to the effluents of the facility.

5) Thermoluminescent dosimeters (TLDs) which contain four readout areas will be used. Each station will have two TLDs; one will be exchanged each quarter and one will be exchanged annually.

6) Individual soil samples will be analyzed for strontium-90 if the gamma results for the sample are greater than 10 times the mean of the control.

7) This sample consists of water from the Plant 2 discharge line, without dilution.

8) Composite samples will be collected with equipment which is capable of collecting an aliquot at time intervals which are short relative to the compositing period.

9) Tritium analysis will be performed on a quarterly composited sample.

10) If the gross beta activity in the water is greater than 8 pCi/l or 10 times the mean of the previous 3 months activity level for the specific location, strontium-90 analysis will be performed.

11) The well sampled at Plant 2 provides a backup source of drinking water and fire protection water to Plant 2. The wells at WNP-1 provide drinking water for the WNP-1 site.

12) Milk samples will be obtained from farms or individual milk animals which are located in sectors with the higher calculated annual average ground-level X/Qs. Milk is normally collected from three to four locations in the ESE, SE, or SSE sectors. If cesium-134 or cesium-137 is measured in an individual milk sample in excess of 30 pCi/l, then strontium-90 analysis should be performed.

13) The species collected from the Snake River are control samples. The three species from each river consist of one anadromous and two resident species.

14) Fruit and vegetables will be obtained from farms or gardens which use Columbia River water for irrigation, if possible. Different varieties will be obtained as they are in season. One sample each of roots, leafy vegetables, and fruit should be collected each period. Vegetables are also collected in the Sunnyside - Grandview area as control samples.

15) Meat and/or poultry are sampled only when vicinal soil and vegetation samples indicate greater then background levels of radioactivity.

KEY FOR FIGURES 1, 2, and 3

| Station Number | Sample Type |
|---|---|
| 1 and 7 | Particulate<br>Radioiodine<br>Direct Radiation<br>Soil |
| 2 and 3 | Direct Radiation |
| 4-6 | Particulate<br>Radioiodine<br>Direct Radiation |
| 8 | Particulate<br>Radioiodine<br>Direct Radiation |
| 9A (control)<br>(control)<br>(control)<br>(control)<br>9B<br>9C (control) | Particulate<br>Radioiodine<br>Direct Radiation<br>Soil<br>Milk<br>Fruit and/or Vegetables |
| 10-25, 40-47, 49-51, 53-56, 61<br>71-86 | Direct Radiation |
| 21, 23, 40, 48, 57 | Particulate<br>Radioiodine |
| 26 (control) | River Water (intake) |
| 27 | Discharge Water |
| 28, 29 | Drinking Water |
| 31, 32, 52 | Ground Water |
| 30, 38 (control) | Fish |
| 33 (control), 34 | Sediment |
| 36, 40, 62, 64, 96 (control) | Milk |

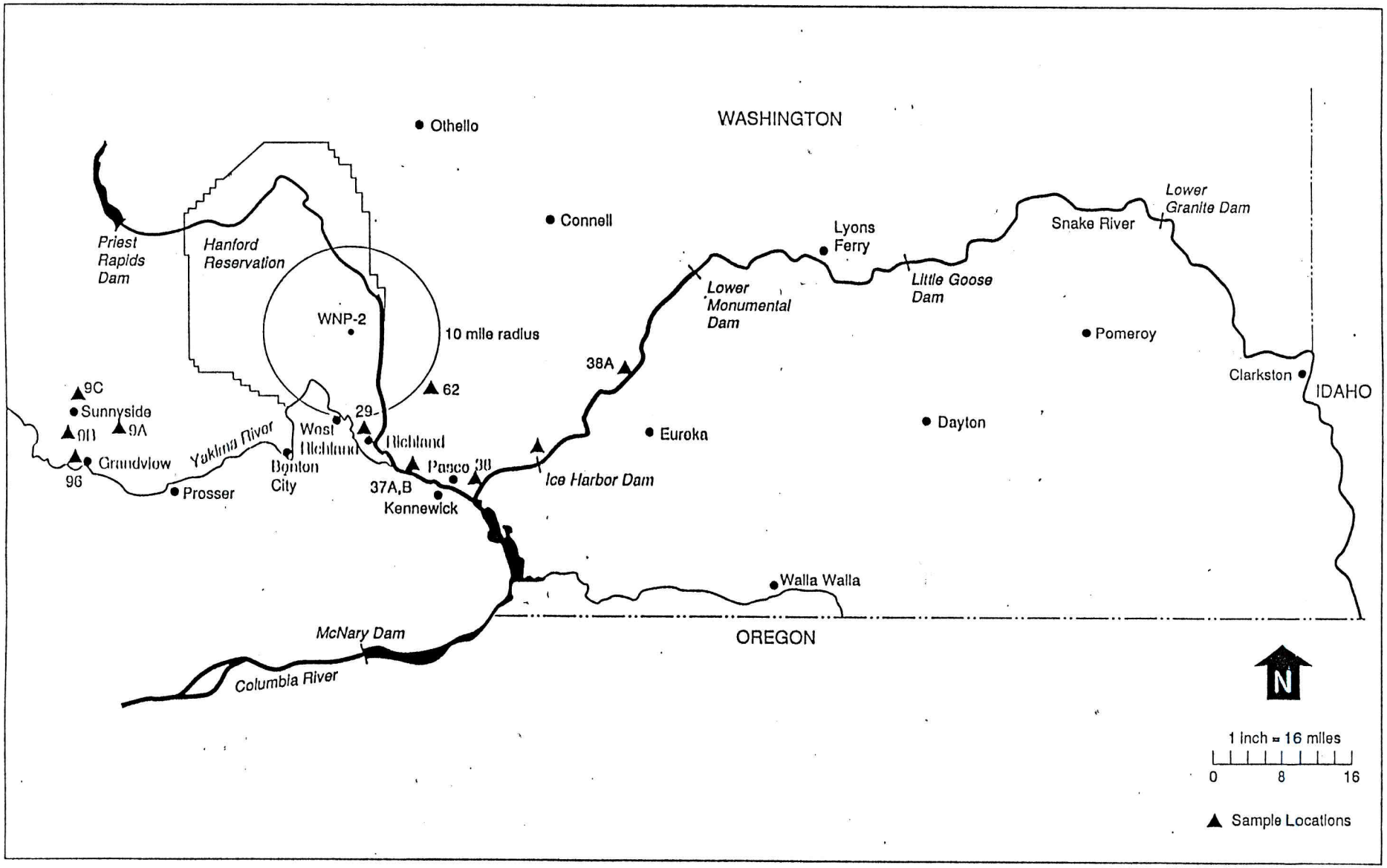


FIGURE 2
REMP SAMPLING LOCATIONS OUTSIDE THE 10-MILE RADIUS

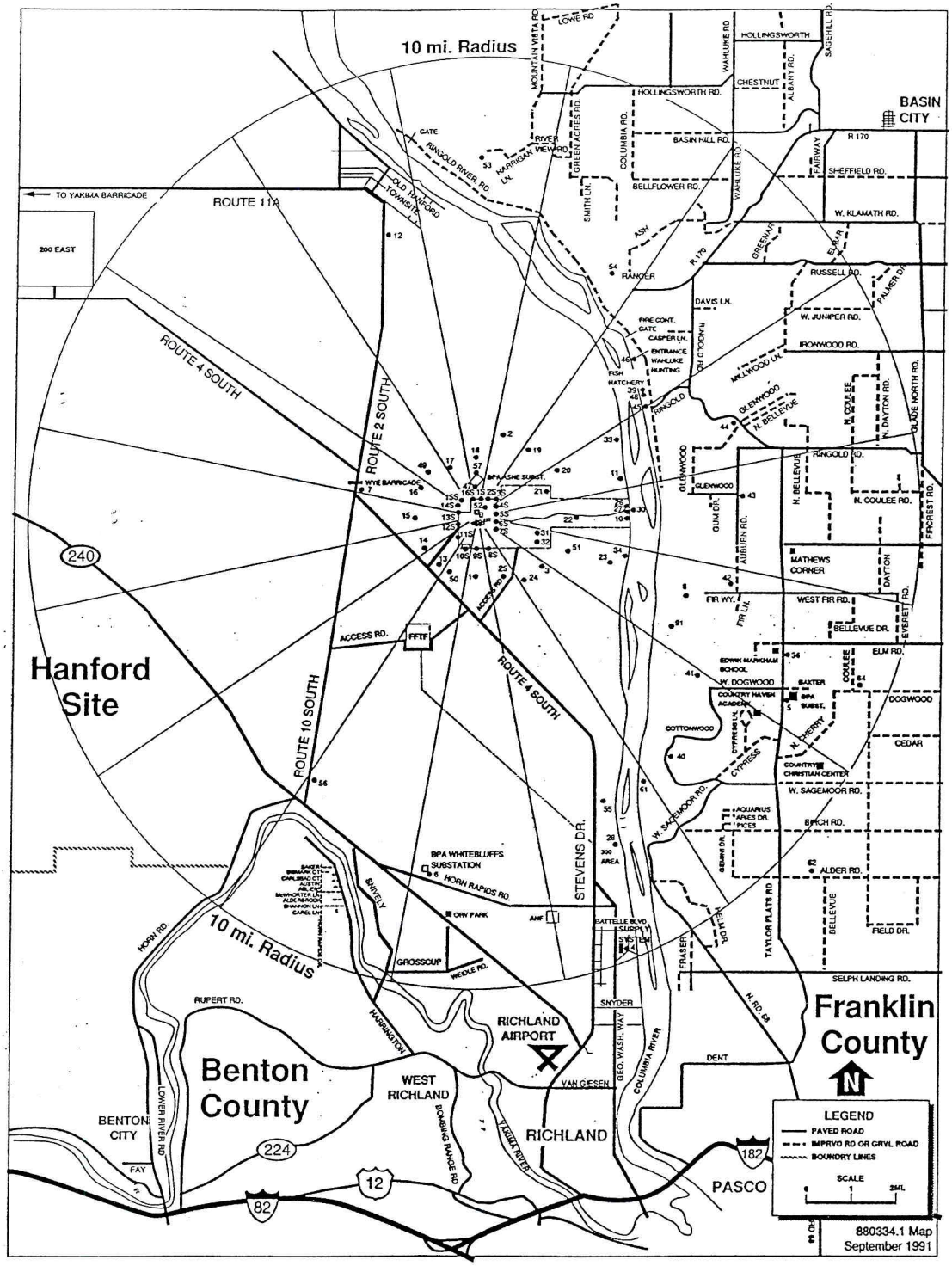


FIGURE 1
REMP SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS

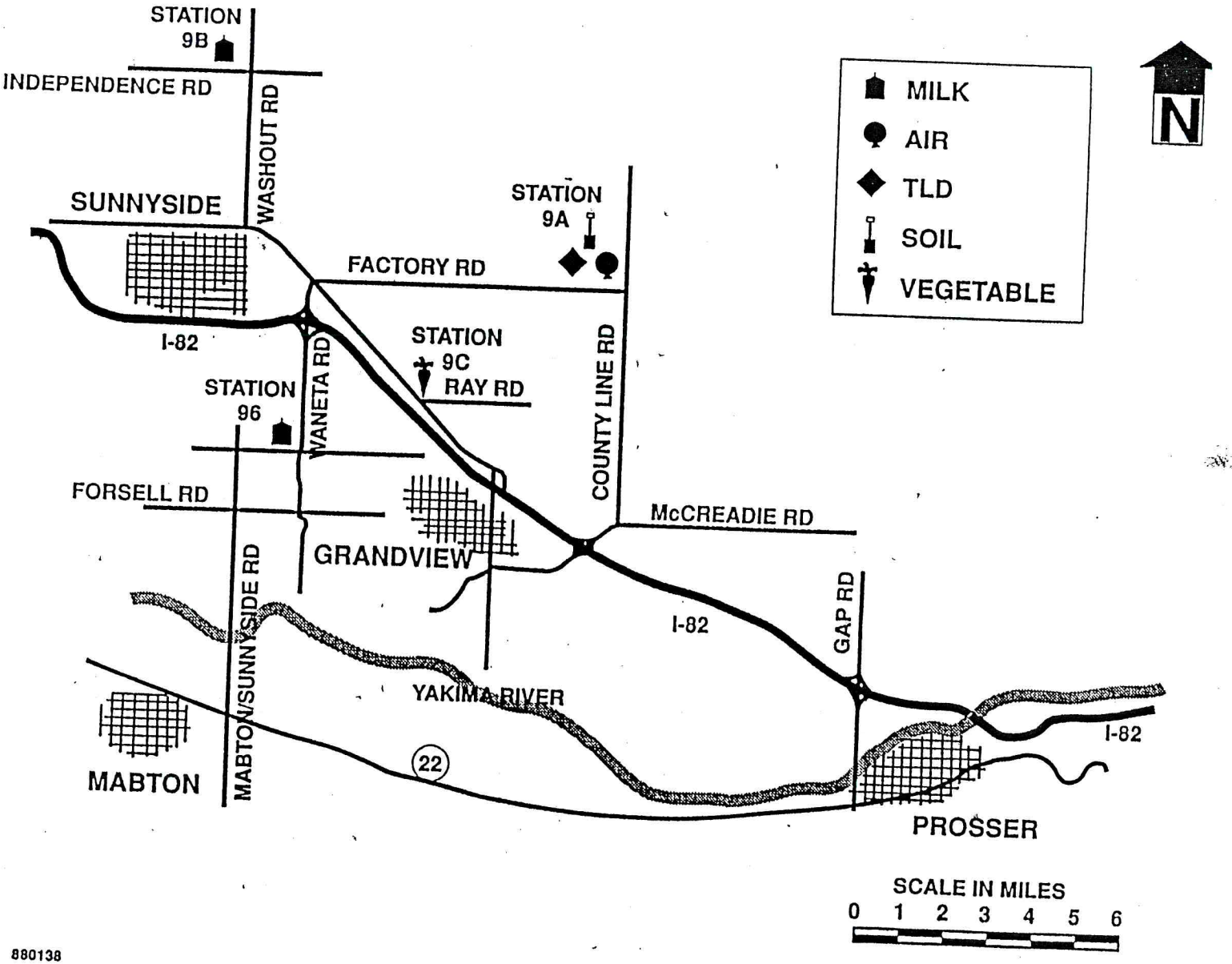


FIGURE 3
REMP SAMPLING LOCATIONS IN THE SUNNYSIDE/GRANDVIEW AREA